



Dear Customer

Please find attached the July 2014 amendment to C/AS3 Acceptable Solution for Buildings Where Care or Detention is Provided (Risk Group SI), published by the Ministry of Business, Innovation and Employment. The Ministry of Business, Innovation and Employment combines the former Department of Building and Housing, Department of Labour, Ministry of Economic Development and Ministry of Science and Innovation.

To update your printed copy of C/AS3, please make the following changes:

<b>Section</b>	<b>Previous version</b>	<b>July 2014 amendment</b>
<b>C/AS3 Acceptable Solution for Buildings Where Care or Detention is Provided (Risk Group SI)</b>		
Title pages	Remove document history/status	Replace with new document history/status
References	Remove page 7/8	Replace with new page 7/8
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MINISTRY OF BUSINESS,  
INNOVATION & EMPLOYMENT  
HĪKINA WHAKATUTUKI

## **C/AS3**

### **Acceptable Solution for Buildings Where Care or Detention is Provided (Risk Group SI)**

For New Zealand Building Code Clauses  
C1-C6 Protection from Fire



### Using this Acceptable Solution

The Ministry of Business, Innovation and Employment may amend parts of this Acceptable Solution at any time. People using this Acceptable Solution should check on a regular basis whether new versions have been published. The current version can be downloaded from [www.dbh.govt.nz/compliance-documents](http://www.dbh.govt.nz/compliance-documents)

Users should make themselves familiar with the preface to the New Zealand Building Code Handbook, which describes the status of Acceptable Solutions and explains other ways of achieving compliance.

Defined words (italicised in the text) are explained in the Building Code Clause A2 and in the Definitions section of this Acceptable Solution. Classified uses of buildings are explained in the Building Code Clause A1.

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New Zealand Government

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## Status of C/AS3

This Acceptable Solution C/AS3, for buildings where care or detention is provided (Risk Group SI), provides a means of compliance with the New Zealand Building Code Clauses C1-C6 Protection from Fire. It is issued under section 22 of the Building Act 2004 as an Acceptable Solution.

This Acceptable Solution is one way that can be used to show compliance with the New Zealand Building Code Clauses C1-C6 Protection from Fire. Other ways of complying with the Building Code are described, in general terms, in the preface of the New Zealand Building Code Handbook.

### When can you use C/AS3

This Acceptable Solution is effective from 1 July 2014. It can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire. It does not apply to building consent applications submitted before 1 July 2014.

The previous version, Amendment 2, of this Acceptable Solution can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire until 28 February 2015. It can be used for building consent applications submitted before 1 March 2015.

Document History			
	Date	Alterations	
New document	Effective from 10 April 2012	C/AS3 is a new publication that can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire.	
Amendment 1 (Errata 1)	Effective from 15 February 2013 until 18 June 2014	pp. 7–8 References pp. 13, 14, 17 Definitions p. 23 1.3 p. 24 2.2.3 p. 35 Figure 3.7 p. 39 Figure 3.12	p. 47 3.15.5 p. 78 Table 4.2 pp. 81–91 5.2.1, 5.3.2, 5.5.4, 5.8.1, Table 5.2, Figure 5.3 p. 103 C4.1.2 and C5.1.1
Amendment 2	Effective from 19 December 2013 until 28 February 2015	p. 7 References pp. 10 and 15 Definitions p. 20 Table 1.1 p. 23 1.3 p. 24, 26–27 2.2.1, 2.2.8, 2.3.1 p. 47 3.15.2	p. 56 4.4.4, 4.4.5 pp. 60–61 Figure 4.4, 4.6.5 pp. 77–79 4.16.12, 4.17.1, 4.17.6 p. 95 7.2 p. 102 B2.1.1 pp. 103–104 C6.1.2
Amendment 3	Effective from 1 July 2014	p. 7 References p. 10, 14 and 15 Definitions p. 20 1.1.1, Table 1.1 p. 23 1.3 p. 24 2.2.1 p. 30 3.3.2 p. 39 3.7.13 pp. 43–44 3.10.2, 3.10.5, 3.11.1, 3.11.5	p. 47 3.15.2 p. 53 4.2.1 p. 62 4.10.3 pp. 77–79 4.16.12, 4.17.2, 4.17.5, 4.18.2 p. 82 5.3.1 p. 87 5.6.8 p. 103 C1.1, C2.1, C4.1.2, C5.1.1 p. 107 Index



# References

For the purposes of New Zealand Building Code compliance, the New Zealand and other Standards, and other documents referred to in this Acceptable Solution (primary reference documents) shall be the editions, along with their specific amendments, listed below. Where the primary reference documents refer to other Standards or other documents (secondary reference documents), which in turn may also refer to other Standards or other documents, and so on (lower order reference documents), then the applicable version of these secondary and lower order reference documents shall be the version in effect at the date this Acceptable Solution was published.

<b>Standards New Zealand</b>		<b>Where quoted</b>
NZS/BS 476:- Part 21: 1987	Fire tests on building materials and structures	C5.1.1
	Methods for determination of the fire resistance of loadbearing elements of construction	
Part 22: 1987	Methods for determination of the fire resistance of non-loadbearing elements of construction	C5.1.1
AS/NZS 1668:- Part 1: 1998	The use of ventilation and air conditioning in buildings	4.16.12, Table 2.1, A2.1.1
	Fire and smoke control in multi-compartment buildings <i>Amend: 1</i>	
AS/NZS 2918: 2001	Domestic solid fuel burning appliances – installation	7.1.1, 7.1.2, 7.3.3, 7.5.5, 7.5.10 Comment, 7.5.12, Figure 7.2
NZS 4232:- Part 2: 1988	Performance criteria for fire resisting closures	Definitions
	Fire resisting glazing systems	
NZS 4332: 1997	Non-domestic passenger and goods lifts	6.4.3
NZS 4510: 2008	Fire hydrant systems for buildings	Table 2.1, A2.1.1
	<i>Amend: 1</i>	
NZS 4512: 2010	Fire detection and alarm systems in buildings	2.2.1, Table 2.1, 6.2.1, A2.1.1, C6.1.6
NZS 4515: 2009	Fire sprinkler systems for life safety in sleeping occupancies (up to 2000 m <sup>2</sup> )	Definitions, 2.2.1, 6.2.1, B3.1.1
NZS 4520: 2010	Fire resistant doorsets	4.2.4, 4.16.6, C6.1.1
NZS 4541: 2013	Automatic fire sprinkler systems	Definitions, 2.2.1, Table 2.1, 5.2.2, 6.2.1, B2.1.1
AS/NZS 5601:- Part 1: 2010	Gas installation	7.2.1, 7.2.2
	General installations <i>Amend: 1</i>	
<b>Standards Australia</b>		
AS 1366:- Part 1: 1992	Rigid cellular plastics sheets for thermal insulation	4.17.2
	Rigid cellular polyurethane (RC/PUR) <i>Amend: 1</i>	
Part 2: 1992	Rigid cellular polyisocyanurate (RC/PIR)	4.17.2
Part 3: 1992	Rigid cellular polystyrene – moulded (RC/PS-M)	4.17.2
	<i>Amend: 1</i>	
Part 4: 1989	Rigid cellular polystyrene – extruded (RC/PS-E)	4.17.2

Errata 1  
Feb 2013

Amend 3  
Jul 2014

Amend 2  
Dec 2013

		Where quoted
	AS 1530:- Part 1: 1994 Part 2: 1993 Part 4: 2005	Methods for fire tests on building materials, components and structures Combustibility test for materials Test for flammability of materials Fire-resistance tests of elements of building construction
	AS 1691: 1985	Domestic oil-fired appliances – installation
	AS 4072:- Part 1: 2005	Components for the protection of openings in fire-resistant separating elements Service penetrations and control joints <i>Amend: 1</i>
Errata 1 Feb 2013		Definitions, C3.1, C4.1.1 4.17.8 4.5.9, C5.1.1  7.3.1, 7.3.2  C5.1.2
	<b>International Standards Organisation</b>	
	ISO 5660:- Part 1: 2002 Part 2: 2002	Reaction-to-fire tests – Heat release, smoke production and mass loss rate Heat release rate (cone calorimeter method) Smoke production rate (dynamic measurement)
Errata 1 Feb 2013		C4.1.2, C7.1.1, C7.1.2 C4.1.2
	ISO 9239:- Part 1: 2010	Reaction to fire tests for flooring Determination of the burning behaviour using a radiant heat source.
Errata 1 Feb 2013		4.17.3, Table 4.2, C2.1
	ISO 9705: 1993	Fire tests – Full scale room test for surface products
		C4.1.2
	<b>European Standards Organisation</b>	
Errata 1 Feb 2013		
	BS EN 12101:- Part 1: 2005	Smoke and heat control systems Specification for smoke barriers
		Definitions
	<b>Building Research Establishment (UK)</b>	
	BRE Defect Action Sheet DAS 131: May 1989	External walls: Combustible external plastics insulation: Horizontal fire barriers
		5.7.18 Comment
	BRE Report 135: 1988	Fire performance of external thermal insulation for walls in multi-storey buildings. Rogowski B.F., Ramaprasad R., Southern J.R.
		5.7.18 Comment
	<b>National Fire Protection Association of America</b>	
	NFPA 285: 1998	Standard method of test for the evaluation of flammability characteristics of exterior non-load-bearing wall assemblies containing components using the intermediate scale, multi-storey test apparatus
		5.8.2
	<b>American Society for Testing and Materials</b>	
	ASTM D 2898: 2010	Standard practice for accelerated weathering of fire-retardant-treated wood for fire testing
		C7.1.3
	<b>New Zealand Legislation</b>	
	Fire Safety and Evacuation of Buildings Regulations 2006	Definitions
	Hazardous Substances and New Organisms Act 1996	1.1.5



# Definitions

The full list of definitions for italicised words may be found in the New Zealand Building Code Handbook.

**Access route** A continuous route that permits people and goods to move between the apron or *construction* edge of the *building* to spaces within a *building*, and between spaces within a *building*.

**Accessible** Having features to permit use by *people with disabilities*.

**Accessible route** An *access route* usable by *people with disabilities*. It shall be a continuous route that can be negotiated unaided by a wheelchair user. The route shall extend from street *boundary* or car parking area to those spaces within the *building* required to be *accessible* to enable *people with disabilities* to carry out normal activities and processes within the *building*.

**Adjacent building** A nearby *building*, including an adjoining *building*, whether or not erected on *other property*.

**Basement** Any *firecell* or part of a *firecell* below the level of the lowest *final exit*.

**Comment:**

Because *fire safety systems* are increased with increases in *escape height*, the precautions for *basements* increase with *basement* depth. Thus a single floor *building* with one *basement* level is treated as a two floor *building*, a single floor *building* with three *basement* levels as a four floor *building*.

**Boundary** means any *boundary* 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.

**Building** has the meaning given to it by sections 8 and 9 of the Building Act 2004.

**Comment:**

Notwithstanding the definition of *building*, a number of separated *buildings* cannot be taken as a single *firecell* for the purposes of this Acceptable Solution.

**Building Act 2004 (the Building Act)** means the principal legislation dealing with building controls in New Zealand.

**Comment:**

The *Building Act* applies to the construction, alteration, and demolition of new and existing buildings throughout New Zealand.

**Building Code** means the regulations made under section 400 of the *Building Act 2004*.

**Building consent** means consent to carry out *building* work granted by a *building consent authority* under section 49 of the *Building Act 2004*.

**Building consent authority** has the meaning ascribed to it by section 7 of the *Building Act 2004*.

**Building element** Any structural and non-structural component or assembly incorporated into or associated with a *building*. Included are *fixtures*, services, *drains*, permanent mechanical installations for access, glazing, partitions, ceilings and temporary supports.

**Building height** Building height means the vertical distance between the floor level of the lowest *occupied space* 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.

**Cavity barrier** A *construction* provided to close openings within a *concealed space* against the passage of *fire*, or to restrict the spread of *fire* within such spaces.

**Chimney** A *non-combustible* structure which encloses one or more *flues*, *fireplaces* or other heating appliances.

**Chimney back** The *non-combustible* wall forming the back of a *fireplace*.

**Chimney breast** The front *fireplace* wall construction above the *fireplace* opening.

**Chimney jambs** The side walls of a *fireplace*.

**Combustible** See *non-combustible*.

**Concealed space** Any part of the space within a *building* that cannot be seen from an *occupied space*.

**Comment:**

This term includes any ceiling space, roof space, space under a raised floor (such as computer rooms, floors, or stages), plenums, spaces under a tiered floor, "left-over spaces" created when some structural element or the like has been covered in; small service or duct spaces within the volume of a *firecell* and the like, but not a *protected shaft*.

**Construct** in relation to a *building*, includes to design, build, erect, prefabricate, and relocate the *building*; and construction has a corresponding meaning.

**Damper blade** A component of a *fire damper* that closes off the airway within a *fire damper* upon detection of *fire* or smoke.

**Dead end** That part of an open path where escape is possible in only one direction.

**Comment:**

A *dead end* ceases to exist where the *escape route* reaches a point in the *open path* which offers alternative directions of travel, or at a *final exit* or an *exitway*.

**Doorset** 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.

**Early childhood centre (ECC)** means premises used regularly for the education or care of 3 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—

a) by the day or part of a day; but

b) not for any continuous period of more than seven days.

ECC does not include home based early childhood services.

**Escape height** The height between the floor level in the *firecell* being considered and the floor level of the required *final exit* which is the greatest vertical distance above or below that *firecell*.

**Comment:**

1. It is necessary only to use the greatest height to the exits required for the *firecell* being considered, even though the *building* may have other *final exits* at lower or higher levels.
2. Where the *firecell* contains *intermediate floors*, or upper floors within *household units* the *escape height* shall be measured from the floor having the greatest vertical separation from the *final exit*.

**Escape route** A continuous unobstructed route from any *occupied space* in a *building* to a *final exit* to enable occupants to reach a *safe place*, and shall comprise one or more of the following: *open paths* and *safe paths*.

**Comment:**

Doors are not obstructions in an escape route provided they comply with C/AS1–C/AS7 and D1/AS1.

**Exitway** All parts of an *escape route* protected by *fire* or *smoke separations*, or by distance when exposed to open air, and terminating at a *final exit*.

**External wall** Any exterior face of a *building* within 30° of vertical, consisting of *primary* and/or *secondary elements* intended to provide protection against the outdoor environment, but which may also contain *unprotected areas*.

**Comment:**

A roof is an *external wall* if within 30° of the vertical.

**Final exit** The point at which an *escape route* terminates by giving direct access to a *safe place*.

Amend 2  
Dec 2013

Amend 3  
Jul 2014

**Foamed plastics** *Combustible* foamed plastic polymeric materials of low density (typically less than 100 kg/m<sup>3</sup>) and are 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 *foamed plastics* are latex foams, polyethylene foams, polyvinyl chloride foams, expanded or extruded polystyrene foams, phenolic foams, ureaformaldehyde foams, polyurethane foams and polychloropene foams.

**Comment:**

1. *Foamed plastics* may be rigid or flexible, but rigid foams are the most common in *building* products. When burnt they tend to generate high levels of heat energy (kJ/kg) and varying quantities of smoke and other toxic gases depending on the nature and volume of the particular product.
2. Where doubt exists as to whether a *building* material is *foamed plastics*, an opinion should be sought from a *person* or organisation with appropriate skill and experience in *fire* engineering. That opinion should be included with the *building consent* application to the *building consent authority*.

**Group Number** The classification number for a material used as a finish, surface, lining, or attachment to a wall or ceiling within an *occupied space* and determined according to the *standard test* methods for measuring the properties of lining materials.

**Comment:**

The method for determining a Group Number is described in C/VM2 Appendix A.

**Group sleeping area** A *firecell* containing communal sleeping accommodation for a specified number of people who may or may not be known to one another. Partial subdivision within the *firecell* is permitted with specific limitation including that no *occupied space* is fully enclosed and all *occupied spaces* are open and available to all occupants at any time. A *group sleeping area firecell* may include spaces for associated direct support functions, such as hygiene facilities and tea making (not cooking) activities, for use by the occupants. It does not include spaces, such as waiting rooms, lounges, dining rooms or kitchens, providing a communal service function for all occupants.

**Comment:**

1. Examples of *group sleeping area firecells* are dormitories, hospital wards, *wharehenui*, backpacker hostels and ski lodges.
2. The maximum number of people permitted in a *group sleeping area firecell*, and the permitted form of subdivision, will depend on the ability of the occupants to react to the presence of *fire* and escape to a *safe place*.

**Handrail** A rail to provide support to, or assist with the movement of a *person*.

**Hazardous** Creating an unreasonable risk to people of bodily injury or deterioration of health.

**Hazardous substance** has the meaning ascribed to it by section 2 of the Fire Service Act 1975 and section 2 of the Hazardous Substances and New Organisms Act 1996.

**Hearth** The insulating floor under the *fire* and in front and at the sides of the *fireplace*.

**Hold-open device** A device which holds a *smoke control door* or *fire door* open during normal use, but is released by deactivating the device by an automatic *fire* detection system, allowing the door to close automatically under the action of a self-closing device.

**Household unit**

(a) means a *building* or group of *buildings*, or part of a *building* or group of *buildings*, that is—

- (i) used, or intended to be used, only or mainly for residential purposes; and
- (ii) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but

(b) does not include a hostel, boarding house, or other specialised accommodation.

**HVAC** An abbreviation for heating, ventilating and airconditioning.

**Insulating material** A material that has a thermal conductivity of less than 0.07 W/mK.

**Insulation** In the context of *fire* protection, the time in minutes for which a prototype specimen of a *fire separation*, when subjected to the *standard test* for *fire* resistance, has limited the transmission of heat through the specimen.

**Integrity** In the context of *fire* protection, the time in minutes for which a prototype specimen of a *fire separation*, when subjected to the *standard test* for *fire* resistance, has prevented the passage of flame or hot gases.

**Comment:**

The precise meaning of *integrity* depends on the type of *building elements* being treated and how it is defined in the *standard test* being used.

**Intended use** In relation to a *building*,—

- (a) includes any or all of the following:
- (i) any reasonably foreseeable occasional use that is not incompatible with the *intended use*;
  - (ii) normal maintenance;
  - (iii) activities undertaken in response to *fire* or any other reasonably foreseeable emergency; but
- (b) does not include any other maintenance and repairs or rebuilding.

**Intermediate floor** Any upper floor within a *firecell* which because of its configuration provides an opening allowing smoke or *fire* to spread from a lower to an upper level within the *firecell*.

**Comment:**

1. Upper floors within *household units* need not meet the specific *fire* safety requirements which apply to *intermediate floors* in all other situations.
2. An *intermediate floor* may be open to the *firecell* or enclosed with non-*fire* rated *construction*. If enclosed with *fire* rated walls another *firecell* is created.
3. *Household units* occur only in *risk groups* SM and SH. Life safety provisions are governed by the limitations in permitted *open path* lengths.
4. *Risk groups* SM, SI, CA, WB, WS and VP allow limited area intermediate floors of 20% or 40% of the floor area depending on other *fire* safety requirements. In other situations C/VM2 is to be used.

**Life rating** The *fire resistance rating* to be applied to elements of *construction* that allows movement of people from their location in a *building* to a *safe place*.

**Means of escape from fire** In relation to a *building* that has a floor area,—

- a) means continuous unobstructed routes of travel from any part of the floor area of that *building* to a place of safety; and

- b) includes all active and passive protection features required to warn people of *fire* and to assist in protecting people from the effects of *fire* in the course of their escape from the *fire*.

**Comment:**

Means of escape include features providing visibility in *escape routes* complying with F6 and signs complying with F8.

**Non-combustible** Materials shall be classified as *combustible* or *non-combustible* when tested to AS 1530 Part 1.

**Notional boundary** The *boundary* which for *fire* safety purposes, is assumed to exist between two *buildings* on the same property under a single land title.

**Comment:**

The *notional boundary* is assumed to exist in the space between the *buildings* and is positioned so that each of the *buildings* would comply with the provisions of the space separation having regards to the amount of its unprotected area. In practise if one of the *buildings* is existing, the position of the *boundary* will be set by the space separation factors for that *building*.

1. The siting of the new *building* which is adjacent to the existing *building* can be checked to see that it also complies, using a revised *notional boundary* location that is no closer than 1.0 metre from the existing *building*.
2. Where both *buildings* are new it is allowable to move the *notional boundary* between *buildings*. However in assessing *fire* spread from one *building* to the other and vice versa, the *notional boundary* should not be located any closer than 1.0 metre from the *building* that is receiving the radiation.

Amend 3  
Jul 2014

**Occupant load** The greatest number of people likely to occupy a particular space within a *building*. It is determined by:

- a) dividing the total floor area by the m<sup>2</sup> per person (occupant density) for the activity being undertaken, or
- b) for sleeping areas, counting the number of sleeping (or care) spaces, or
- c) for fixed seating areas, counting the number of seats.

**Comment:**

See Paragraphs 1.4.5 (for fixed seating) and 1.4.6 (for sleeping areas) where appropriate.

**Occupied space** Any space within a *building* in which a *person* will be present from time to time during the *intended use* of the *building*.

**Open path** That part of an *escape route* (including *dead ends*) within a *firecell* where occupants may be exposed to *fire* or smoke while making their escape.

**Open space** Open space means land on which there are, and will be, no *buildings* and which has no roof over any part of it other than overhanging eaves.

**Other property** Any land or *buildings* or part of any land or *buildings*, that are:

- a) not held under the same *allotment*; or
- b) not held under the same *ownership*; and includes a *road*.

**Owner** In relation to land and any *buildings* on the land,—

- (a) means the *person* who—
  - (i) is entitled to the rack rent from the land; or
  - (ii) would be so entitled if the land were let to a tenant at a rack rent; and
- (b) includes—
  - (i) the *owner* of the fee simple of the land; and
  - (ii) for the purposes of Building Act 2004 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.

**Penetration** A *building element* passing through an opening in a *fire separation*.

**Comment:**

A *penetration* may include, but is not limited to: pipes, cables, ducts, hoses, drains, cable trays, ropes, data outlets, power outlets, hatches, glazing, structural bracing etc.

Amend 3  
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Amend 2  
Dec 2013

**People with disabilities** People whose ability to use *buildings* is affected by mental, physical, hearing or sight impairment.

**Place of safety** Place of safety means either—

- (a) a *safe place*; or
- (b) a place that is inside a *building* and meets the following requirements:
  - (i) the place is constructed with *fire separations* that have fire resistance sufficient to withstand *burnout* at the point of the *fire source*; and
  - (ii) the place is in a *building* that is protected by an automatic fire sprinkler system that complies with NZS 4541 or NZS 4515 as appropriate to the *building's* use; and
  - (iii) the place is designed to accommodate the intended number of persons; and
  - (iv) the place is provided with sufficient means of escape to enable the intended number of persons to escape to a *safe place* that is outside a *building*.

**Primary element** A *building element* providing the basic loadbearing capacity to the structure, and which if affected by *fire* may initiate instability or premature structural collapse.

**Comment:**

Suspended floors in multi-storey *buildings* are *primary elements*.

**Property rating** The *fire resistance rating* to be applied to elements of *construction* that allows for protection of *other property*.

**Protected shaft** A space, other than a *safe path*, enclosed by *fire separations* or *external walls* used to house *building services*, lifts, or conveyors which pass from one *firecell* to another.

**Railway line** has the meaning ascribed to it by section 4 of the Railways Act 2005.

**Relevant boundary** Relevant *boundary* means the *boundary* of an *allotment* that is *other property* in relation to the *building* in question and from which is measured the separation between the *building* and that *other property*; and for the *external wall* of any *building*, the *relevant boundary* is the nearest of—

- (a) a *boundary* of a freehold *allotment*, except that if the *other property* is a *road*, *railway line*, or public *open space*, the *relevant boundary* is the *boundary* on the far side of that *other property*; or
- (b) a *boundary* of a cross-lease or a company lease or a licence, except that if the *other property* is *open space* to which the lessee or licensee of the *building* in question has an exclusive right of access and occupation or to which 2 or more occupiers of the *building* in question have rights of access and occupation, the *relevant boundary* is the *boundary* on the far side of that *other property*; or
- (c) a *boundary* shown on a unit plan (but excluding a *boundary* between a principal unit and its accessory unit), except that if the *other property* is open space and is common property, the *relevant boundary* is the *boundary* on the far side of that *other property*.

**Comment:**

1. Where an easement, such as a right of way, occurs within an *allotment*, the *relevant boundary* shall remain the same as if the easement did not exist.
2. *Boundaries* within a cross-lease or company lease or licence are shown on a survey plan. In some cases the *boundary* is the *external wall* or roof of a *building*.
3. The unit title *boundaries* of principal units, accessory units, and common property are shown in the unit plan. A *boundary* is frequently an internal or *external wall*, an upper floor, or the roof of a *building*.
4. A wall along a *boundary* between two *allotments* is called a “party wall” when the *owners* of the *allotments* each have legal rights in respect of that wall registered by way of easements on one or both titles. An internal wall between cross-leases, company leases, or unit titles, or between one of them and common property, is not generally called a party wall but in that case also the lessees, unit title holders, or corporate body concerned each have legal rights in respect of that wall. Such a wall separates areas which are *other property* in relation to each other, but the wall itself is part of each property. The *fire* protection consequence of that legal concept is that such a wall can be regarded as a *fire separation* providing protection against horizontal *fire* spread in each direction. In other words, that wall may provide the appropriate *FRR* instead of each property having its own wall of that *FRR*.

**Risk group** The classification of a *building* or *firecells* within a *building* according to the use to which it is intended to be put.

**Road** This term 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.

**Safe path** That part of an *exitway* which is protected from the effects of *fire* by *fire separations*, *external walls*, or by distance when exposed to open air.

# Part 1: General

## CONTENTS

- 1.1 Introduction and scope
- 1.2 Using this Acceptable Solution
- 1.3 Alterations and changes of use to buildings
- 1.4 Calculating occupancy loads

## 1.1 Introduction and scope

This Acceptable Solution can be used for establishing compliance with NZBC C1 to C6 Protection from Fire. It is one of a suite of Acceptable Solutions C/AS1 to C/AS7, each of them corresponding to a *risk group* (summarised in Table 1.1 and defined in Paragraph 1.1.1).

If the uses of a *building*, or part of a *building*, cover more than one *risk group*, one or more of these Acceptable Solutions may need to be followed to demonstrate compliance. Paragraph 1.2 explains how to determine the relevant *risk groups* for the *building* activities.

Notes shown under '**Comment**', occurring throughout this document, are for guidance purposes only and do not form part of this Acceptable Solution. Words in *italic* are defined at the front of this document. For ease of use, paragraphs, tables and figures containing similar information are allocated the same reference numbers in each of the Acceptable Solutions. If there is no corresponding information in a particular Acceptable Solution, the numbering is preserved by the notation:

- 1) "THIS PARAGRAPH DELIBERATELY LEFT BLANK"
- 2) "**This table not required for this Acceptable Solution**"
- 3) Figures are omitted without notification.

Appendices to this Acceptable Solution are part of and have equal status to this Acceptable Solution.

### Comment:

It is recommended that the commentary document for Acceptable Solutions C/AS1 to C/AS7 be read in conjunction with this Acceptable Solution.

<b>Table 1.1 Risk groups and Acceptable Solutions</b>				
	<b>Acceptable Solution</b>	<b>Risk group</b>	<b>Applies to</b>	
C/AS1	Buildings with sleeping (residential) and outbuildings	SH	Houses, townhouses and small <i>multi-unit dwellings</i> Outbuildings	Amends 2 and 3
C/AS2	Sleeping (non institutional)	SM	Permanent accommodation eg, apartments Transient accommodation eg, hotels, motels, hostels, backpackers, refuge shelters Education accommodation	Amend 3 Jul 2014
C/AS3	Care or detention	SI	<b>Institutions, hospitals (excluding special care facilities), residential care, rest homes, care in the community houses and homes, medical day treatment (using sedation), detention facilities (excluding prisons)</b>	Amend 3 Jul 2014
C/AS4	Public access and educational facilities	CA	Crowds, halls, recreation centres, public libraries (<2.4 m storage height), cinemas, shops, personal services (eg, dentists and doctors except as included above, beautician and hairdressing salons), schools, restaurants and cafes, <i>early childhood centres</i>	
C/AS5	Business, commercial and low level storage	WB	Offices (including professional services such as law and accountancy practices), laboratories, workshops, manufacturing (excluding <i>foamed plastics</i> ), factories, processing, temperature controlled storage (capable of <3.0 m storage height other than some limited areas in processing areas) and other storage <i>buildings</i> capable of <5.0 m storage height (except some limited areas <8.0 m to the apex), light aircraft hangars	
C/AS6	High level storage and other high risks	WS	Warehouses (capable of ≥5.0 m storage height other than some limited areas, see C/AS5), temperature controlled storage (capable of ≥3.0 m storage height other than some limited areas, see C/AS5), trading and bulk retail (≥3.0 m storage height)	Amend 3 Jul 2014
C/AS7	Vehicle storage and parking	VP	Vehicle parking – within a <i>building</i> or a separate <i>building</i>	

**Comment:**

Designing a *building* to provide *fire* safety involves decisions on both the *construction* materials and layout needed to reduce the risk to an acceptable level. The risk is assessed according to: the number and mobility of the occupants (*occupant load* and *risk group* of the *building*); the activities undertaken within the *building*; and the nature of the *building* materials and contents. This assessment allows each *building* activity to be categorised in a *risk group*, which is the basis for determining *fire* safety features.

**Scope**

**1.1.1.** The scope of this Acceptable Solution is restricted to *risk group* SI. This covers *buildings* or parts of *buildings* where people are unable to self-evacuate without assistance through requiring special care or treatment, or they are restrained or their liberties are restricted. This will include the following provided they are no more than 20 storeys high (from ground level):

- a) Hospitals, including outpatients and day procedures (excluding special care facilities as described in Paragraphs 1.1.2 c) and 1.1.3.
- b) Medical centres and dental practices where sedation is administered or treatment where people are unable to self-evacuate without assistance (eg, dialysis or chemotherapy)
- c) Aged care facilities
- d) Residential care in an institution and hospices, and
- e) Police Stations and Court *buildings* with detention facilities.
- f) Houses used for care in the community.

Amend 3 Jul 2014



### 1.3 Alterations and changes of use to buildings

If this Acceptable Solution is the basis of compliance of *building work* relating to an *alteration*, addition or change of use of an existing *building*, the *building work* shall comply fully with this Acceptable Solution.

Amend 2  
Errata 1

Amend 2  
Dec 2013

**Comment:**

Sections 112 and 115 of the Building Act require the *means of escape from fire* of an existing *building* being altered, or the use being changed, to comply as nearly as is reasonably practicable with the Building Code.

Parts 1, 2, 3, and 4 of this Acceptable Solution may be used for an assessment of the *means of escape from fire* of an existing *building* that is being altered, to meet the requirements of section 112 of the *Building Act*.

Parts 1, 2, 3, and 4 of this Acceptable Solution may be used for an assessment of the *means of escape from fire*, and Part 5 for the assessment of *fire* rating performance, where an existing *building* is undergoing a change of use, to meet the requirements of section 115 of the Building Act.

The extent of assessment of the *means of escape from fire* of an existing *building* should follow the guidelines issued by MBIE “**Requesting information about means of escape from fire for existing buildings**”. This considers a number of risk factors including:

- a) Age of the *building*
- b) *Importance level* of the *building*
- c) Extent of the alteration.

Amend 2  
Dec 2013

An existing *building* with a high *risk score* from the guidelines should be assessed against all of the *building* systems and features specified in Parts 1, 2, 3 and 4 of this Acceptable Solution, or alternatively be assessed using Verification Method C/VM2.

Sections 112 and 115 of the *Building Act* require the existing *building* to comply with other parts of the Building Code to at least the same extent as before the *alteration* or addition.

Amend 3  
Jul 2014

### 1.4 Calculating occupant loads

**1.4.1** The *occupant load* shall be determined from the *risk group* and number of people in each space of the *building*. The *occupant load* may need to be evaluated not only for each *risk group* but also for:

- a) A space or open floor area involving one or more activities, and
- b) A floor containing more than one *risk group*, and
- c) A single *firecell*, and
- d) Each floor within a *firecell*.

**1.4.2** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**1.4.3** Duplication shall be avoided by:

- a) Ensuring that, where people may be involved in more than one activity, they are counted only once, and
- b) Not including an *occupant load* for areas such as *exitways*, lift lobbies or sanitary facilities that are used intermittently by people already counted elsewhere in the *building*.

**1.4.4** THIS PARAGRAPH DELIBERATELY LEFT BLANK

#### Risk group SI

**1.4.5** The *occupant load* of *risk group SI* shall be calculated as the number of beds (see Paragraph 1.1.4) in the *firecell*. The requirements of this Acceptable Solution take into account that other people may be present in the *firecell* or *building*, including people who are:

- a) Receiving care, treatment or being detained
- b) Required to attend those described in a)
- c) Who may be visiting those described in a)
- d) Awaiting treatment or care, and
- e) Providing ancillary services (for example receptionists, office staff, kitchen staff and orderlies).

#### Justification for exceptions

**1.4.6** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**Table 1.2: This table is not required for risk group SI.**

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

CONTENTS	
2.1	Provision of firecells
2.2	Fire safety systems
2.3	Fire resistance ratings

## 2.1 Provision of firecells

### Firecell floor area limits

**2.1.1** The floor area of a *firecell* shall not exceed 500 m<sup>2</sup>.

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**2.1.3** THIS PARAGRAPH DELIBERATELY LEFT BLANK

### 2.2. Fire safety systems

**2.2.1** The *fire safety systems* for firecells required for this *risk group* shall be as follows. *Fire safety system* types shall be as defined in Table 2.1.

- a) Type 7 alarm system throughout the *building* in compliance with NZS 4541 or NZS 4515 and NZS 4512. Water supplies for the sprinkler system shall be a single supply which may be a public reticulated main except if there are more than 100 people receiving hospital care or in detention, the water supply for the sprinkler system shall be a dual supply and shall comply with NZS 4541 or NZS 4515 and with one of the supplies being independent of the public reticulated main, and

- b) Type 9 *smoke* control in any air handling system, and

- c) Type 18 *building fire* hydrant system in all cases where the height from the Fire Service attendance point to any floor is greater than 15.0 m. Otherwise, a Type 18 system is required unless the Fire Service hose run distance from Fire Service vehicular access to any point on any floor is less than 75 m.

**2.2.2** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**2.2.3** If any *firecell* in a *building* requires a manual or automatic *fire* alarm or sprinkler system, that system shall be provided in all other *firecells* throughout the *building* (refer to Figure 2.1). As a Type 5 system (refer to Table 2.1) provides for non-latching smoke detection with heat detection back-up in sleeping spaces, other (non-sleeping) *firecells* shall be protected with standard automatic smoke detection. Where sleeping spaces are provided in the other *firecells* they shall be protected with a Type 5 system where a Type 4 is being extended. Smoke detection shall not be extended into *risk group* VP: heat detection shall be provided instead.

Amend 3  
Jul 2014

Errata 1  
Feb 2013

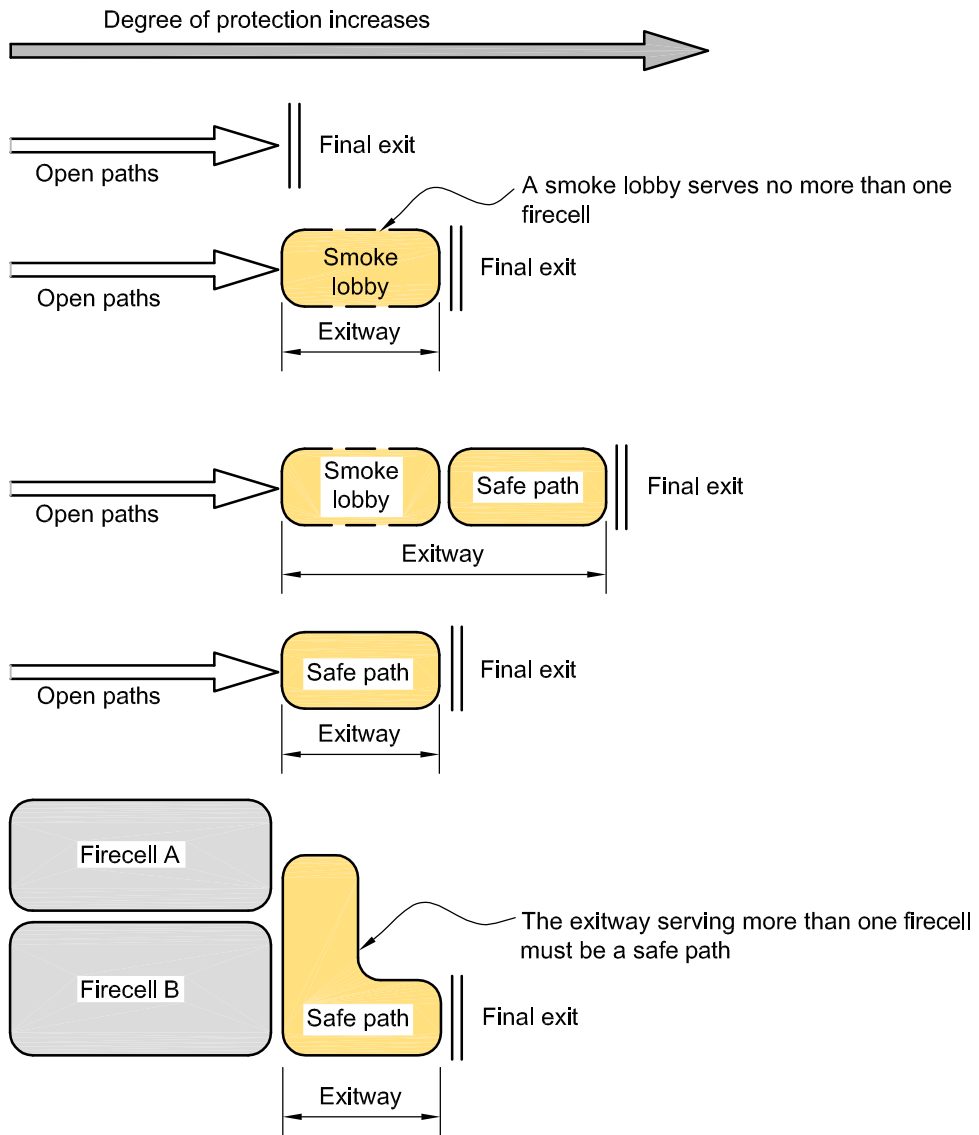
Amends  
2 and 3

**Comment:**

The occupant numbers apply to the whole *building*. Therefore if there are 50 persons in one part of the *building* receiving care and 51 in another also receiving care that equals 101 and the requirement applies.

Amend 3  
Jul 2014

**Figure 3.1** Escape routes  
Paragraphs 3.1.1 and 3.1.2



Note:

The *final exit* is where the *escape route* enters a *safe place*. This might be beyond the exit door from the *building*

## 3.2 Number of escape routes

3.2.1 THIS PARAGRAPH DELIBERATELY LEFT BLANK

3.2.2 The minimum number of *escape routes* from a floor level shall be as specified in Table 3.1.

Number of occupants	Minimum number of <i>escape routes</i>
Up to 50	2
Up to 150	3
Up to 250	4

## 3.3 Height and width of escape routes

### Height

3.3.1 Height requirements within *escape routes* shall be as follows:

- a) The clear height shall be no less than 2100 mm across the full width, except that isolated ceiling fittings not exceeding 200 mm in diameter may project downwards to reduce this clearance by no more than 100 mm, 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.

### Width

3.3.2 Width requirements within *escape routes* shall be as follows:

- a) **Width of all available escape routes:** the total combined width of all available *escape routes* shall allow 8 mm/person for horizontal travel and 10 mm/person for vertical travel.
- b) **Widths of individual routes:** the widths of individual *escape routes* shall be no less than 1200 mm for horizontal travel, and 1500 mm for vertical travel. See Paragraph 3.15.4 for widths of doors required for the passage of beds.
- c) DELIBERATELY LEFT BLANK
- d) DELIBERATELY LEFT BLANK

e) DELIBERATELY LEFT BLANK

- f) **Horizontal escape route with a single direction of escape:** this shall be wide enough at any point to take the full *occupant load* from all contributing *occupied spaces*. However, the *escape route* may have its width increased progressively as it passes the exit from each *occupied space* (see Figure 3.4).
- g) **Horizontal escape route with two directions of escape:** this shall have sufficient width for the full length of the route to allow for the *occupant load* from all contributing *occupied spaces*. However, this shall not apply if the requirements of Paragraph 3.7.13 e) are met for escape through adjacent *firecells*.
- h) **Intermediate floors:** for *firecells* containing an *intermediate floor*, both the vertical and horizontal parts of the *open path escape route* shall be wide enough to take the full *occupant load* from all contributing *occupied spaces*.
- i) **Vertical safe paths widths:** Vertical *safe paths* shall have minimum widths at any point determined only by the largest total *occupant load* passing that point in the direction of escape from:
  - i) any single level (where not part of an *intermediate floor firecell*).
  - ii) all levels in a *firecell* where it spans more than one level (i.e. *intermediate floors*).

#### Comment:

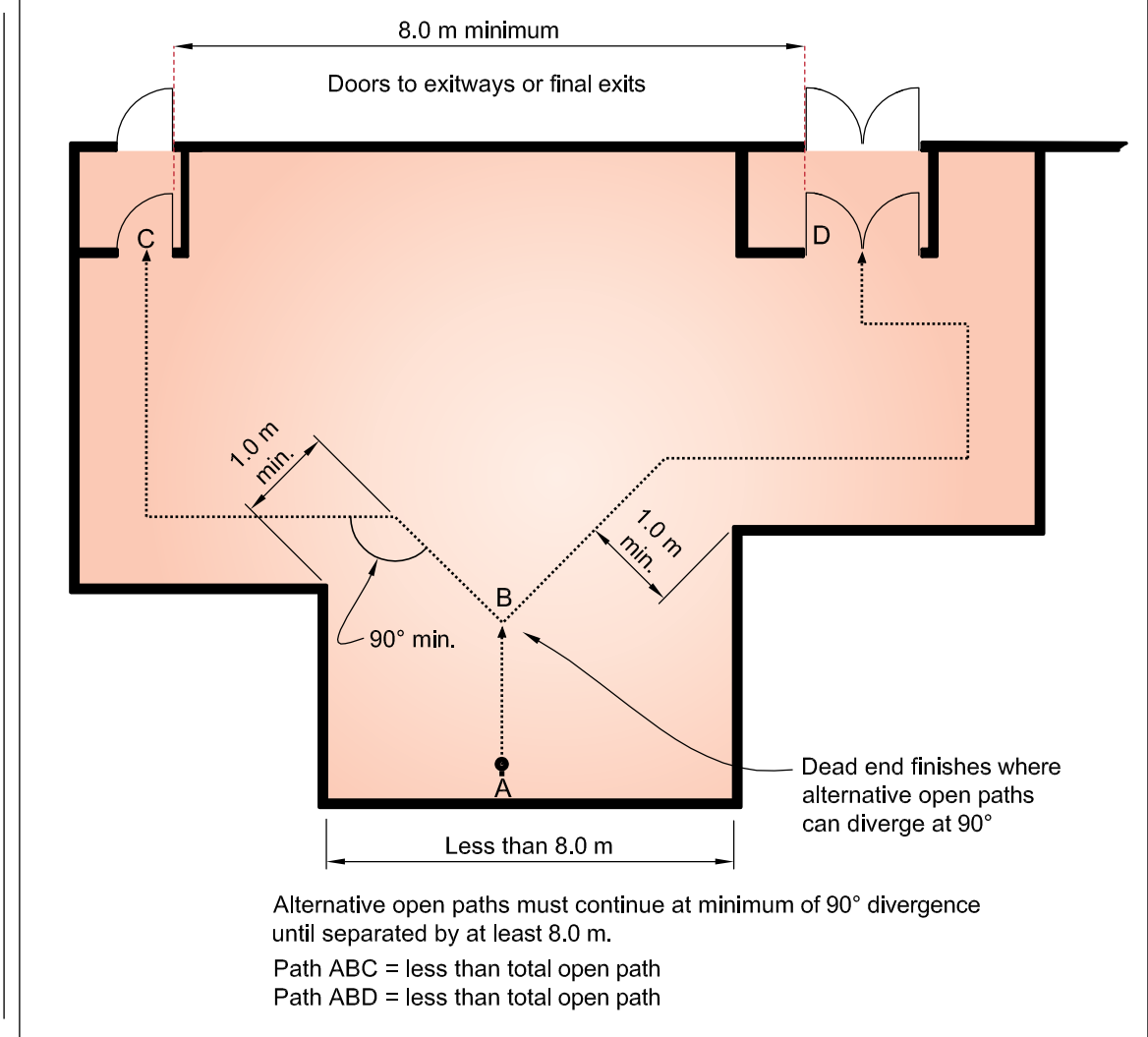
1. A stair may have more than one *firecell* entering it at any level. Here the combined occupancy entering the stair from all *firecells* should be used.
2. In vertical *safe paths* it is not necessary to provide for cumulative *occupant load* as the *escape route* passes each floor level provided those floor levels are separate *firecells*.

Amend 3  
Jul 2014

j) DELIBERATELY LEFT BLANK

- k) **Basements:** if an *escape route* from upper floors is joined at the level of a *final exit* by an *escape route* from a *basement* or lower floors, the *escape route* width at the point they combine shall be increased to accommodate the *occupant loads* from both directions (see Figure 3.5).

**Figure 3.12** Alternative open path separation  
Paragraph 3.6.2



Errata 1  
Feb 2013

### Passing into an adjacent firecell

**3.7.13** If an *open path* passes through a number of *fire separations* it is permitted to continue as the same *open path* provided the cumulative *travel distance* does not exceed the permitted distance specified in Table 3.2.

An *open path* may pass into an adjacent *firecell* on the same level (see Figure 3.15) and recommence as a new *open path* provided that:

- All *firecells* on the *escape route* have no fewer than two directions of escape, separated as required by Paragraph 3.6.2, and
- Adjacent *firecells* into which evacuation may take place have a floor area sufficient to accommodate not only their own occupants, but also the occupants from the

adjacent *firecell*. This shall be calculated on the basis of the *occupant load* of the two *firecells*, and

- Each *firecell* has at least one other *escape route* independent of the route into the adjacent *firecell*. This other route may be by way of a *final exit* or via a third *firecell* provided that the exit from that third *firecell* is independent of exits from the other two *firecells*, and
- The *escape route* does not pass through more than three *fire separations* before entering an *exitway* or *final exit*, and
- The *escape route* width meets the requirements of Paragraph 3.3.2 for the *firecell* on the *escape route* that has the greatest *occupant load*.

Amend 3  
Jul 2014

**Comment:**

*Open path* lengths in each *firecell* are controlled by the requirements of Table 3.2 for that *firecell*.

Refer to Paragraph 3.15.3 to determine whether doors between *firecells* need to be hung to swing both ways because escape may be in either direction, and Paragraph 3.15.9 for *hold-open device* requirements.

This provision may be used to divide wards in hospitals and similar institutions where occupants are bedridden, and provision is made for beds to be wheeled through into a 'holding area'. See Paragraph 4.6.3.

**3.7.14** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**3.8 Dead ends**

**No more than 50 occupants**

**3.8.1** A *dead end* shall not serve an *occupant load* greater than 50.

**3.8.2** THIS PARAGRAPH DELIBERATELY LEFT BLANK

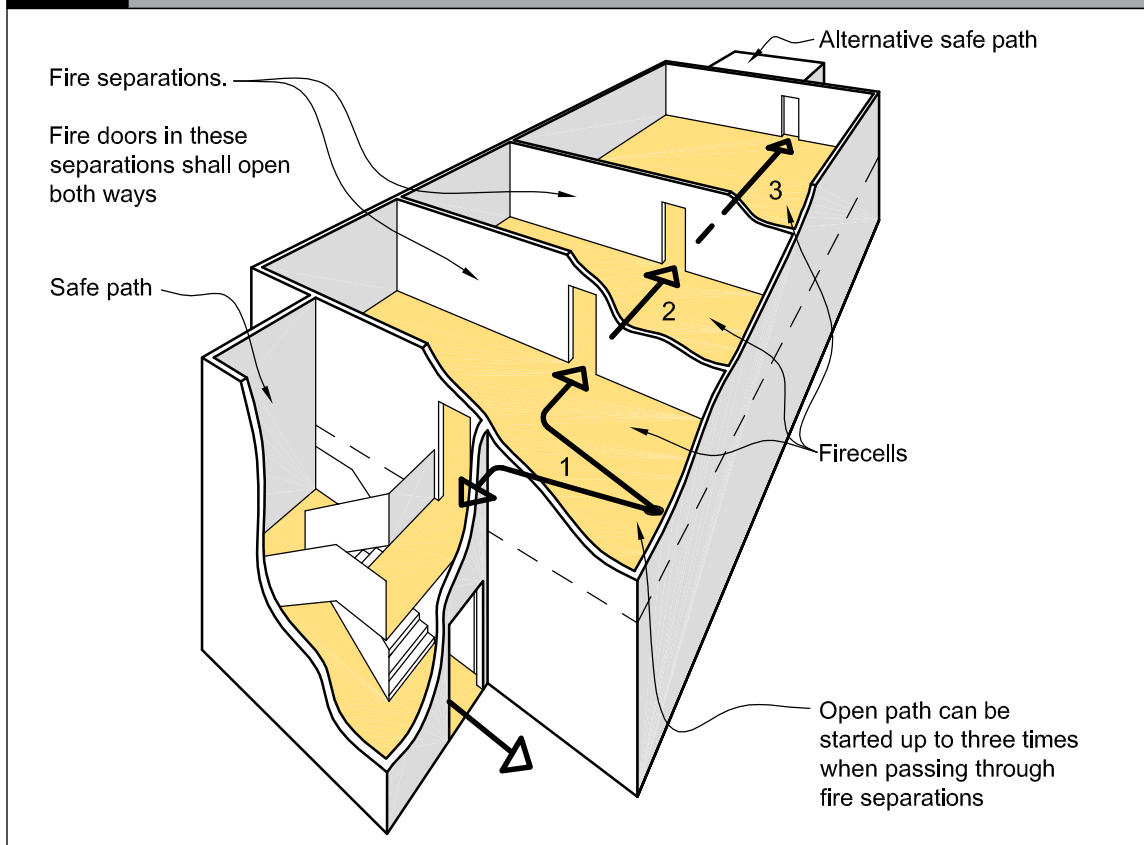
**3.9 Exitways**

**3.9.1** *Exitways* consist of *smoke lobbies* and *safe paths*.

**Comment:**

*Smoke lobbies* are not required in *risk group S1*.

**Figure 3.15** Open path passing into adjacent firecells  
Paragraphs 3.7.13 and 4.16.9



**3.10 Control of exitway activities**  
 .....

**3.10.1** Exitways shall not be used for:

- a) Any storage of goods, solid waste or solid waste containers, or
- b) Entry points to solid waste chutes, or
- c) The location of furniture or other *combustibles*, or
- d) Storage of cloaks or linen, or
- e) A cleaner’s cupboard not *fire separated* from the *exitway*, or
- f) The location of an electrical switchboard or similar, or
- g) Any activity (other than as permitted by Paragraph 3.10.2).

**3.10.2** Some activities are permitted in an *exitway* if:

- a) An alternative *escape route* is available from all *firecells* served by the *safe path* in which the activities occur, and
- b) DELIBERATELY LEFT BLANK
- c) The *escape route* is not impeded by the activity or the occupants involved in that activity, and
- d) Those activities:
  - i) are visible to users of the *exitway*, except in the case of *sanitary fixtures*
  - ii) exist only to provide support functions to the activities of the *risk group* served by the *exitway*
  - iii) occupy a total floor area of not more than 6.0 m<sup>2</sup>.

**Comment:**

Permitted activities include but are not limited to a reception counter (but not an associated office) and toilet facilities

Amend 3  
Jul 2014

**Lifts**

**3.10.3** A passenger lift, but not a goods lift, may be located in a vertical *safe path* containing a *stairway* provided the following conditions are satisfied:

- a) The lift shaft and all its openings are located entirely within a single *firecell* containing the vertical *safe path*, and
- b) Passenger access into and from the lift takes place entirely within the *safe path*, and

c) No other activity occurs within the vertical *safe path*, and

d) The lift machine room is a separate *firecell*, and the openings for lift ropes through the *fire separation* are as small as practicable, and any *penetrations*, such as for electrical cables, are *fire stopped*. (See Paragraph 4.4 for *fire stopping*.)

**3.10.4** Lift doors shall be as specified in Paragraphs 4.16.3 and 4.16.11.

**3.10.5** THIS PARAGRAPH DELIBERATELY LEFT BLANK

Amend 3  
Jul 2014

**3.11 External escape routes**  
 .....

**3.11.1** If an *escape route* enters a space exposed to the open air (e.g. an open stairway, a balcony, across a roof or a ground level path), it shall meet the requirements of a *safe path* between that point and the *final exit*. *Safe path* separation requirements shall be achieved by providing either distance or *fire rated construction* between the *escape route* and adjacent *firecells*, as specified in Paragraphs 3.11.2 to 3.11.6.

Amend 3  
Jul 2014

Amend 3  
Jul 2014

**Comment:**

Balconies with one direction of escape comply with the requirements of a *safe path* if the *external wall* beside the balcony has no *unprotected areas* or if the balcony is large enough to allow separation by distance from the *external wall* (see Paragraph 3.11.2). Balconies with two directions of escape from all *firecell* exits are also considered to be *safe paths*, even if the adjacent *external wall* has 100% *unprotected area*.

**Separation by distance**

**3.11.2** Separation by distance shall be achieved by:

- a) Locating the *escape route* no less than 1.0 m from *external walls*, or
- b) Locating the *escape route* so that it diverges from *external walls* (see Paragraph 3.11.5 a), or
- c) Providing alternative directions of escape from the point where the *escape route* passes through an *external wall* and becomes an external *escape route* (see Paragraph 3.11.5 b).



**3.11.3** If there is only one direction of escape, roofs and *external walls* shall have no *unprotected areas* closer than 1.0 m to an *external escape route* as all *firecells* passed by the *external escape route* are sprinklered.

**Comment:**

This provision is to limit heat radiation exposure to occupants who have only one direction of escape. Therefore, the limiting distances apply horizontally to both sides of the *escape route*.

**3.11.4** If the distance separating *external walls* or roofs from an *external dead end escape route* is less than 1.0 m, those walls and roofs shall comply with the *FRR* requirements of Paragraphs 5.3 and 5.7.3 to 5.7.5. Glazing shall comply with Paragraph 4.2 and the *FRR* shall be in accordance with Paragraph 2.3.

**3.11.5** For an *escape route* which passes through an opening in an *external wall*, parts of the *external wall* need not be *fire rated* if:

- a) The direction of escape to a single *final exit* diverges from the *external wall* at an angle of no less than 45° in plan, or
- b) The directions of escape to alternative *final exits* diverge from each other at an angle of no less than 90° in plan and the *escape routes* subsequently do not both pass the same *firecell* (other than the *firecell* from which they originated).
- c) DELIBERATELY LEFT BLANK
- d) DELIBERATELY LEFT BLANK

**Comment:**

The relaxation of *FRR* requirements does not apply where *fire rated construction* is necessary due to the proximity of a *relevant boundary* (see Paragraph 5.3).

**Separation by fire rated construction**

**3.11.6** Except where the separation distance requirements of Paragraphs 3.11.3 or 3.11.5 are achieved:

- a) *External walls* and roofs adjacent to *external escape routes* shall comply with the *FRR* requirements of Paragraphs 5.3 and 5.7 and have no *unprotected areas*, except that glazing for *safe paths* complying with Paragraph 4.2 shall be permitted, and
- b) If the *escape route* is a balcony with a single direction of escape, and the vertical distance between the underside of the balcony and the closest *unprotected area* in the *external wall* below is less than 5.0 m (see Figure 3.19), balcony barriers shall:
  - i) have no openings, and
  - ii) be protected with a material having a *Group Number* of 1

**Comment:**

See Verification Method C/VM2 Appendix A for the method of assigning the *Group Number*.

- c) If the vertical separation between the underside of an *external escape route* and *unprotected areas* in the *external wall* below is less than 5.0 m:
  - i) the floor of any *external escape route* closer than 2.0 m to an *external wall* shall have an *FRR* of no less than 60/60/60, except that this does not apply if the *escape route* is a balcony with two directions of escape, and
  - ii) treads and risers of stairs on *external escape routes* shall either be *constructed* from a material with a critical radiant flux of no less than 2.2 kW/m<sup>2</sup> or shall be protected on the underside with a material having a *Group Number* of no greater than 2, and

**Comment:**

If the *escape route* is a balcony with two directions of escape, the *external wall* need not be a *fire separation* and the requirements for the barrier b) and the floor of the balcony c) i) do not apply.

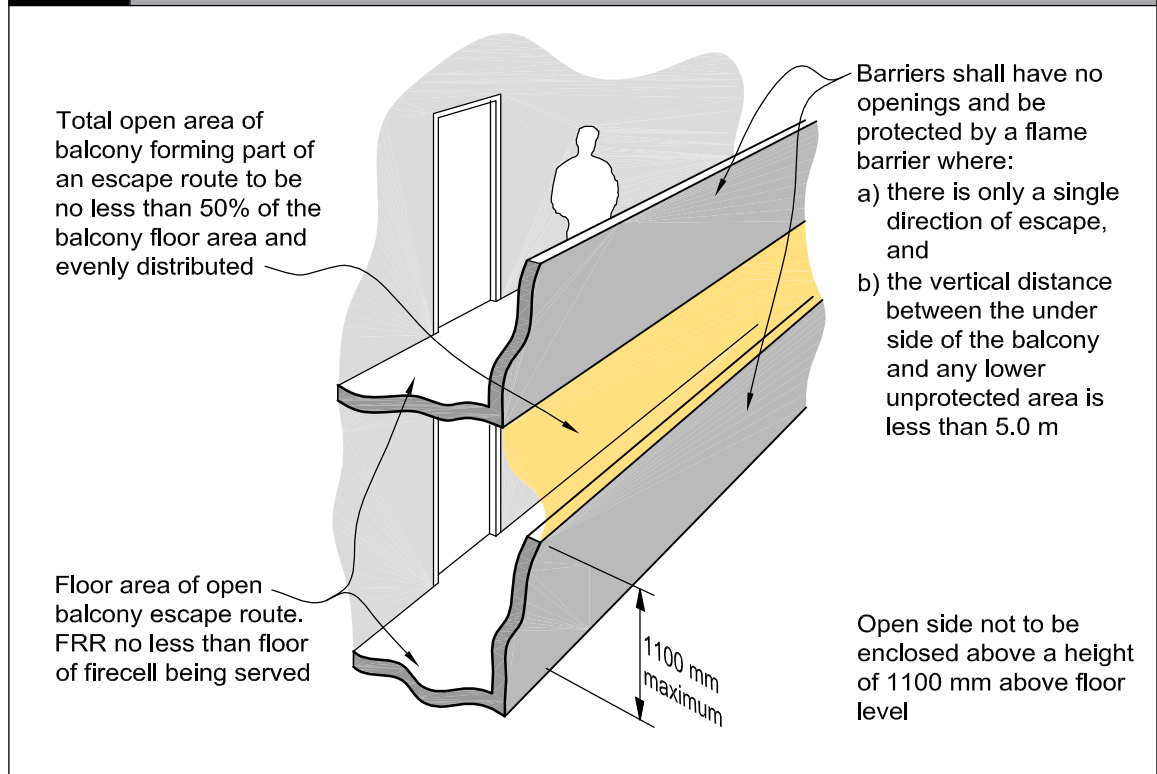
- d) If the *escape route* comprises external horizontal and internal vertical *safe paths*, a *smoke separation* shall be provided between them.

Amend 3  
Jul 2014

Amend 3  
Jul 2014



**Figure 3.19** Open balconies  
Paragraphs 3.11.6 and 3.11.7



## Ventilation openings

**3.11.7** The open area of a balcony or bridge shall be no less than 50% of the balcony floor area, and shall be evenly distributed along the open sides and any approach ramp (see Figure 3.19). Where an *escape route* on a balcony is served by an open *stairway*, similar ventilation shall be provided on the *stairway*. Open sides shall not be enclosed above a height of 1100 mm from the floor, except that a fixed open grille may be used if it provides the required free air space.

## Barriers

**3.11.8** Changes in *exitway* floor level other than in the direction of travel shall have barriers that comply with Acceptable Solution F4/AS1.

**3.11.9** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**3.11.10** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**3.12** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**3.13** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**3.14** THIS PARAGRAPH DELIBERATELY LEFT BLANK

## 3.15 Doors subdividing escape routes

### Door closers and latching

**3.15.1** Except as permitted by Paragraph 3.15.7 (revolving doors, automatic doors and access control systems), doors on *escape routes* shall satisfy the following requirements:

- a) They shall be hinged or pivoted on one vertical edge only, except that sliding doors may be used where the space, including an *exitway*, has an *occupant load* of less than 20. Roller shutter doors or tilt doors shall not be used as *escape route* width except in an intermittently *occupied space* where the roller shutter door is the only *access route* and is open at all times the space is occupied, and

- b) *Fire and smoke control doors* shall be self-closing, and the self-closing device shall either be:
- i) active at all times, or
  - ii) activated by releasing a *hold-open device* in response to operation of a smoke detector (see Paragraph 3.15.10), or
  - iii) a self-closer that is activated by operation of a smoke detector but allows the door to swing freely at other times. The smoke detector requirements shall be the same as for a *hold-open device* (see Paragraph 3.15.10), and
- c) If such doors are required to be secure, they shall be fitted with simple fastenings that can be readily operated from the direction approached by people making an escape complying with Paragraph 3.15.14, and
- d) They shall not be fitted with any locking devices unless these comply with Paragraph 3.15.2, and
- e) They shall have door handles which satisfy the requirements of Acceptable Solution D1/AS1 for use by *people with disabilities*, and
- f) They shall be *constructed* to ensure that the forces required to open these doors do not exceed those able to be applied:
- i) with a single hand to release the latch (where fitted), and
  - ii) using two hands to set the door in motion, and
  - iii) using a single hand to open the door to the minimum required width.

#### Comment:

These requirements are based on the force requirements of Appendix C C6.1.3.

### Locking devices

**3.15.2** If the *building* is occupied, locking devices shall:

- a) Be clearly visible, located where such a device would be normally expected and, in the event of *fire*, designed to be easily operated without a key or other security device, and allow the door to open in the normal manner.

If the operation of a locking device is unusual, such as the pressing of a button close to the door, it shall have signage that complies with NZBC F8.3.1, and

**Comment:**

Examples of unacceptable locking or security devices are card access and keypad locks that are not interfaced with the *fire* alarm and detection systems.

- b) Not prevent or override the direct operation of panic fastenings fitted to any door, and
- c) If they are of an electromechanical type, they shall, in the event of a power failure or door malfunction, either:
  - i) automatically switch to the unlocked (fail-safe) condition, or
  - ii) be readily opened by an alternative method satisfying the requirements of Paragraph 3.15.2 a), and

- d) If the *escape height* is greater than 25 m occupants in the vertical *safe path* shall be able to re-enter every floor. Doors required to be unlocked from the *safe path* side may be unlocked at all times or only when the fire alarm is activated. Doors designated as available for entry shall have signage indicating their status.

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**Comment:**

One way of ensuring compliance with Paragraph 3.15.2 is to develop a *building* management plan.

This Acceptable Solution specifies that all stair doors are unlocked. This is to ensure that:

- a) In multi stair *buildings* people escaping down a stair are able to move from one stair to another and can continue their escape along an alternative route via a route across a floor if one stair becomes smoke-logged or unusable for any other reason.
- b) In single stair *buildings*, people are able move out of the stair and wait for rescue by emergency services within the floor.

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The requirement applies to the whole height of the vertical *safe path*, meaning that once required on a *safe path* greater than 25 m, *escape height* floors between 25 m and ground also have to comply. The doors may be locked during normal occupation but must be available upon activation of the fire alarm.

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**Direction of opening**

**3.15.3** Doors on *escape routes* shall be hung to open in the direction of escape. However, this is not required if the number of occupants of spaces with egress using the door is no greater than 50. If escape may be in either direction, doors shall swing both ways. For manual sliding doors, see Paragraph 3.15.1.

**3.15.4** Manual doors used for the passage of beds shall be capable of swinging in both directions, and in the case of care patients the doors shall be of sufficient width to allow the passage of a bed and essential patient life support equipment.

**Comment:**

Manual doors are required to swing both ways to allow for the passage of beds that may be being moved into the space during evacuation using a strategy that involves horizontal movement to another *firecell*.

**Degree and width of opening**

**3.15.5** Doors on *escape routes* (see Figure 3.22) shall satisfy the following requirements:

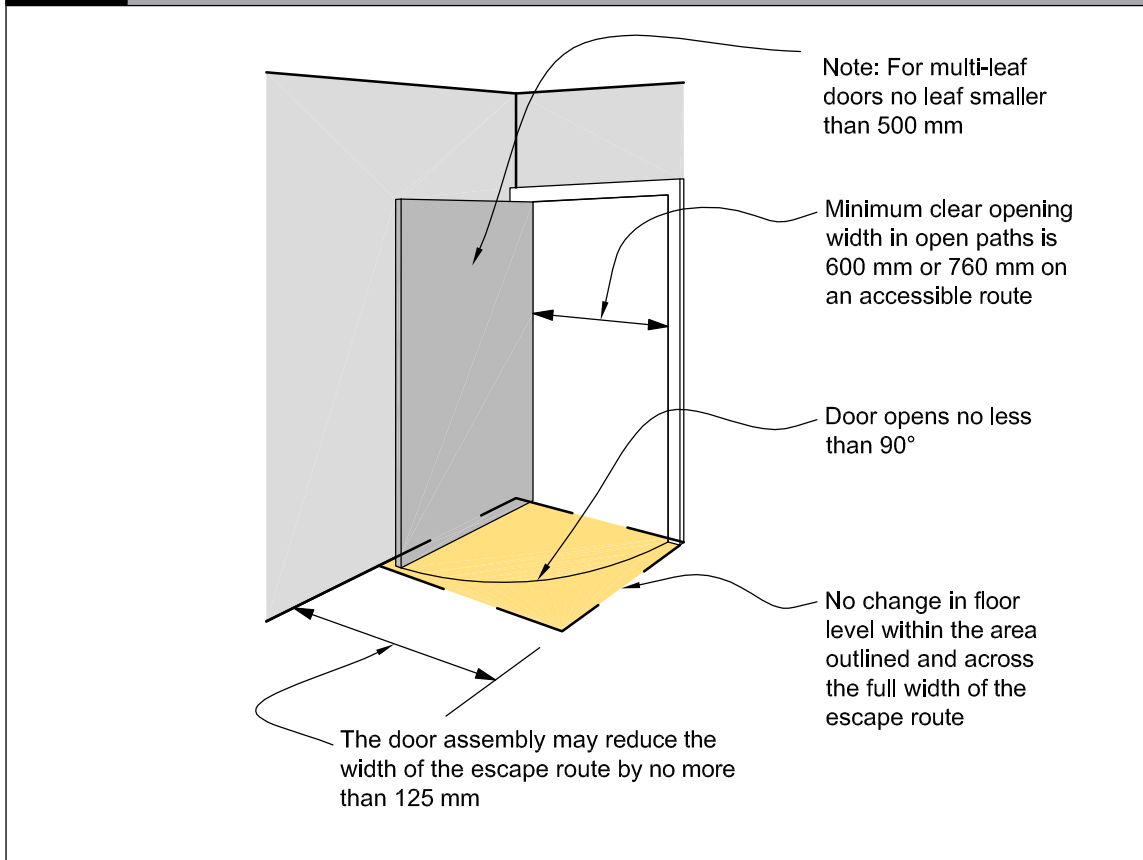
- a) In *open paths*, provide an unobstructed opening width of no less than 950 mm, and when multi-leaf, have no single leaf less than 500 mm wide, and
- b) Within *exitways* (including entry and *final exit* doors), reduce the minimum *exitway* width required by Paragraph 3.3 by no more than the 125 mm per door leaf allowed under Paragraph 3.3.6 d) to:
  - i) 950 mm into horizontal *safe paths*, or
  - ii) 1250 mm within horizontal *safe paths* and in vertical *safe paths*, and
- c) Open no less than 90°, and
- d) Open onto a floor area which:
  - i) extends for a distance of no less than the arc of the door swing, and
  - ii) is at the same level on both sides of the door for the full width of the *escape route*, and

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**Comment:**

A 20 mm threshold weather-stop is acceptable on external doors (see Acceptable Solution D1/AS1).

**Figure 3.22 Degree and width of openings**  
Paragraph 3.3.6 d) and 3.15.5



- e) When opened, not cause the door swing to obstruct the minimum required width of any *escape route*. For example, doors which open onto a corridor used as an *escape route* shall not obstruct the minimum required width of that *escape route* (see Figure 3.23).

### Vision panels

**3.15.6** Vision panels, in accordance with Paragraph 4.2, shall be provided on doors which:

- Are hung to swing both ways, or
- Lead into, or are within *exitways*, except when the door is the egress for a sleeping space (such as a ward or *suite*), or
- Subdivide corridors used as *escape routes*.

# Part 4: Control of internal fire and smoke spread

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- 4.1 Firecells
- 4.2 Glazing in fire and smoke separations
- 4.3 Structural stability during fire
- 4.4 Fire stopping
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- 4.6 Specific requirements for sleeping areas
- 4.7 Deliberately left blank
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- 4.15 Concealed spaces
- 4.16 Closures in fire and smoke separations
- 4.17 Interior surface finishes, floor coverings and suspended flexible fabrics
- 4.18 Building services plant

## 4.1 Firecells

**4.1.1** *Firecells* shall be *fire separated* from each other by the *life rating* specified in Paragraph 2.3 of this Acceptable Solution if the *firecell* is categorised in *risk group* SI or by the higher of the two *life ratings* if it is categorised in another *risk group* (see Paragraph 2.3 of the relevant Acceptable Solution to determine that *life rating*).

## 4.2 Glazing in fire and smoke separations

**4.2.1** Glazing in *fire separations* shall be fixed *fire resisting glazing* having the same *FRR* value for *integrity* as the *fire separation*.

**4.2.2** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.2.3** There is no restriction on the area of glazing in *smoke separations* (including *smoke lobbies*). Non-*fire resisting glazing* may be used if it is toughened or laminated *safety glass*. Glazing shall have at least the same smoke-stopping ability as the *smoke separation*.

### Fire doors and smoke control doors

**4.2.4** Glazing in *fire doors* shall be *fire resisting glazing* having the same *integrity* value as the door. If vision panels are used they shall comply with NZS 4520.

**4.2.5** Glazing in *smoke control doors* shall meet the requirements for *smoke separations*.

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### 4.3 Structural stability during fire

#### Stability of building elements having an FRR

**4.3.1** To avoid premature failure, this Acceptable Solution requires the structural stability of *primary building elements* with an *FRR* to be retained for the duration of that *FRR*. *Primary elements*, located entirely within a *firecell* and providing support to *fire separations*, may need to be evaluated for *fire* exposure from multiple sides simultaneously.

**Comment:**

This situation arises when a *primary element*, such as a column or wall, located entirely within a *firecell* provides lateral support to a *firecell* boundary wall or vertical support to the *firecell* floor/ceiling. Results against the standard furnace test for *fire* resistance may not be suitable as they commonly relate to exposure from one side only. Separate evaluation is required to assess the performance of *primary elements* when exposed to *fire* from more relevant sides simultaneously.

**4.3.2** During a *fire*, *primary elements* shall resist collapse under:

- a) The design dead and live loads required by NZBC B1, and
- b) Any additional loads caused by the *fire*.

**Comment:**

NZBC B1.3.3 (c) and (i) requires that structural stability take account of vertical and horizontal loads, temperature and *fire* effects.

Additional loadings can arise from changes in length or other deformations in *building elements* as a result of high temperatures.

Yield strength of most materials generally reduces with temperature increase, so that strength reduction is related to the time for which the *primary element* is exposed to *fire*. Factors which need to be taken into account include the maximum temperature attained, the capacity of the element to absorb heat, potential loss of section, the degree of exposure, whether any applied coating is used to protect the element from the effects of *fire*, and the degree of restraint provided by the surrounding structure.

#### Unrated primary elements

**4.3.3** In many cases *primary elements* are rated for *structural adequacy*, and sometimes for *integrity* and *insulation*. However, *primary elements* need not have an *FRR* where any of the following circumstances exist:

- a) They are located outside an *external wall* which is 2.0 m or more from the *relevant boundary*, and are shielded from the effects of *fire* by protected areas of the wall (see Figure 4.1)
- b) They are added to strengthen an existing *building* and are required only to carry horizontal loads induced by wind or earthquake.

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**Suites**

**4.6.5** If sleeping areas are subdivided to create *suites* (see Figure 4.4(b)), each *suite* shall contain no more than six beds. Each *suite* shall be a separate *firecell* with *fire separations* having an *FRR* of no less than the *life rating*. *Suites* may be subdivided with non-*fire* rated *construction* to provide separate spaces for sleeping, sanitary facilities and other activities. Where sanitary facilities are shared, those facilities may be contained within one of the *suites*, but entry from other *suites* must be through *fire separations*.

**Special care facilities**

**4.6.6** As areas where procedures using sedation (including dentists) and dialysis are carried out require longer evacuation times or have an extended delay in their evacuation strategies, they shall be either:

- a) Contained in separate *firecells* having *fire* and *smoke separations* with an *FRR* of no less than 60 minutes, or
- b) Grouped together within a *firecell* which is separated from other activities by *fire* and *smoke separations* with an *FRR* of no less than 60 minutes. Within that *firecell*, each space shall be separated from adjacent spaces by *smoke separations*.

**Comment:**  
Horizontal evacuation within *risk group* SI is permitted in this Acceptable Solution. However, a stay-in-place strategy requires design features outside the scope of this Acceptable Solution.  
  
These spaces usually have a climate controlled environment, so special care should be taken with the design of smoke detection and air handling system smoke control.

**Support and service functions**

**4.6.7** Spaces used for direct support functions to *group sleeping areas* and special care facilities may be included in those *firecells*. The direct support functions may be separated with non-*fire* rated *construction*.

**Comment:**  
Direct support functions include treatment rooms, security desks or kiosks, nurses' stations, tea bays, and sanitary facilities essential to the operation of the sleeping areas and special care facilities.

**4.6.8** Spaces providing communal service functions to adjacent sleeping areas, detention and special care facilities in the same *building* shall be sprinklered and *fire* separated with *fire separations* complying with Paragraph 4.6.2.

**Comment:**  
Communal service functions include offices, waiting rooms, lounges, stores, dining rooms, laundries and kitchens supporting the operation of sleeping areas, detention and special care facilities.

**4.6.9** Service vehicle loading and unloading areas within the perimeter walls of a *building* shall meet the requirements of Acceptable Solution C/AS7.

**4.6.10** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.7** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.8** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.9 Exitways**

**4.9.1** *Exitways*, unless external and separated by distance, shall comprise *safe paths* which are *firecells*.

**4.9.2** The *safe path* shall be separated from all adjoining *firecells* by *fire separations* having a *FRR* in accordance with Paragraph 2.3 throughout its length.

**4.9.3** *Safe paths* which are stairs leading from lower floors or *basements*, and which continue to floors above the level of the *final exit*, shall have the lower levels *fire separated* from the *final exit* level. The *fire separation* shall have an *FRR* in accordance with Paragraph 2.3, or that required for the lower level, whichever is the greater.



**4.9.4** *Safe paths* which are long corridors shall be subdivided by *smoke separations* in accordance with Paragraph 4.12.

**4.9.5** Air ducts passing through *exitways* shall not include *combustible* materials.

**4.9.6** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.9.7** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.10 Intermittent activities**

**4.10.1** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**Solid waste storage**

**4.10.2** Solid waste storage areas shall be enclosed when located adjacent to *occupied spaces*; in other situations these areas may be unenclosed. Enclosed solid waste storage areas within any *firecell* shall themselves be a separate *firecell* separated from

adjacent *firecells* by *fire separations* having an *FRR* of no less than 60 minutes (see Paragraph 4.11.5 for waste chutes).

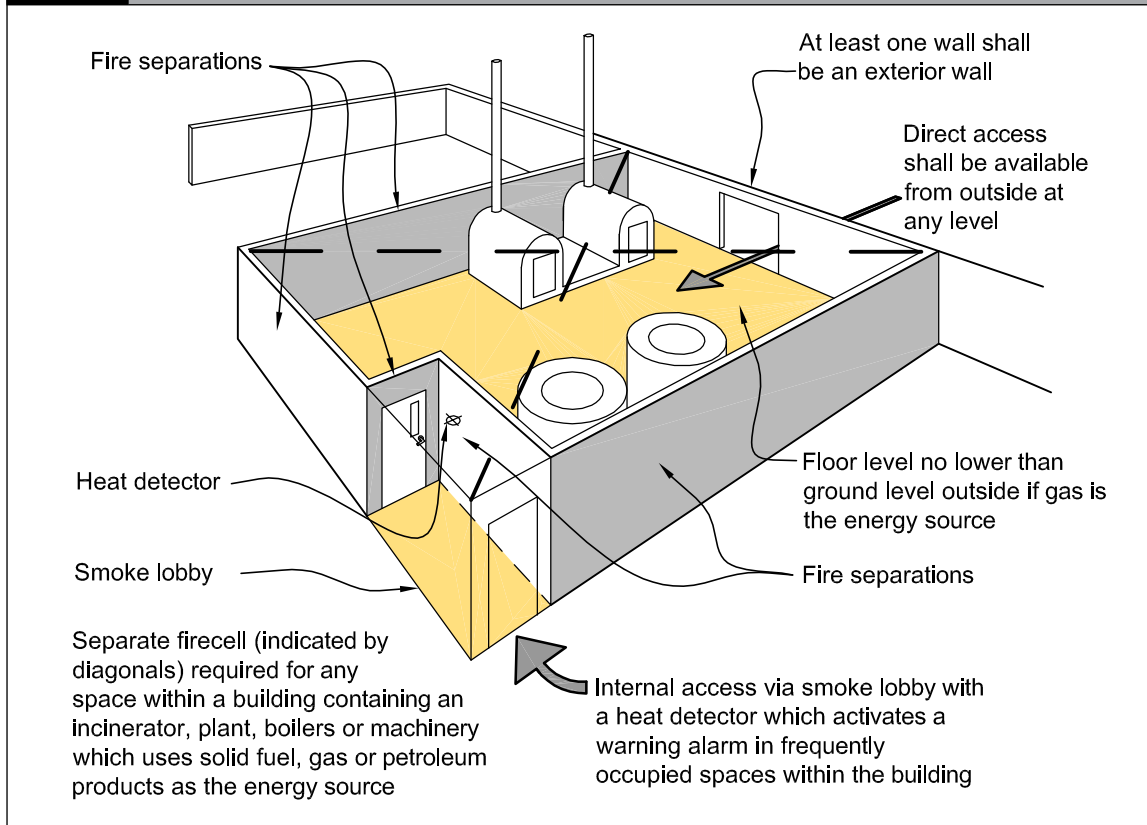
**Plant, boiler and incinerator rooms**

**4.10.3** Any space within a *building* (see Figure 4.5) containing an incinerator, plant, boiler or machinery which uses solid fuel, gas or petroleum products as the energy source (but excluding space and local water heating appliances) shall be a separate *firecell* with an *FRR* of no less than 45 minutes, and shall have:

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- a) At least one *external wall*
- b) External access that may be at any floor level including the roof. Where alternative internal access is provided, it shall be via a *smoke lobby* that is protected with a heat detector connected to a Type 2, 3, 4, or 5 system, and
- c) Its floor level no lower than the ground level outside the *external wall* if gas is the energy source.

**Figure 4.5** Plant, boiler and incinerator rooms  
Paragraph 4.10.3





**Protected shaft access panels**

**4.16.10** Access panels to *protected shafts* shall have the *fire* resistance performance as required by Paragraph 4.16.1 and shall:

- a) Be capable of being opened only with a special tool, and
- b) If smoke seals cannot be provided, be tight-fitting with a maximum total gap of 8 mm around the panel (see Figure 4.17).

**Lift landing doors**

**4.16.11** Other than where Paragraph 3.10.3 for a passenger lift within a vertical *safe path* applies, *doorsets* for lift-landing doors opening into lift shafts which are *protected shafts* shall be *fire doors* complying with Paragraphs 4.16.1 to 4.16.3. Lift-landing doors need not be *fire* rated from the shaft side.

**Fire dampers**

**4.16.12** Any duct (unless fully enclosed by *construction* with an *FRR* no less than required for the *fire separation*) that passes through a fire or smoke separation shall not reduce the *fire* resistance and/or smoke separating function of the *construction* through which the duct passes.

Where a *fire damper* is used to maintain the required *fire* resistance it shall:

- a) Comply with AS/NZS 1668.1, and

- b) Have a *fire integrity* and *insulation* rating no less than that of the *fire separation*, except that the damper blade is not required to have an *insulation* rating if the *building* is sprinkler protected or means are provided to prevent *combustible* materials being placed closer than 300 mm to the *fire damper* and air duct.

Where a smoke damper is used to maintain the smoke separating function it shall:

- a) Comply with AS/NZS 1668.1, and
- b) Be actuated on alarm activation.

*Fire dampers* and smoke dampers shall be capable of being readily accessed for servicing.

**Comment:**

Smoke control system shut down on alarm activation, on its own, is not sufficient where a delayed evacuation strategy is in place. The commentary provides further guidance on smoke control in air handling in this case.

**Fire shutters**

**4.16.13** If a floor has a service opening (eg, for stairs, conveyor, forklift access or similar installation) which is not used as part of an *escape route*, and which is fitted with a *fire shutter*, the floor may be treated as a *fire separation*.

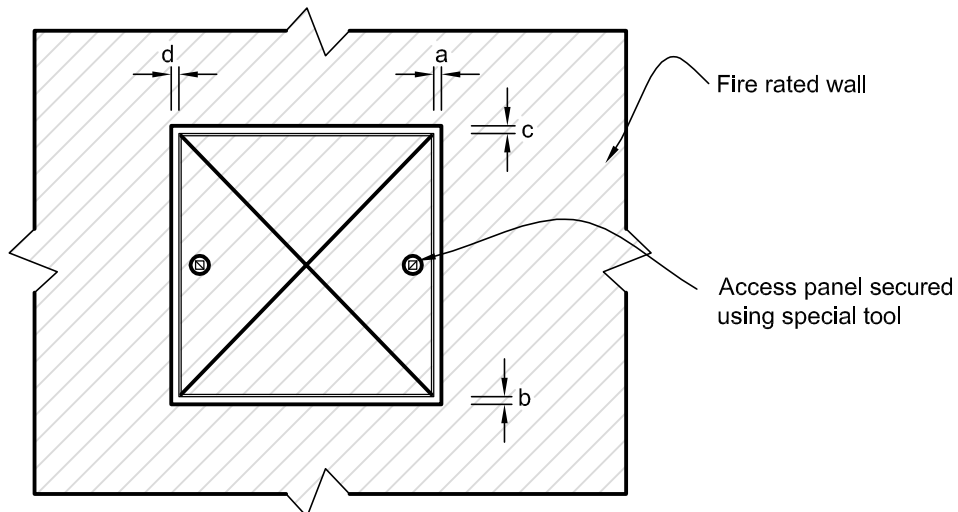
**4.16.14** The *fire shutter* shall be automatically activated by a signal from a smoke detector.

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**Figure 4.17** Access panels  
Paragraph 4.16.10



NOTE: Dimensions a + b + c + d = 8 mm maximum



**4.16.15** A fire shutter shall include a device to retard the rate of closing to no more than 150 mm per second.

**4.17 Interior surface finishes, floor coverings and suspended flexible fabrics**

**Surface finish requirements for walls, ceilings, ducts and insulation**

**4.17.1** Surface finish requirements shall be as specified in Table 4.1.

Table 4.1 Surface finishes					
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Exitways All occupied spaces in importance level 4 buildings	Sleeping spaces and treatment areas	All other occupied spaces	Ducts for HVAC systems: internal surfaces	Ducts for HVAC systems: external surfaces	Acoustic treatment and pipe insulation within air handling plenum
Maximum permitted Group Number					
2	2	3	2	3	3

**Comment:**

The method for assigning the Group Number to a material and for establishing the smoke production rate is specified in Verification Method C/VM2 Appendix A. Particular note should be made of the requirements for ducts. There are also instances of certain surface finishes being assigned Group Numbers without evaluation e.g. films and paint coatings.

**Comment (continued):**

This paragraph applies to foamed plastics building materials whether exposed to view from the occupied space or enclosed.

**Flooring**

**4.17.3** Flooring shall be either non-combustible or, when tested to ISO 9239-1, shall have a critical radiant flux of not less than that specified in Table 4.2.

**4.17.4** Paragraph 4.17.3 shall apply to flexible finishes such as carpets, vinyl sheet or tiles, and to finished or unfinished floor surfaces.

**Foamed plastics and combustible insulating materials**

**4.17.2** 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 as specified in Table 4.1 and the foamed plastics shall comply with the flame propagation criteria as specified in AS 1366 for the material being used. This requirement does not apply to building elements listed in Paragraph 4.17.6.

**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 (see Appendix A of C/VM2), otherwise a surface lining is also required such that the completed system achieves a Group Number of 3.

Table 4.2 Critical radiant flux requirements for flooring	
Area of building	Minimum critical radiant flux when tested to ISO 9239-1
Sleeping areas, treatment areas and exitways	2.2 kW/m <sup>2</sup>
Non-sleeping firecells accommodating more than 50 persons	1.2 kW/m <sup>2</sup>
All other occupied spaces other than household units	1.2 kW/m <sup>2</sup>

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**Wood and wood products in floors**

**4.17.5** In addition to the requirements of Paragraph 4.17.3, where floors in multi-storey buildings are *fire separations* and where the flooring material is made of wood products (wood products include boards manufactured from wood fibres or chips bound by an adhesive) the flooring material shall have either a thickness of no less than nominally 20 mm, or the floor assembly shall have an *FRR* of -/30/30 when exposed to *fire* from the flooring side.

**Comment:**

1. Nominal 20 mm thickness includes standard flooring products such as 19 mm particle board or 17 mm plywood. These are acceptable.
2. Paragraph 4.17.5 addresses potential *fire* spread from the upper to lower *firecell* by limiting *fire* spread down through the floor assembly. Protecting the upper *firecell* from a *fire* in the lower *firecell* is still also a requirement, achieved by use of *fire separations* as described in Paragraph 4.13.

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**Exceptions to surface finish requirements**

**4.17.6** *Surface finish* requirements do not apply to:

- 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>
- b) Electrical switches, outlets, cover plates and similar small discontinuous areas
- c) Pipes and cables used to distribute power or services
- 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
- e) *Damp-proof courses*, seals, caulking, flashings, thermal breaks and ground moisture barriers
- f) Timber joinery and structural timber *building elements constructed* from solid wood, glulam or laminated veneer lumber. This includes heavy timber columns, beams, portals and shear walls not more than 3.0 m wide, but does not include exposed timber panels or permanent formwork on the underside of floor/ceiling systems
- g) Individual *doorsets*, and

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h) 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 less

- i) DELIBERATELY LEFT BLANK.
- j) DELIBERATELY LEFT BLANK.

**4.17.7** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**Suspended flexible fabrics**

**4.17.8** When tested to AS 1530 Part 2, suspended flexible fabrics shall, within all *occupied spaces* including *exitways*:

- a) Have a *flammability index* of no greater than 12, and
- b) When used as underlay to roofing or exterior cladding that is exposed to view, have a *flammability index* of no greater than 5.

**4.17.9** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**4.17.10** THIS PARAGRAPH DELIBERATELY LEFT BLANK

**Air ducts**

**4.17.11** Where air ducts are contained wholly within a *protected shaft*, provided the shaft does not also contain lifts, only the interior *surface finish* of the air duct is required to comply with Table 4.1.

**4.18 Building services plant**

**Automatic activation**

**4.18.1** When any smoke detection system is activated, it shall automatically turn off all air-conditioning and mechanical ventilation plant which is not required or designed for *fire* safety.

**Comment:**

Paragraph 4.18.1 does not apply to non-distributed ventilation and air-conditioning such as typical domestic/commercial heat pump units.

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**Air handling systems**

**4.18.2** Where smoke control in air handling systems is required to prevent the recirculation of smoke through an air handling system to other *firecells* in a *building*, these systems shall be as specified in Appendix A A2.1.



# Part 5: Control of external fire spread

## CONTENTS

- 5.1 Fire separation for buildings with more than one title
- 5.2 Horizontal fire spread from external walls
- 5.3 FRRs of external walls
- 5.4 Small openings and fire resisting glazing
- 5.5 Table method for external walls
- 5.6 Horizontal fire spread from roofs and open sided buildings
- 5.7 Vertical fire spread
- 5.8 Exterior surface finishes

## 5.1 Fire separation for buildings with more than one title

**5.1.1** When a *building* is subdivided so that the *building* straddles more than one title, each part of the *building* located on a separate title, other than titles comprising vehicle parking, areas shall be separated from:

- a) The part of the *building* on an adjacent title by *fire separations* having an *FRR* meeting the *property rating* in accordance with Paragraph 2.3, and
- b) Any external area in common, unless Paragraph 5.1.2 applies, by *external walls* complying with Paragraph 5.3 except that, if roofed, the area in common shall be a *firecell* separated from adjacent titles by *fire separations* meeting the *property rating* in accordance with Paragraph 2.3.

### Comment:

In a) above, vertical *fire separations* provide *fire ratings* between titles. Floors between titles are also *fire separations* and provide the horizontal separation. See Acceptable Solution C/AS7 for allowances in vehicle parking areas of *buildings* separated into multiple titles.

In b) above, a *notional boundary* is established between the titles, and the permitted *unprotected area* in the *external walls* of both titles is determined with respect to that *notional boundary*. When the area in common is roofed, the danger to life and adjacent property is increased; hence the need for greater precautions.

**5.1.2** If a *building* is subdivided (as in Paragraph 5.1.1 a)) and all the titles and any areas in common are sprinklered throughout, the requirements for *fire separations* of Paragraph 5.1.1 b) need not apply. However, the requirements for *fire separation of safe paths* in Paragraphs 4.9.2 and 4.9.3 shall still apply.

## 5.2 Horizontal fire spread from external walls

### Separation

**5.2.1** Specific separation requirements for *unprotected areas* in *external walls* shall be applied in the following circumstances:

- a) If, due to the configuration of a single *building* or the siting of other *buildings* on the same property, *external walls* of adjacent *firecells* are exposed to each other at an angle of less than 90°, and one or both *firecells* contain a sleeping *risk group* or *exitways*, or
- b) If there are *unprotected areas* in *external walls* facing a *relevant boundary* to *other property* at an angle of less than 90°.

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#### Comment:

When the vertical planes of two *external walls* of separate *firecells*, or of an *external wall* and a *relevant boundary* of *other property* (where the wall faces that *boundary*), intersect at an angle of less than 90°, there is potential danger of *fire* spread between *firecells* or to *other property*.

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**5.2.2** Protection shall be achieved by using one or more of the following approaches:

- a) Providing the sprinkler system with a water supply complying with NZS 4541 and consisting of two independent supplies, one of which is not dependent on towns mains
- b) Distance separation (see Paragraph 5.5)
- c) Limiting *unprotected areas* in *external walls* (see Paragraph 5.5)
- d) Using *fire resisting glazing* (see Paragraph 5.4).

**5.2.3** Where the intersection angle of the *building* and the *relevant boundary* is 90° or greater, there are no requirements and an *unprotected area* of 100% is permitted for the *external wall*.

**5.2.4** A combination of small *unprotected areas* and *fire resisting glazing* as specified in Paragraph 5.4 is the only method permitted for a wall or part of a wall less than 1.0 m from the *relevant boundary*.

**5.2.5** Table 5.2 applies only to the permitted *unprotected area* in *external walls* 1.0 m or more from the *relevant boundary*. This can be combined with the areas of *fire resisting glazing* and small *unprotected areas* in Paragraph 5.4.

**5.2.6** Regardless of the method adopted, all parts of an *external wall* other than allowable *unprotected areas* shall have the appropriate *FRR* as specified by the relevant parts of this Acceptable Solution.

### Analysis required for all external walls

**5.2.7** The analysis shall be done for all *external walls* of the *building* to check the permitted *unprotected area* in each wall.

### Notional boundary – firecells on the same property

**5.2.8** For *firecells* 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*. In such cases, when applying Tables 5.2 and 5.3 the words *relevant boundary* shall be interpreted as *notional boundary*.

**5.2.9** Where one or both *firecells* on the same property contain *risk groups* SI, SM, SH or *exitways*, analysis shall be done separately for each *firecell* with respect to the chosen *notional boundary*.

### 5.3 FRRs of external walls

**5.3.1** *Building elements* that are part of an *external wall* that is required to be *fire rated* shall be *fire rated* as required by Paragraph 2.3. If a *safe path* has an *external wall* that is required to be *fire rated*, that wall may be 100% unprotected provided any walls between the *safe path* and adjacent *firecells* have an *FRR* determined using the *property rating*.

**5.3.2** Any part of an *external wall* enclosing a *firecell* and not permitted to be an *unprotected area* shall have an *FRR* in accordance with Paragraph 2.3. If the *external wall* is less than 1.0 m from the *relevant boundary* the wall shall be *fire rated* to protect from both directions.

**5.3.3** When the *unprotected area* of an *external wall* is permitted to be 100%, but the *primary elements* in the line of that wall are required to be *fire rated*, the rating of those *primary elements* shall be the *life rating* in accordance with Paragraph 2.3.

#### Comment:

*Primary elements* are required to be *fire rated* in *buildings* with an *escape height* of greater than 25 m and where they support, or are an integral part of, other *fire rated building elements*.

### 5.4 Small openings and fire resisting glazing

**5.4.1** *External wall construction* shall meet the following requirements:

- Unprotected areas* (referred to as Type A areas) and areas of *fire resisting glazing* (referred to as Type B areas) shall be located to comply with Figure 5.1, and
- The remainder of the wall shall be *fire rated* equally for exposure to *fire* on both sides.

#### Size and spacing of Type A and Type B areas

**5.4.2** Type A areas shall be no greater than 0.1 m<sup>2</sup>. Type B areas are unlimited in size in this *risk group*, but the spacing of Type B areas shall comply with Figure 5.1.

**5.4.3** There is no restriction on the area of *fire resisting glazing* in this Acceptable Solution. The *fire resisting glazing* shall be rated for *integrity* and the *FRR* of both the glazing and the *external wall* shall be as required by Paragraph 2.3.

**5.4.4** There is no limitation on the spacing between adjacent Type A and Type B areas which occur in different *firecells*. Within a *firecell* the following requirements shall apply:

- Type A areas shall be no closer, both vertically and horizontally, than 1.5 m to another Type A or to a Type B area
- Type B areas shall be no closer to one another, vertically or horizontally, than the dimensions X or Y shown on Figure 5.1, and
- Where Type B areas are staggered, rather than being aligned vertically or horizontally, the shortest distance, in any direction, between adjacent areas shall be no less than the greater of the X and Y measurements.

**Table 5.1: This table is not required for this Acceptable Solution.**

### 5.5 Table method for external walls

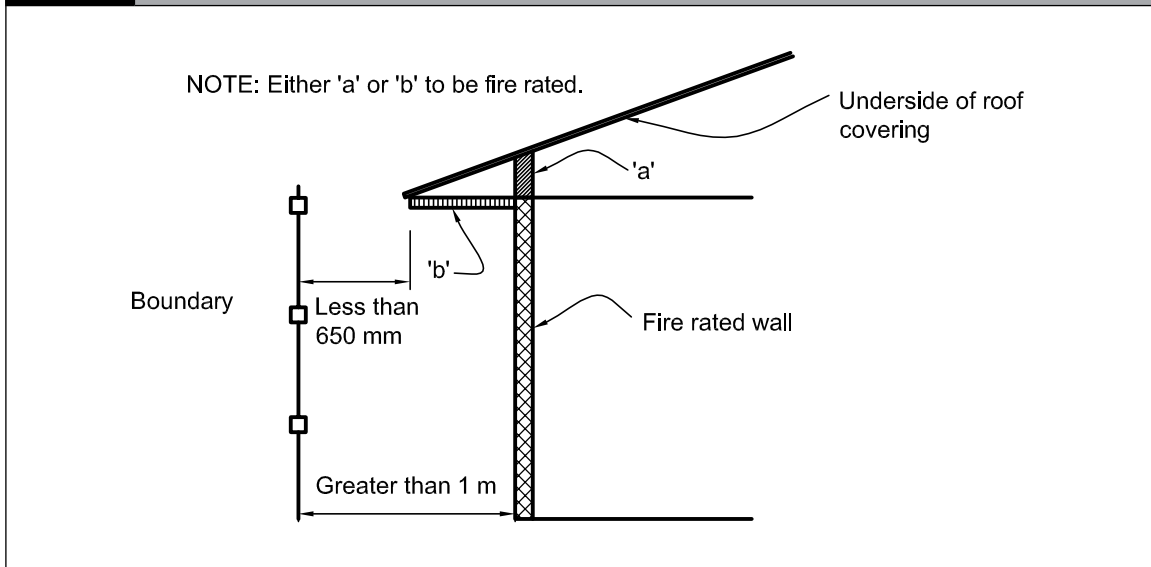
**5.5.1** The table method for *external walls* is the means of satisfying the requirements of this Acceptable Solution for the control of external *fire* spread and shall be applied to *external walls* of *buildings* which are parallel to or angled at less than 90° to the *relevant boundary*. Table 5.2 is split into three parts according to the angle incident between the subject wall and the *relevant boundary*. If the wall is parallel to the *boundary* or the angle is less than 45°, then columns 2 and 3 shall be used (see Figures 5.2 and 5.3).

**5.5.2** The table method shall be used to determine the percentage of *unprotected area* in the *external wall* of each *firecell* depending on the distance to the *relevant boundary*.

Amend 3  
Jul 2014

Errata 1  
Feb 2013

**Figure 5.4** Eaves projection  
Paragraphs 5.6.3 and 5.6.5



### Open sided buildings

**5.6.6** An open sided *building* may be either a detached *building* or connected to another *building* (see Figure 5.5). For the open sided *building* to be deemed 'detached', the horizontal distance between the other *building* and the roof of the open sided *building* shall be no less than:

- a) 1.0 m for a roof area exceeding 40 m<sup>2</sup>, and
- b) 0.3 m for a roof area no greater than 40 m<sup>2</sup>.

**5.6.7** A *building* having only a single floor level may be *constructed* with walls and roof having 100% *unprotected area* provided that:

- a) At least two sides of the perimeter wall are completely open to the environment, and
- b) If attached to another *building*, both *buildings* are under the control of the same occupancy, and
- c) For unlimited roof plan areas, no part of the roof is closer than 1.0 m to a *relevant boundary*, and
- d) For roof plan areas of no greater than 40 m<sup>2</sup>, no part of the roof is closer than 0.3 m to a *relevant boundary*.

### Comment:

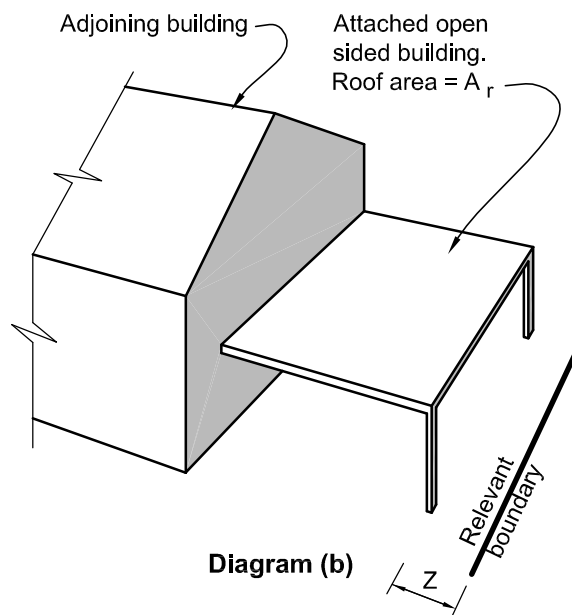
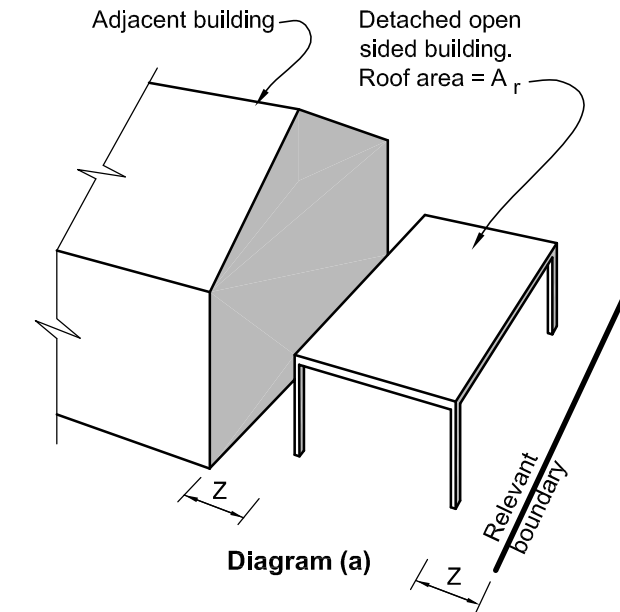
Examples of open sided *buildings* having a roof area exceeding 40 m<sup>2</sup> are porte cocheres, while those with roof areas of less than 40 m<sup>2</sup> would be structures such as carports.

### Floor projections

**5.6.8** If a floor projects beyond the face of any part of an *external wall* which requires a *property rating*, or any part of the projection is closer than 1.0 m to the *relevant boundary*, the floor projection shall have the same *FRR* as the floor inside the *external wall*, and exposed exterior faces of the projection shall comply with Paragraph 5.8.

Amend 3  
Jul 2014

**Figure 5.5** Open sided buildings – distance and FRR requirements  
Paragraph 5.6.6



**Separation distances for non-fire rated construction**

When  $A_r$  is no greater than  $40 \text{ m}^2$ , 'Z' shall be no less than  $0.3 \text{ m}$ .  
When  $A_r$  exceeds  $40 \text{ m}^2$ , 'Z' shall be no less than  $1.0 \text{ m}$ .

**NOTES:**

1. This figure applies only to single storey open sided buildings.
2. In all cases at least two sides of the perimeter wall shall be completely open to the environment.



# Appendix C (normative): Test methods

## C1.1 General

This Appendix contains test methods for confirming that specific *building elements* satisfy relevant provisions of the Acceptable Solutions for Protection from Fire. It includes both established *standard tests* and other test methods for *building elements* in situations where *standard tests* are unavailable.

### Comment:

Regardless of the year of the Standard incorporated by reference in this Acceptable Solution, there is no intention to require the *building elements* listed here to be retested to the current edition of the relevant Standard when they have previously been tested to an earlier version of that Standard in force at the date of testing.

Amend 3  
Jul 2014

## C2.1 Flammability of floor coverings

Materials shall be assigned a critical radiant flux when tested to:

ISO 9239 Reaction to fire tests for flooring – Part 1: Determination of the burning behaviour using a radiant heat source.

Or in lieu of testing refer to Table B1 of Appendix B in C/VM2.

Amend 3  
Jul 2014

## C3.1 Flammability of suspended flexible fabrics and membrane structures

Materials shall be assigned a *flammability index* when tested to:

AS 1530 Methods for fire tests on building materials and structures – Part 2: Test for flammability of materials.

## C4.1 Properties of lining materials

### C4.1.1 Combustibility test

Materials shall be classified as *non-combustible* or *combustible* when tested to:

AS 1530 Methods for fire tests on building materials and structures – Part 1: Combustibility test for materials

**C4.1.2** Material for internal surface linings shall be given a *Group Number* in accordance with Appendix A of C/VM2 and tested to either:

ISO 5660 Reaction-to-fire tests Part 1 Heat release rate (cone calorimeter method), and Part 2 Smoke production rate (dynamic method), or

ISO 9705 Fire tests – Full scale room test for surface products.

Or in lieu of testing refer to Table A1 of Appendix A in C/VM2.

Errata 1  
Feb 2013

Amend 3  
Jul 2014

## C5.1 Fire resistance

**C5.1.1** *Primary and secondary elements*, closures and *fire stops* shall be assigned a *fire resistance rating (FRR)* when tested to:

- a) AS 1530 Methods for fire tests on building materials and structures – Part 4: Fire resistance tests of elements of building construction, or
- b) NZS/BS 476 Fire tests on building materials and structures – Parts 21 and 22.

**C5.1.2** *Fire stops* shall be tested:

- a) In circumstances representative of their use in service, paying due regard to the size of expected gaps to be *fire stopped*, and the nature of the *fire separation* within which they are to be used, and
- b) In accordance with AS 4072: Components for the protection of openings in fire-resistant separating elements – Part 1: Service penetrations and control joints.

Errata 1  
Feb 2013

## C6.1 Fire doors and smoke control doors

**C6.1.1** *Fire doors* shall be evaluated in circumstances representative of their use in service, and shall comply with NZS 4520: Fire-resistant doorsets.

**Smoke control doors**

**C6.1.2** A door shall be deemed to be a *smoke control door* if, in addition to the requirements in this Acceptable Solution for *smoke control doors*:

- a) The door is a *fire door* that is fitted with appropriate smoke seals, or if:
- b) It is *constructed* with solid core leaves. Solid timber core leaves, when used, shall have a leaf thickness of no less than 35 mm, and
- c) It is provided with smoke seals as required by this Acceptable Solution. Smoke seals shall be in continuous contact with the mating element, and located so as to minimise interruption by hardware, and
- d) The frames are constructed of timber, and the jambs are no less than 30 mm thick, and
- e) Any vision panel cut-outs are no less than 150 mm from the leaf edges, and
- f) The maximum average clearances (excluding pre-easing) are:
  - i) Leaf to frame 3 mm
  - ii) Leaf to leaf 5 mm
  - iii) Leaf to top of any floor covering 10 mm, and
- g) If there are additional facings, they shall be adhesive fixed, and
- h) It is provided with signage identifying it as a *smoke control door* in accordance with Acceptable Solution F8/AS1.

**Frictional forces**

**C6.1.3** The forces required to open any *fire door* or *smoke control door* on an *escape route*, shall not exceed 67 N to release the latch, 133 N to set the door in motion, and 67 N to open the door to the minimum required width. These forces shall be applied at the latch stile. These requirements do not apply to horizontal sliding doors in *risk group S1* or to power-operated doors.

**Self-closing provision**

**C6.1.4** All *fire* and *smoke control door* leaves shall be self-closing, and provision shall be made for the self-closing device to be adjustable during commissioning to satisfy the requirements of Paragraph C6.1.3 after installation.

**C6.1.5** Where it is desirable in normal circumstances for a *fire door* or *smoke control door* to operate freely, it is acceptable to use a self-closer mechanism which activates in the event of *fire* but does not operate at other times.

**Comment:**

1. These circumstances can occur where people are under care. Leaving the door to the occupant's room (or *suite*) open reduces that occupant's feeling of isolation and permits ready observation by staff.
2. Self-closers can be an obstruction to the elderly and *people with disabilities*, who may have difficulty in opening the door against the pressure applied by the self-closer. Acceptable Solution C/AS3 Paragraph 4.6 describes situations where smoke control doors do not have to be self-closing where they are used within a *group sleeping area* or *suite*.

**Automatic smoke-sensing devices**

**C6.1.6** Automatic smoke-sensing devices complying with NZS 4512, if used, shall be positioned within the stream of air that passes the door when the *smoke control door* is fully open.

**C7.1 Fire properties of external wall cladding systems**

**C7.1.1** *Fire* properties of *external wall* cladding systems shall be determined in accordance with:

- ISO 5660 Reaction-to-fire tests –
- Heat release, smoke production and mass loss rate –
- Part 1: Heat release rate (cone calorimeter method).

**C7.1.2** In addition to meeting the general requirements of ISO 5660 Part 1, testing shall be in accordance with the following specific requirements:

- a) An applied external heat flux of 50 kW/m<sup>2</sup>, and
- b) A test duration of 15 minutes, and
- c) The total heat release measured from start of the test, and
- d) Sample orientation horizontal, and
- e) Ignition initiated by the external spark igniter.

Amend 2  
Dec 2013

Amend 2  
Dec 2013



**Control of internal fire and smoke spread continued**

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Amend 3  
Jul 2014

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