Ministry of Business, Innovation & Employment

Dear Customer

Please find attached the December 2013 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:

Section	**Previous version**	**December 2013 amendment**
C/AS3 Acceptable Solution for Buildings Where Care or Detention is Provided (Risk Group SI)		
Title pages	Remove document history/status	Replace with new document history/status
References	Remove pages 7/8	Replace with new pages 7/8
Definitions	Remove pages 9/10, 15/16	Replace with new pages 9/10, 15/16
C/AS3 Part 1	Remove pages 19/20, 23/24	Replace with new pages 219/20, 23/24
C/AS3 Part 2	Remove pages 25–28	Replace with new pages 25–28
C/AS3 Part 3	Remove pages 47/48, 55/56, 59–62	Replace with new pages 47/48, 55/56, 59–62
C/AS3 Part 4	Remove pages 77–80	Replace with new pages 77–80
C/AS3 Part 7	Remove pages 95/96	Replace with new pages 95/96
Appendices	Remove pages 101–104	Replace with new pages 101–104

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 19 December 2013. 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 19 December 2013.

The previous version, Amendment 1 (Errata 1), of this Acceptable Solution can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire until 18 June 2014. It can be used for building consent applications submitted before 19 June 2014.

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	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

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.

		Where quoted
Standards New Zealand		
NZS/BS 476:-	Fire tests on building materials and structures	
Part 21: 1987	Methods for determination of the fire resistance of loadbearing elements of construction	C5.1.1
Part 22: 1987	Methods for determination of the fire resistance of non-loadbearing elements of construction	C5.1.1
AS/NZS 1668:-	The use of ventilation and air conditioning in buildings	
Part 1: 1998	Fire and smoke control in multi-compartment buildings *Amend: 1*	Table 2.1, A2.1.1
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:-	Performance criteria for fire resisting closures	
Part 2: 1988	Fire resisting glazing systems	Definitions
NZS 4332: 1997	Non-domestic passenger and goods lifts	6.4.3
NZS 4510: 2008	Fire hydrant systems for buildings *Amend: 1*	Table 2.1, A2.1.1
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^2)	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:-	Gas installation	7.2.1, 7.2.2
Part 1: 2010	General installations *Amend: 1*	
Standards Australia		
AS 1366:-	Rigid cellular plastics sheets for thermal insulation	
Part 1: 1992	Rigid cellular polyurethane (RC/PUR) *Amend: 1*	4.17.2
Part 2: 1992	Rigid cellular polyisocyanurate (RC/PIR)	4.17.2
Part 3: 1992	Rigid cellular polystyrene – moulded (RC/PS-M) *Amend: 1*	4.17.2
Part 4: 1989	Rigid cellular polystyrene – extruded (RC/PS-E)	4.17.2

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			Where quoted
	AS 1530:-	Methods for fire tests on building materials, components and structures	
	Part 1: 1994	Combustibility test for materials	Definitions, C3.1, C4.1.1
	Part 2: 1993	Test for flammability of materials	4.17.8
	Part 4: 2005	Fire-resistance tests of elements of building construction	4.5.9, C5.1.1
	AS 1691: 1985	Domestic oil-fired appliances – installation	7.3.1, 7.3.2
	AS 4072:-	Components for the protection of openings in fire-resistant separating elements	
	Part 1: 2005	Service penetrations and control joints	C5.1.2
Errata 1 Feb 2013		*Amend: 1*	
	International Standards Organisation		
	ISO 5660:-	Reaction-to-fire tests – Heat release, smoke production and mass loss rate	
	Part 1: 2002	Heat release rate (cone calorimeter method)	C4.1.2, C7.1.1, C7.1.2
Errata 1 Feb 2013	Part 2: 2002	Smoke production rate (dynamic measurement)	C4.1.2
	ISO 9239:-	Reaction to fire tests for flooring	
	Part 1: 2010	Determination of the burning behaviour using a radiant heat source.	4.17.3, Table 4.2, C2.1
Errata 1 Feb 2013	ISO 9705: 1993	Fire tests – Full scale room test for surface products	C4.1.2
	European Standards Organisation		
Errata 1 Feb 2013			
	BS EN 12101:-	Smoke and heat control systems	
	Part 1: 2005	Specification for smoke barriers	Definitions
	Building Research Establishment (UK)		
	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
	National Fire Protection Association of America		
	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
	American Society for Testing and Materials		
	ASTM D 2898: 2010	Standard practice for accelerated weathering of fire-retardant-treated wood for fire testing	C7.1.3
	New Zealand Legislation		
	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.

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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 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.*

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) 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.

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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.

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

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.

Table 1.1	Risk groups and Acceptable Solutions		
	Acceptable Solution	***Risk group***	**Applies to**
C/AS1	Single *household units* and small multi-unit dwellings	SH	Houses, townhouses and small *multi-unit dwellings* Limited area outbuildings
C/AS2	Sleeping (non institutional)	SM	Permanent accommodation eg, apartments Transient accommodation eg, hotels, motels, hostels, backpackers Education accommodation
C/AS3	Care or detention	SI	Institutions, hospitals (excluding special care facilities), residential care, resthomes, medical day treatment (using sedation), detention facilities (excluding prisons)
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, *early childhood centres*
C/AS5	Business, commercial and low level storage	WB	Offices (including professional services such as law and accountancy practices), laboratories, workshops, manufacturing (excluding *foamed plastics*), factories, processing, cool stores (capable of <3.0 m storage height) and other storage *buildings* capable of <5.0 m storage height, light aircraft hangars
C/AS6	High level storage and other high risks	WS	Warehouses (capable of ≥5.0 m storage height), cool stores (capable of ≥3.0 m storage height), trading and bulk retail (≥3.0 m storage height)
C/AS7	Vehicle storage and parking	VP	Vehicle parking – within a *building* or a separate *building*

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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.

1.3 Alterations and changes of use to buildings

Amend 2 Errata 1

If this Acceptable Solution is being used for an assessment of an existing *building* that is being *altered*, Parts 1, 2, 3 and 4 of this Acceptable Solution shall be considered to the extent necessary for compliance with the *Building Act* s112.

Errata 1 Feb 2013

The *building work* itself shall comply fully with this Acceptable Solution.

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If this Acceptable Solution is being used where an existing *building* is undergoing a change of use, Parts 1, 2, 3, 4 and 5 of this Acceptable Solution shall be considered to the extent necessary for compliance with the *Building Act*.

Where compliance with the requirements of the *Building Act* for alterations and changes of use is not fully demonstrated through using this Acceptable Solution, the level of the assessment required shall be agreed with the *building consent authority* or *territorial authority*.

Comment:
The extent of assessment should be consistent with a number of risk factors including:

a) Age of the *building*

b) *Importance level* of the *building*

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c) Extent of the alteration.

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*.

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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*.

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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

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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

Firecell floor area limits

2.1.1 The floor area of a *firecell* shall not exceed 500 m^2.

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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 where there are more than 100 people in hospital care or detention, the water supply for the sprinkler system shall be a dual supply shall comply with NZS 4541 or NZS 4515 and with one of the supplies being independent of the public reticulated main, and

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

c) Type 18 *building fire* hydrant system, unless the Fire Service hose run distance from the Fire Service vehicular access to any point on a floor is less than 75 m.

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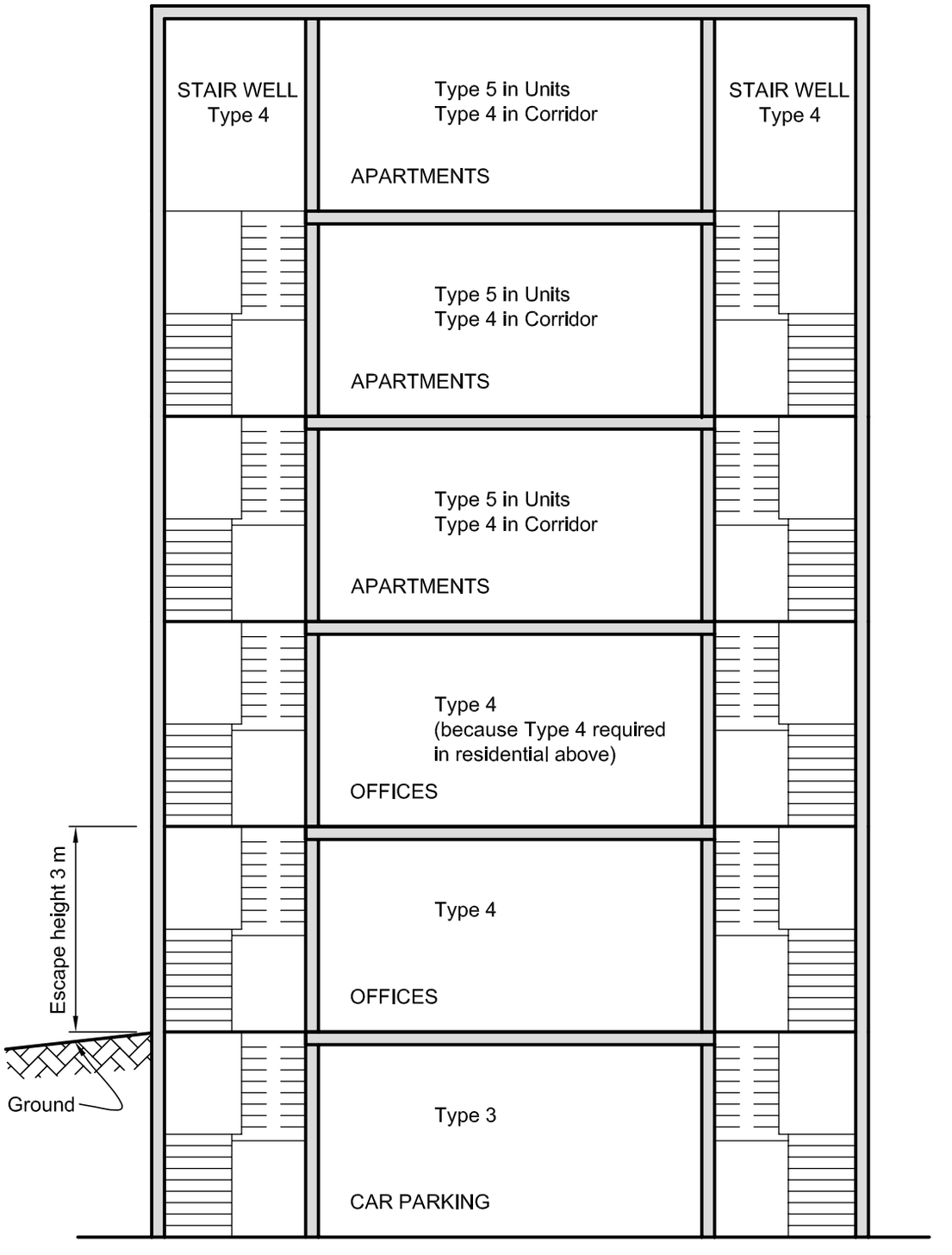
2.2.3 If any *firecell* in a *building* requires a manual or automatic *fire* alarm or sprinkler system, that system shall be provided in all other *firecells* throughout the *building* (refer to Figure 2.1). As a Type 5 system (refer to Table 2.1) provides for non-latching smoke detection with heat 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.

Errata 1 Feb 2013

Figure 2.1 **Systems throughout a building**
Paragraph 2.2.3



More than one risk group on a floor

2.2.4 If there is more than one *risk group* on one floor level, the *fire* safety requirements will depend on whether the *risk groups* occupy the same *firecell*, or whether the floor is divided by *fire separations* into different *firecells*.

Comment:
Refer to Paragraphs 2.2.1 to 2.2.3 for the requirements for individual *firecells* in this *risk group*.

2.2.5 Where *fire separations* are not needed between different *risk groups* on the same floor level, the *fire safety systems* adopted for the whole floor level shall be those of the primary *risk group* (as defined in Paragraph 1.2.2).

2.2.6 The *fire safety systems* required by Paragraph 2.2.3 shall be interconnected to alert all occupants of that floor level in the event of *fire*.

Comment:
Refer to Paragraphs 2.2.7 and 2.2.8 for the requirements for other floor levels in the *building*.

Table 2.1 **Fire safety systems specified in this Acceptable Solution**

Type of system	System description	Relevant Standards for installation
7	Automatic *fire* sprinkler system with smoke detection and alarm system	NZS 4541, NZS 4515, NZS 4512
9	Smoke control in air handling system	AS/NZS 1668.1
18	*Building fire* hydrant system	NZS 4510

Other floors in a building

2.2.7 The alarm systems required in a *building* shall be interconnected to alert all *building* occupants in the event of *fire* except:

a) In areas that have the local smoke component of a Type 5 system, and

b) In a *risk group* SI where it is deemed appropriate to alert management and staff without notifying other occupants.

Same risk group on different floors

2.2.8 If *firecells* containing the same *risk group* occur at different levels in the same *building*, the *fire safety systems* for the *firecell* having the most onerous requirements shall be applied to all *firecells* in that *risk group*.

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2.3. Fire resistance ratings

FRR values

2.3.1 Unless explicitly stated otherwise in this Acceptable Solution, the *fire resistance ratings* (*FRRs*) that apply for this *risk group* shall be as follows:

Life rating = 60 minutes. This applies to *fire* rating requirements in Part 3: Means of escape and Part 4: Control of internal fire and smoke spread.

Property rating = 60 minutes. This applies to *fire* rating requirements in Part 5: Control of external fire spread.

Comment:
Throughout this Acceptable Solution, minimum *FRRs* are specified for particular situations. It is therefore essential to check for specific requirements.

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Structural elements in a single storey *building* need not be *fire* rated if *FRRs* are not required for any other reason.

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2.3.3 If there is more than one *risk group* on a floor in the *building*, the highest required *FRR* shall be applied to common spaces and shared *escape routes* for that floor level.

General requirements for FRRs

2.3.4 *FRRs* shall apply to the sides of *primary* and *secondary elements* which are exposed to *fire*.

2.3.5 When different *FRRs* apply on each side of a *fire separation*, being a wall, the higher rating shall apply to both sides.

2.3.6 Floors shall have an *FRR* for exposure from the underside.

2.3.7 The *FRR* of a *primary element* integral with a *fire separation* shall be no less than that of the *fire separation*.

2.3.8 Except as required by Paragraph 4.3.3, areas of *external wall* not permitted to be *unprotected areas* shall be rated for *fire* exposure from within a *firecell*.

2.3.9 Areas of *external wall* not permitted to be *unprotected areas* shall be rated for *fire* exposure from both sides equally where:

a) Walls are within 1.0 m of the *relevant boundary*, or

b) The *building height* is more than 10 m, or

c) The *final exit* is one or more floor levels below any *risk group* SI occupancy.

2.3.10 *Building elements* shall have an *FRR* no less than that of any *building element* to which they provide support within the *firecell* or in any adjacent *firecell*.

2.3.11 Structural framing members connected to *building elements* with an *FRR* shall be rated at no less than the *building elements* to which they are connected, or alternatively their connections and supports shall be designed so that their collapse during *fire* will not cause collapse of the *fire* rated elements.

Applying insulation component in FRR

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2.3.13 *Insulation* ratings are not required in *risk group* SI.

Part 3: Means of escape

CONTENTS

3.1 General principles

3.1.1. All *buildings* shall have *means of escape from fire* which include *escape routes*. An *escape route* (see Figure 3.1) shall provide protection to any occupant escaping to a *safe place* from a *fire* within a *building*.

3.1.2. The components of an *escape route*, in ascending order of protection, are the *open paths*, *exitways* (these may comprise *smoke lobbies* and *safe paths*), and *final exits* (see Figure 3.1). Two or more of these components will be necessary, depending on the total *travel distance*. An *escape route* shall not pass from a higher to lower level of protection in the direction of escape.

3.1.3. Provided the allowable lengths of *open paths* are not exceeded, an *escape route* may comprise only an *open path* and *final exit*.

3.1.4. *Escape routes* shall comply with NZBC D1. Ramps, stairs, ladders, landings, *handrails*, doors, vision panels and openings shall comply with Acceptable Solution D1/AS1.

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

A *building* management plan procedure should be approved by the *building consent authority* and should include a provision to ensure that all *escape route* doors are unlocked when anybody is lawfully in the *building*.

This Acceptable Solution does not prevent *owners*, for security purposes, from locking *escape route* doors when the *building* is unoccupied.

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People escaping down a stair have to be able to move from one stair to another so that, if one stair becomes smoke-logged or unusable for any other reason, people can continue their escape along an alternative route. If the stair is a single means of escape, people will still need to move out of the stair and wait for rescue by emergency services within the floor.

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

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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

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

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:

a) Are hung to swing both ways, or

b) Lead into, or are within *exitways*, except when the door is the egress for a sleeping space (such as a ward or *suite*), or

c) Subdivide corridors used as *escape routes*.

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

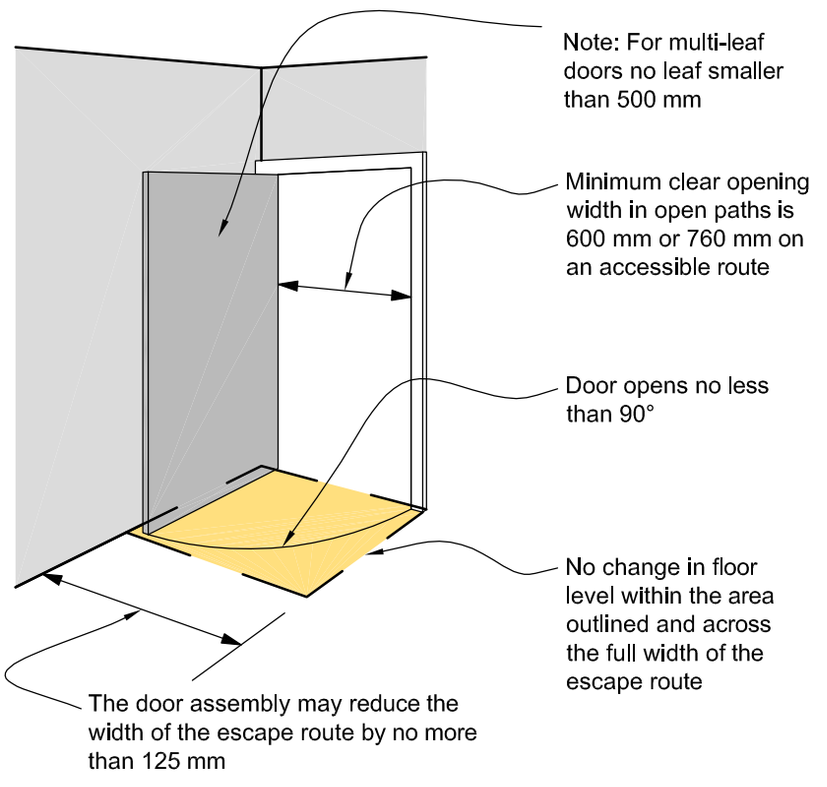
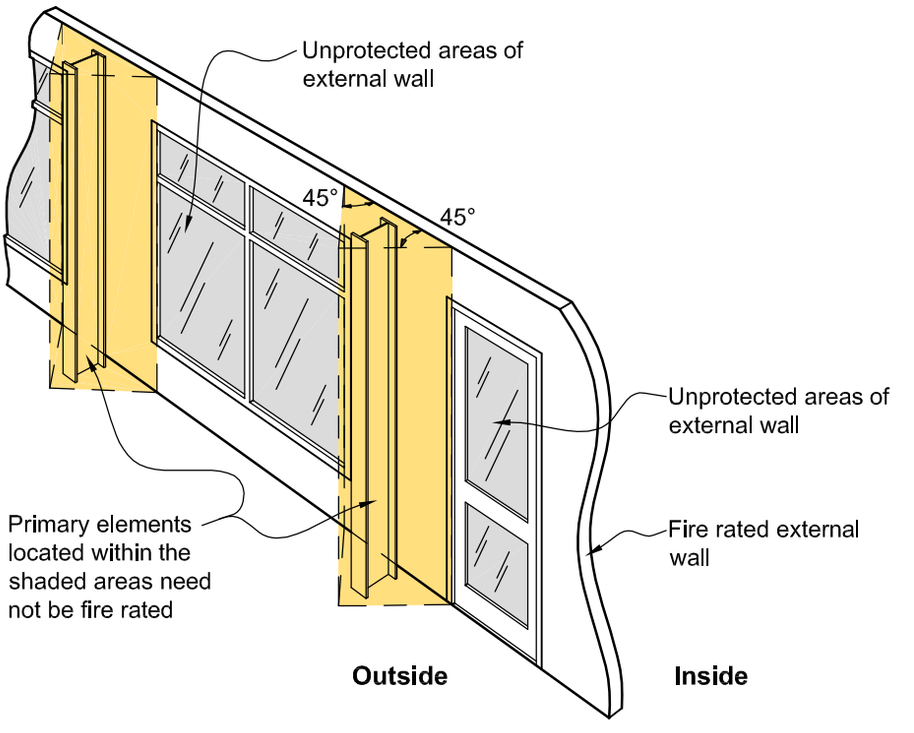


Figure 4.1 **Permissible positioning of unrated primary elements**
Paragraph 4.3.3



Providing vertical stability

4.3.4 *Building elements* required to have an *FRR* shall have their vertical *stability* provided in one or more of the following ways:

a) *Primary elements* in a vertical orientation (eg, walls and columns) shall be rated for *structural adequacy*

b) *Primary elements* in a horizontal orientation (eg, floors and beams) shall be supported by *primary elements* with at least an equivalent *structural adequacy* rating.

Providing horizontal stability

4.3.5 *Building elements* required to have an *FRR* shall have their horizontal *stability* provided in one or more of the following ways:

a) Be cantilevered from a structural base having an *FRR* of no less than that of the *building element* concerned

b) Be supported within the *firecell* by other *building elements* having an *FRR* no less than that required for the element being supported. The *structural adequacy* and diaphragm action of supporting *building elements*, located entirely within a single *firecell*, must be assessed when exposed to *fire* from all relevant sides simultaneously

c) Be supported by *primary elements* outside the *firecell*.

Comment:
It is assumed that *fire* will be restricted to the *firecell* of origin at least for the time required by the *property rating* of the *primary element* concerned.

The *stability* of a beam or *fire separation* may, for example, be provided by beam or diaphragm action of a floor or wall which is rated only for *structural adequacy*.

A *standard test* for *fire* resistance commonly exposes *fire separations* from one side only and may not be a suitable measure for determining the *structural adequacy* of a *building element* when exposed to *fire* from more than one side simultaneously.

4.4 Fire stopping

Introduction

4.4.1 The continuity and effectiveness of *fire separations* shall be maintained around *penetrations*, and in gaps between or within *building elements*, by the use of *fire stops*.

Fire stops

4.4.2 *Fire stops* shall have an *FRR* of no less than that required for the *fire separation* within which they are installed, and shall be tested in accordance with Appendix C C5.1.

4.4.3 *Fire stops* and methods of installation shall be identical to those of the prototype used in tests to establish their *FRR*.

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4.4.4 The material selected for use as *fire stops* shall have been tested for the type and size of the gap or *penetration*, and for the type of material and *construction* used in the *fire separation*.

Comment:
There are many types of *fire stops* (eg, mastics, collars, pillows), each designed to suit specific situations. A *fire stop* is appropriate for a particular application if it passes the test criteria when installed as proposed.

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4.4.5 A *fire stop* for a *penetration* is not required to have an *insulation* rating if means are provided to keep *combustible* materials at a distance of 300 mm away from the *penetration* and the *fire stop* to prevent ignition.

4.5 Firecell construction

4.5.1 Each of the *building elements* enclosing a *firecell* is permitted to have a different *FRR* depending on the characteristics of the *firecell*, the reason for the *FRR*, and the *risk groups* contained on either side of any *fire separation*.

Comment:
An *FRR* of zero may apply to some walls and most roofs.

4.5.2 Except where *intermediate floors* are permitted, each floor in a multi-storey *building* shall be a *fire separation*.

4.5.3 *Fire* and *smoke separations* shall have no openings other than:

a) For closures such as *doorsets*, and

b) *Penetrations* complying with Paragraph 4.4, and

c) For glazing permitted by Paragraph 4.2.

4.5.4 *Firecell* and *smokecell* effectiveness shall be maintained by ensuring continuity of *fire* and *smoke separations* at separation junctions, and around joints where closures, *protected shafts* and *penetrations* occur.

Junctions of fire separations

4.5.5 Where *fire separations* meet other *fire separations* or *fire* rated parts of *external walls*, they shall either be bonded together or have the junction *fire stopped* over its full length (see Figures 4.2 and 4.3).

4.5.6 Where one *fire separation* is a wall and the other a floor, the wall/floor junction shall be *constructed* with the *FRR* required for the higher rated element.

Junctions with roof

4.5.7 Vertical *fire separations* and *external walls* shall either:

a) Terminate as close as possible to the external roof cladding and *primary elements* providing roof support, with any gaps fully *fire stopped* (see Figures 4.2 and 4.3), or

b) Extend not less than 450 mm above the roof to form a parapet.

Ceiling space firecells

4.5.8 Large roof or ceiling spaces may be *constructed* as separate *firecells* above more than one occupied *firecell* provided that the ceiling is a *fire separation* rated from below. In this situation vertical *fire separations* in the *firecell* below need terminate only at the ceiling.

4.6 Specific requirements for sleeping areas

4.6.1 *Risk group* SI *firecells* shall be separated from *firecells* containing other *risk groups* by *fire separations* having *FRR*s in accordance with Paragraph 2.3.

4.6.2 Sleeping areas shall be separate *firecells* but may include direct support functions (see Paragraph 4.6.7). *Fire separations* within a *risk group* SI *firecell* that are between non-sleeping areas and sleeping areas, and between adjacent sleeping areas, shall have *FRR*s in accordance with Paragraph 2.3.

Group sleeping areas

4.6.3 Where sleeping accommodation is contained within only a single *group sleeping area firecell*, the number of beds shall not exceed 12. For care facilities (not detention) where the sleeping accommodation is distributed over two or more *group sleeping area firecells*, each *firecell* shall:

a) Contain no more than 20 beds, and

b) Have sufficient space to accommodate, in an emergency, the beds from an adjacent *firecell* of any occupants unable to walk.

Comment:
In this Acceptable Solution the term 'beds' is used to denote the number of people expected to be cared for or detained in the *firecell*. Therefore, a double bed counts as two beds, a tier of three single bunks (one above another) counts as three beds and four reclining recovery chairs counts as four beds.

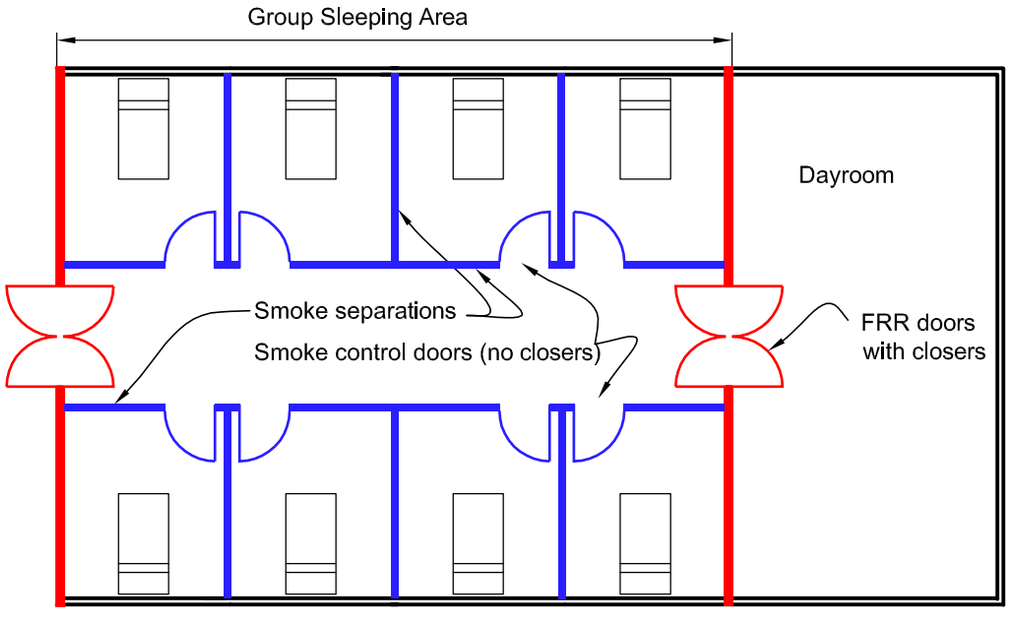
4.6.4 A *group sleeping area firecell* in *risk group* SI may be subdivided by either (see Figure 4.4(a)):

a) Non-*fire* rated partitions having a gap of no less than 400 mm between the top of the partitions and the underside of the roof or ceiling, or

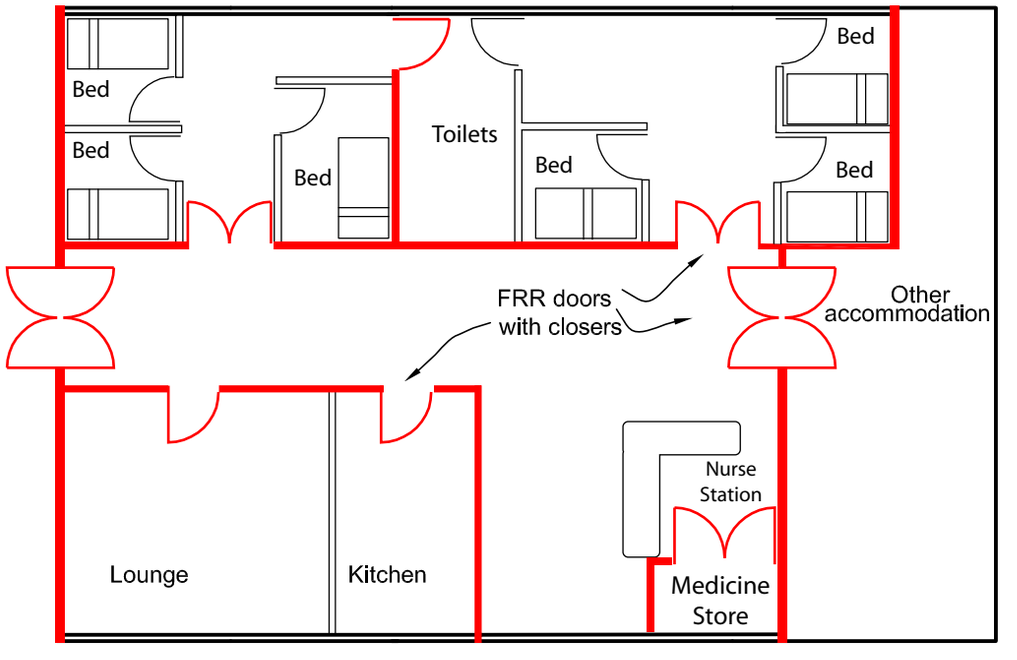
b) Full height *smoke separations* including *smoke control doors* which need not be fitted with self-closers.

Comment:
In certain specific situations, the *smoke control door* need not be fitted with a self-closer. Typical examples of such situations would be residential care premises or a hospital bedroom.

Figure 4.4 **Group sleeping areas and suites**
Paragraphs 4.6.4 and 4.6.5



(a) GROUP SLEEPING AREAS



(b) SUITES

KEY TO WALL FRR
Life rating FRR
Smoke separation walls

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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*.

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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.

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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.

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4.10 Intermittent activities

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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

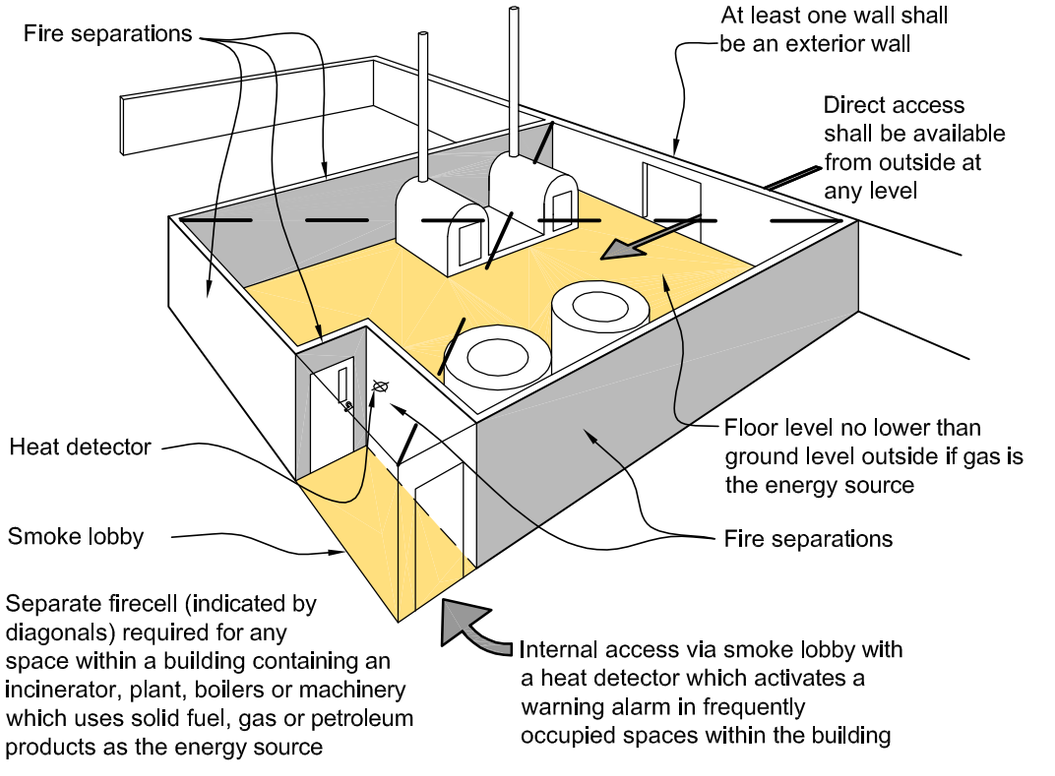
4.10.3 Any space within a *building* (see Figure 4.5) containing an incinerator, plant, boiler or machinery which uses solid fuel, gas or petroleum products as the energy source (but excluding space and local water heating appliances) shall be a separate *firecell* with an *FRR* of no less than 90 minutes, and shall have:

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 Unless fully enclosed by *construction* with an *FRR* of no less than that required for the *fire separation*, any air duct passing through a *fire separation* shall be equipped with a *fire damper* which, in the event of duct failure or collapse due to *fire*, closes the opening through the separation. The *fire damper* shall have an *FRR* of no less than that of the *fire separation*, except that the *damper blade* is not required to have:

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a) An *insulation* rating if means to prevent *combustible* materials being placed closer than 300 mm to the the *fire damper* and air duct are provided, or

b) A *structural adequacy* rating.

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The *fire damper* shall be capable of being readily accessed for servicing.

Comment:
Fire dampers are not effective in stopping smoke and are not required in *smoke separations*. Smoke control in ducts is effected by smoke control devices in the air handling system (see Paragraph 4.18).

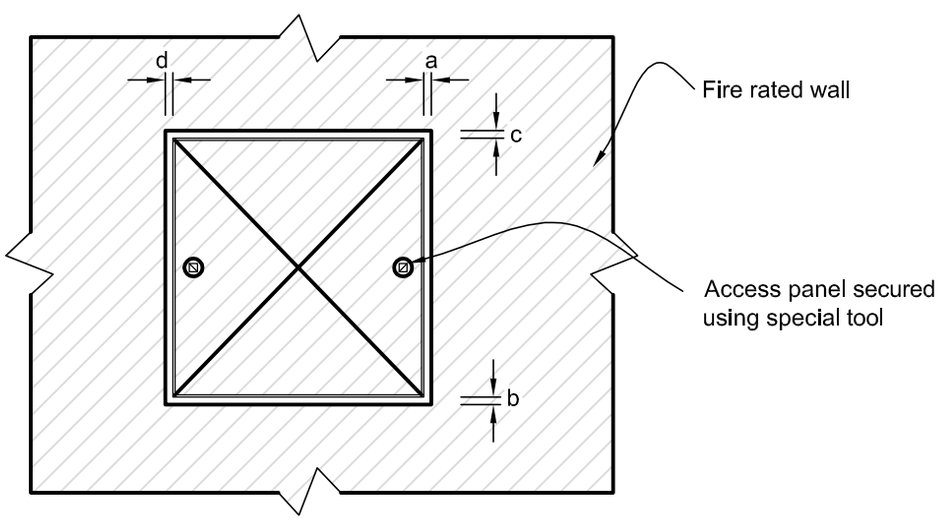
Fire shutters

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.

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

Figure 4.17 **Access panels**
Paragraph 4.16.10



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

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.

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Foamed plastics and exposed combustible insulating materials

4.17.2 If *foamed plastics building* materials or exposed *combustible insulating materials* form part of a wall, ceiling or roof 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, otherwise a surface lining is also required such that the completed system achieves a *Group Number* of 3. This paragraph applies to *foamed plastics building* materials whether exposed to view from the *occupied space* or enclosed.

Flooring

4.17.3 Flooring shall be either *non-combustible* or, when tested to IS0 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.

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^2
Non-sleeping *firecells* accommodating more than 50 persons	1.2 kW/m^2
All other *occupied spaces* other than *household units*	1.2 kW/m^2

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Wood and wood products in floors

4.17.5 In any *firecell* which has a *firecell* below, the flooring may be of wood products (wood products include boards manufactured from wood fibres or chips bound by an adhesive) provided it has either a thickness of no less than 20 mm, or the floor assembly has an *FRR* of -/30/30 when exposed to *fire* from the flooring side.

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^2

b) Electrical switches, outlets, cover plates and similar small discontinuous areas

c) Pipes and cables used to distribute power or services

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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

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^2, whichever is less

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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.

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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.

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

5.1.1 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.

7.2 Gas-burning appliances

7.2.1 For gas-burning appliances AS/NZS 5601.1 sections 6.7, 6.8 and 6.9 and Appendix H are Acceptable Solutions for the *construction* and installation of *flues* and sections 5.11, 6.2, 6.3 and 6.10 are Acceptable Solutions for the installation of appliances, with the modifications given in Paragraph 7.2.2.

7.2.2 Modifications to AS/NZS 5601.1

Delete paragraph 6.2.11 and substitute the following:

"6.2.11 Seismic restraint

Seismic restraint of appliances installed in buildings shall be designed in accordance with B1/VM1 Paragraphs 2.0 and 13.0."

Add a Note to 6.4 as follows:

"Ventilation requirements are contained in Acceptable Solution G4/AS1. The ventilation requirements of this Standard may exceed the performance requirements of NZBC G4."

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7.3 Oil-fired appliances

7.3.1 AS 1691, as modified by Paragraph 7.3.2, is an Acceptable Solution for the installation of domestic oil-fired appliances.

7.3.2 Modifications to AS 1691

Delete paragraph 2.2.3 and substitute the following:

"2.2.3 Electrical equipment

Electrical equipment shall comply with Acceptable Solution G9/AS1 or Verification Method G9/VM1."

Delete "CSIRO durability Class 2 or better" from paragraph 3.1.2 (b) and substitute "H5 treatment".

Delete the Note to paragraph 3.1.2 (d).

Delete paragraph 3.1.4 and substitute the following:

"3.1.4 Stability

The appliance shall be mechanically fixed to the building.

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

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

Delete the words "without specific approval" from paragraph 3.2.8 (b).

Delete paragraph 5.1.1.

Add Note to 5.2.2:

"Note: Refer to Acceptable Solution G4/AS1 for ventilation requirements."

7.3.3 AS/NZS 2918 Sections 2 and 4 are also Acceptable Solutions for the installation of *flues* for domestic oil-fired appliances.

7.4 Downlights

7.4.1 Recessed luminaires shall be installed with clearances from *building elements* including insulation of 100 mm.

Comment:
The requirement for a clearance of 100 mm from recessed luminaires also applies when installing or replacing insulation where recessed luminaires are present.

7.5 Open fires

Chimneys

7.5.1 *Chimneys* shall be *constructed* in accordance with Table 7.1 and Figure 7.1. They shall have:

a) *Fireplaces* lined with *fire* bricks having a thickness of no less than 50 mm

b) *Fireplace* joints of *non-combustible* material and shall be sealed against air leakage

c) *Chimney* brickwork of no less than a single skin of brick 90 mm thick plus a 65 mm thick layer of grout, and

d) An expansion gap provided in *chimneys* containing *flue liners*. These *flue liners* shall be wrapped in a *combustible* material of thickness no less than 0.25 mm (eg, heavy-quality *building* paper) to prevent the grout filling from bonding with the *flue liner*.

Table 7.1 Minimum acceptable dimensions of chimneys

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

Appendix A (normative): Fire safety systems

A1.1 Fire alarm and sprinkler systems

A1.1.1 *Fire* alarm systems used in *fire safety systems* shall satisfy the requirements of Acceptable Solution F7/AS1. *Fire* sprinkler systems used in the *fire safety systems* shall, except where specified, also satisfy the requirements of Appendix B.

A1.2 Requirements common to alarm systems

A1.2.1 Except for domestic smoke alarm systems and, where otherwise specified, each *fire* alarm system, regardless of method of activation, shall be provided with a means of communication with the Fire Service in accordance with Acceptable Solution F7/AS1.

A2.1 Fire safety system descriptions

A2.1.1 The following text provides a brief description of *fire safety systems* not otherwise described in Acceptable Solution F7/AS1. See F7/AS1 for descriptions of *fire* alarm systems Types 1, 2, 3, 4, 5, 6 and 7.

Type 9 – Smoke control in air handling systems

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

a) AS/NZS 1668: Part 1 and interface with any Type 4 or 7 system installed if it is self contained detection, control and provision of output signal/alarm, or

b) NZS 4512 to provide ancillary function output for control of the *HVAC* system if a Type 4 or 7 alarm system is used as a means of smoke detection.

Type 18 – Fire hydrant systems for buildings

Fire hydrant systems shall comply with NZS 4510.

Appendix B (normative): Fire sprinkler systems

B1.1 Introduction

B1.1.1 Wherever sprinklers are required by this Acceptable Solution, they shall comply with the relevant New Zealand Standard, amended as shown in Paragraphs B2.1 and B3.1.

B2.1 Automatic fire sprinkler systems

B2.1.1 NZS 4541 is amended as follows:

Clause 103 Definitions

Sprinkler system A system including:

(a) to (i) No change.

(j) Delete.

(k) Delete.

(l) No change.

Clause 205 Delete entire clause.

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Clause 209 Delete entire clause.

Clause 1203 Routine Surveys

Clause 1203.1 Delete first two paragraphs and replace with:

> "It is important that a sprinkler system at all times complies with this Standard as amended by Paragraph B2.1 of Appendix B to C/AS3 in all respects. To ensure that building alterations, changes in process or storage patterns or progressive deterioration of system components do not prejudice system compliance, a comprehensive survey shall be carried out biennially at intervals not exceeding 28 months. Such surveys shall be carried out by an independent qualified person."

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B3.1 Residential fire sprinkler systems

B3.1.1 NZS 4515 is amended as follows:

Clause 1.5 Definitions

Sprinkler system A system including:

(a) to (g) No change.

(h) Delete.

Clause 1.11 Delete entire clause.

Clause 2.1.2 Delete.

Clause 2.1.3 Delete.

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.

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.

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

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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.

Errata 1 Feb 2013

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-resistent separating elements –
Part 1: Service penetrations and control joints.

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

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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

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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* SI 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^2, 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.