MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Dear Customer

Please find attached the January 2017 amendments 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.

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

Section	**Previous version**	**January 2017 Amendment 4**
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 page 7/8	Replace with new pages 7-8B
C/AS3 Part 1	Remove page 21/22	Replace with new page 21/22
C/AS3 Parts 2 and 3	Remove pages 27/28, 47/48	Replace with new pages 27/28, 47/48
C/AS3 Part 4	Remove page 77/78	Replace with new page 77/78
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Appendices	Remove page 103-106	Replace with new pages 103-106

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

C
BUILDING CODE

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

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.

Enquiries about the content of this document should be directed to:

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Acceptable Solutions and Verification Methods are available from www.building.govt.nz

New Zealand Government

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 January 2017. 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 January 2017.

The previous version, Amendment 3, of this Acceptable Solution can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire until 30 May 2017. It can be used for building consent applications submitted before 31 May 2017.

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 until 30 May 2017	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
Amendmnet 4	Effective 1 January 2017	pp. 8, 8A References p. 21 1.1.2 p. 27 2.3.1 p. 47 3.15.5	p. 77 4.16.12 p. 84 5.5.7 p. 103 C4.1.2 Table C1

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	4.16.12, Table 2.1, A2.1.1 (Amend 3 Jul 2014)
Errata 1 Feb 2013	*Amend: 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 2 Dec 2013	*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

			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 *Amend: 1*	C5.1.2
Amend 4 Jan 2017	AS ISO 9705: 2003	Fire tests – Full scale room test for surface products	Table C1
	International Standards Organisation		
	ISO 5660:-	Reaction-to-fire tests – Heat release, smoke production and mass loss rate	
Errata 1 Feb 2013	Part 1: 2002	Heat release rate (cone calorimeter method)	C4.1.2, C7.1.1, C7.2.1 Table C1
	Part 2: 2002	Smoke production rate (dynamic measurement)	C4.1.2, Table C1 (Amend 4 Jan 2017)
	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, Table C1 (Amend 4 Jan 2017)
	European Standards Organisation		
Errata 1 Feb 2013			
	BS EN 12101:-	Smoke and heat control systems	
	Part 1: 2005	Specification for smoke barriers	Definitions
	EN 13501	Fire classification of construction products and building elements.	
	Part 1: 2007	Classification using test data from reaction to fire tests *Amend: 1*	Table C1
Amend 4 Jan 2017			
	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

	Where quoted
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
Australian Building Codes Board	
National Construction Code	Table C1

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Outside the scope of this Acceptable Solution

1.1.2. *Buildings* or parts of *buildings* in *risk groups* other than SI are outside the scope of this Acceptable Solution. Refer to Table 1.1 and use the corresponding Acceptable Solution instead.

Buildings with complex features are outside the scope of this Acceptable Solution and also of Acceptable Solutions C/AS1 to C/AS7 corresponding to other *risk groups*. Verification Method C/VM2 or an *alternative solution* shall be used instead. Complex features include:

Amend 4 Jan 2017

a) Atriums

b) *Intermediate floors*, other than limited area *intermediate floors*

c) Operating theatres, hyperbaric chambers

d) *Buildings* more than 20 storeys high, and

e) Prisons.

If the Acceptable Solution cannot be followed in full, use Verification Method C/VM2 or an *alternative solution* to demonstrate compliance.

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1.1.3. This *risk group* invariably requires a *fire* safety strategy involving delayed initiation of evacuation and movement to a *place of safety* within the *building*. However, this Acceptable Solution does not provide for the *building* features that would be required for a stay-in-place strategy for activities such as operating theatres, intensive care units, prisons, delivery rooms and recovery rooms.

1.1.4. For the purposes of C/AS3 the term 'bed' means the number of people that are under care or detention and can include people on beds, recliner or lounge chairs, dentist chairs, treatment tables and other furniture where an occupant may be for the period of treatment, in care or detention.

Hazardous substances not covered by this Acceptable Solution

1.1.5. This Acceptable Solution does not provide for any use, storage or processing of *hazardous substances*. Compliance with NZBC F3 and the Hazardous Substances and New Organisms Act 1996 shall be ensured where applicable in addition to the requirements of this Acceptable Solution.

1.2 Using this Acceptable Solution

1.2.1 The process for using this Acceptable Solution shall be as follows.

Step 1: Determine which Acceptable Solutions apply

a) Determine the *risk group* for each of the activities carried out in the *building* (refer to Table 1.1 and to Paragraph 1.1.1 of this and the other Acceptable Solutions). If the activity is not listed explicitly, choose the nearest suitable *risk group*.

b) If there is more than one *risk group* for a *firecell*, determine its primary *risk group* (see Paragraph 1.2.2: this is the one with the most onerous *fire* safety requirements).

c) Apply this Acceptable Solution for any *firecell* in *risk group* SI by following steps 2 and 3.

d) Then apply the relevant Acceptable Solutions for *firecells* with any other *risk groups* in the *building*.

Comment:
Firecells*:* The Acceptable Solutions use the concept of *firecells* to divide *buildings* into compartments. Each *firecell* can be considered individually in the first instance and subsequently the *fire* safety requirements for the whole *building* can be developed, for example when considering a multi- storey *building* that has different activities on a number of floors, or even has different activities/uses on the same floor.

Future flexibility: A *building* is very likely to undergo one or more changes of use over its lifetime. Even under the same use, floor layout and furnishing will alter to accommodate changes in technology and occupant practices. Therefore, at the time of initial *construction*, *owners* should consider the advantages of providing for *fire safety systems* to suit alternative occupancies as these systems could be difficult or excessively expensive to install at a later date.

For Paragraph 1.2.1 Step 1 b), the most onerous *fire* safety requirements usually occur in Part 2: Firecells, fire safety systems and fire resistance ratings of each Acceptable Solution. *Buildings* or parts of *buildings* with sleeping occupancies generally have the most onerous requirements.

Step 2: Determine the parameters for risk group SI

a) Establish the relevant *building* measurements (these will include *building height*, floor plans, wall openings and distances to *relevant boundaries*).

b) Work out the *occupant loads* for the relevant *building* spaces (refer to Paragraph 1.4).

Comment:
Applying the Acceptable Solution depends largely on the basic *building* measurements as above; therefore, this should determine these as accurately as possible before using this document.

Step 3: Satisfy the fire safety requirements

Satisfy the *fire* safety requirements of this Acceptable Solution (refer to Parts 2-7), based on the *occupant loads* and on the *building*'s dimensions and features where required.

Primary risk groups

1.2.2 If a *building* contains a number of different activities which individually may be categorised in different *risk groups*, the *risk group* designated for a particular *firecell* within a *building* shall be that of the primary *risk group*. The primary *risk group* shall be that one within the *firecell* that has the most onerous *fire* safety requirements.

1.2.3 Depending on the particular *building* and the uses or activities within that *building*, there may be several primary *risk groups*, with one or more on each floor.

Comment:
For example, levels of a multi-storey *building* may be categorised in different *risk groups* such as:

Basement carparks	VP
Shopping floors	CA
Office floors	WB
Domestic accommodation	SM

A single floor may also contain several *risk groups* such as:

Offices	WB
Shops	CA
Cafeteria	CA

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

Property rating = 60 minutes.

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

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

Amend 2 Dec 2013

2.3.2 THIS PARAGRAPH DELIBERATELY LEFT BLANK

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

2.3.12 THIS PARAGRAPH DELIBERATELY LEFT BLANK

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.

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.

Amend 3 Jul 2014

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.

Amend 3 Jul 2014

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.

Amend 2 Dec 2013

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 and within horizontal *safe paths*, or

ii) 1250 mm within vertical *safe paths*, and

Amend 4 Errata 1

c) Open no less than 90°, and

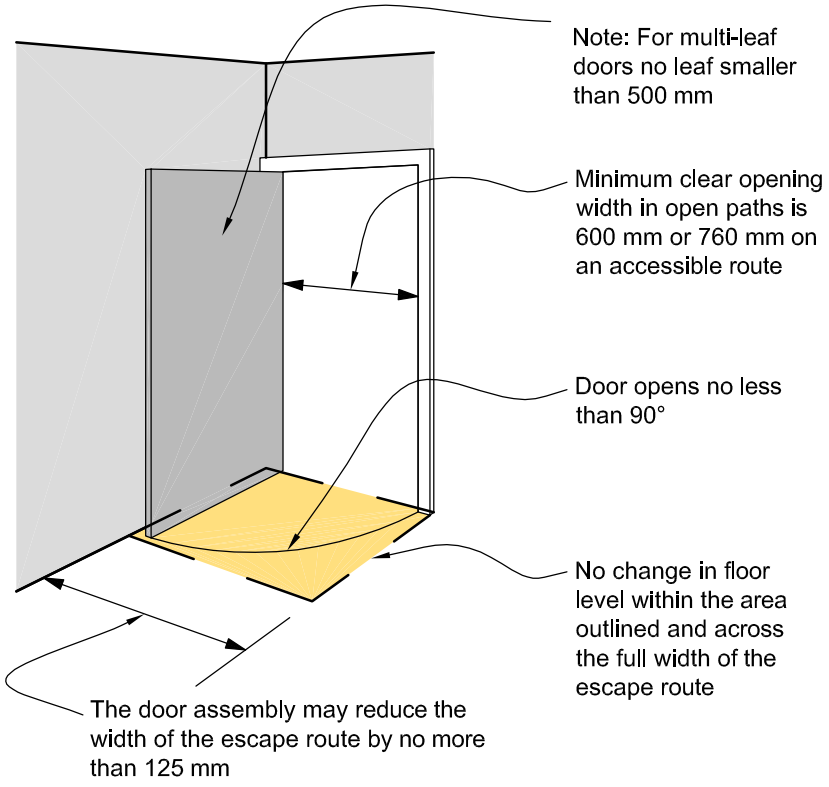
d) Open onto a floor area which:

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).

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:

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*.

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:

Amend 3 Jul 2014

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.

Amend 2 Dec 2013

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.

Amend 3 Jul 2014

Where evacuation is delayed, ventilation ducts that pass through a *fire separation* to a *place of safety* within the *building* must provide a *smoke damper* complying with AS/NZS 1668.1.

Comment:
Delayed evacuation relates to any evacuation regime other than all *building* occupants moving directly to a *place of safety* outside, simultaneously and immediately on detection of *fire*.

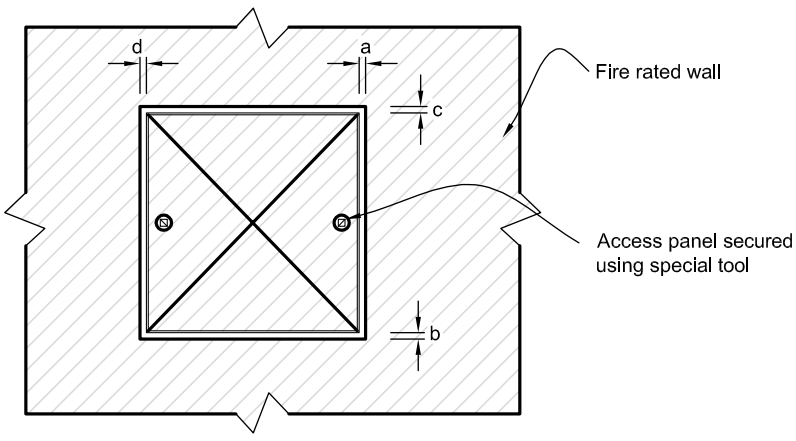
Amend 4 Jan 2017

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.

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.

Amend 2 Dec 2013

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.

Amend 3 Jul 2014

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.

Amend 3 Jul 2014

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 IS0 9239-1, shall have a critical radiant flux of not less than that specified in Table 4.2.

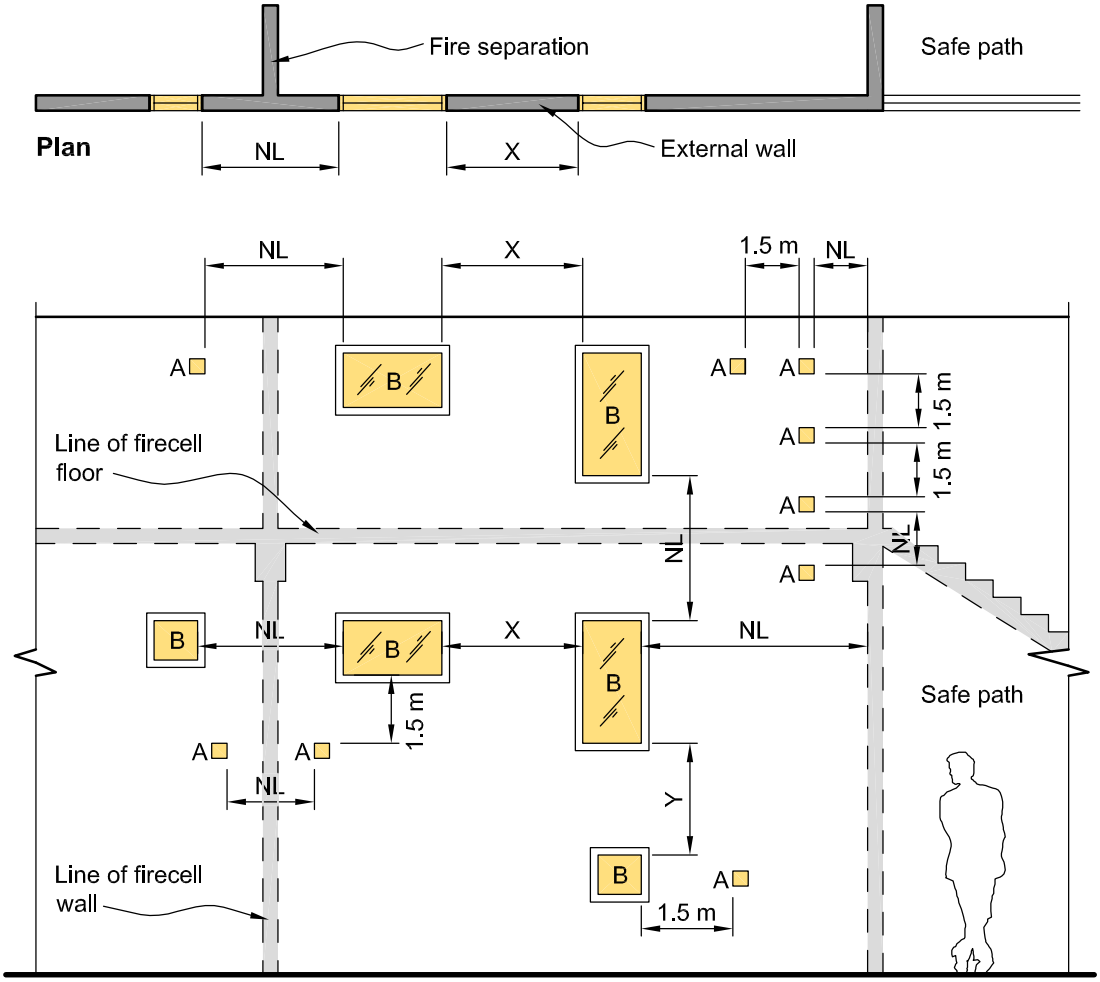
4.17.4 Paragraph 4.17.3 shall apply to flexible finishes such as carpets, vinyl sheet or tiles, and to finished or unfinished floor surfaces.

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

Errata 1 Feb 2013

Figure 5.1 **Method 1 – Permitted small unprotected areas and fire resisting glazing**
Paragraphs 5.4.1 and 5.4.4



Elevation

Dimensions shown are minimum distances between Type A unprotected areas and of Type B fire resisting glazing

Legend

A□ Type A *unprotected areas* of 0.1 m^2 maximum

B Type B areas of *fire resisting glazing* complying with Table 5.1

NL No limitation on spacing

X Spacing to be no less than the greater of the widths of the two Type B areas being considered

Y Spacing to be no less than the greater of the heights of the two Type B areas being considered

5.5.3 Table 5.2 can also be used to determine the required distance from the *relevant boundary* where the percentage of *unprotected area* has previously been determined. Select the appropriate percentage (under the rectangle width column) and read the permitted distance to the *relevant boundary* from the left hand column of Table 5.2.

5.5.4 If Table 5.2 does not contain the exact measurements for the *firecell* being considered, use the next highest value for percentage area or next lowest value for *boundary* distance.

Errata 1 Feb 2013

5.5.5 The largest individual *unprotected area* in the *external wall* and distance to any adjacent *unprotected areas* shall be restricted to the maximum dimensions specified in Table 5.3.

5.5.6 DELIBERATELY LEFT BLANK

5.5.7 As an alternative to the table method the Commentary to Verification Method Appendix A: Methodology for Horizontal Fire Spread (Tabular Data) can be used. For this method the tables for *unprotected area* and the wing/return wall tables in the Commentary must be used together.

Amend 4 Jan 2017

Comment:
For guidance on the appropriate *FLED* refer to Table 2.2 of Verification Method C/VM2. This method requires a higher level of understanding of spread of fire to *other property* and should only be used by suitably qualified and experienced designers.

Errata 1 Feb 2013

Table 5.2 Maximum percentage of unprotected area for external walls

Minimum distance to *relevant boundary* (m) (see Figure 5.3)	Percentage of wall area allowed to be unprotected					
	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
	Angle between wall and *relevant boundary* up to 45°		Angle between wall and *relevant boundary* 46° to 60°		Angle between wall and *relevant boundary* 61° to 89°	
	Width of sprinklered *firecell*		Width of sprinklered *firecell*		Width of sprinklered *firecell*	
	Up to 5 m	Greater than 5 m	Up to 5 m	Greater than 5 m	Up to 5 m	Greater than 5 m
Less than 1	0	0	0	0	0	0
1	80	60	90	66	100	70
2	100	80	100	90	100	100
3	100	100		100		100

Table 5.3 Maximum size of largest permitted single unprotected area in external walls

Minimum distance to *relevant boundary* (m) (see Figure 5.3)	Maximum largest single *unprotected area* (m^2)	Minimum distance to adjacent *unprotected areas* (m)
1	15	1.5
2	35	2.5
3	60	3.5

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.

Amend 3 Jul 2014

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

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.

Errata 1 Feb 2013

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

Amend 3 Jul 2014

Australian and European classifications can be used to achieve *Group Numbers* in Table C1.

Table C1 Alternative test or classification standards for Group Numbers

Requirements according to C/VM2 Appendix A using ISO 9705 and ISO 5660	Requirements according to NCC Specification C1.10 Clause 4 using AS ISO 9705	European Classification using EN 13501-1
Group Number 1- S	Group Number 1, and a smoke growth rate index not more than 100	Class A1, A2 or Class B and Smoke production rating s1 or s2
Group Number 1	Group Number 1	Class A1, A2 or B
Group Number 2- S	Group Number 2, and a smoke growth rate index not more than 100	Class C and Smoke production rating s1 or s2
Group Number 2	Group Number 2	Class C
Group Number 3	Group Number 3	Class D
Group Number 4	Group Number 4	Class E and F

Amend 4 Jan 2017

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

Amend 2 Dec 2013

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

Amend 2 Dec 2013

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 ade 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.

C7.1.3 Timber claddings which have a *fire retardant* treatment incorporated in or applied to them shall be subjected to the regime of accelerated weathering described by ASTM D 2898 Method B with the water flow rate from Method A, before testing in accordance with the requirements of Paragraph C7.1.1.

C7.1.4 *External wall* cladding systems, which comprise only materials which individually are classified as *non-combustible*, may be deemed to satisfy all the requirements of Paragraph 5.8.1.

Comment:
The *non-combustible* classification represents a more onerous performance level than those required by Paragraph 5.8.1 and is therefore acceptable.
A *non-combustible* classification may be claimed only if the respective materials have been subjected to testing as described in Paragraph C7.1.1.

C7.1.5 Claddings incorporating a metal facing with a melting point of less than 750°C covering a *combustible* core or insulant shall be tested as described in Paragraph C7.1.2 without the metal facing present.

Comment:
Aluminium has a melting point of less than 750°C.

Index

References are to the relevent paragraphs, figures or tables in **C/AS3** unless otherwise stated. References to Appendices are prefixed by the Appendix letter.