MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Please find attached Amendment 5, effective 5 November 2020, to Acceptable Solution C/AS1 and Verificaton Method C/VM1 for Clauses C1–C6 Protection from Fire of the New Zealand Building Code. The previous amendment to C/AS1 and C/VM1, Amendment 4, was in January 2017.

Section	**Previous version**	**November 2020 amendment**
Title pages	Remove title page and document history/status	Replace with new title page and document history/status
Contents	Remove page 5/6	Replace with new page 5/6
References	Remove page 7/8	Replace with new page 7/8
Definitions	Remove pages 9–14	Replace with new pages 9–14
C/AS1 Part 1	Remove pages 15–20	Replace with new pages 15–20
Appendices/ Index	Remove pages 39–40	Replace with new pages 39–40

MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

C/VM1

Verification Method for Solid Fuel Appliances

C/AS1

Acceptable Solution for Buildings with Sleeping (residential) and Outbuildings (Risk Group SH)

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

C
BUILDING CODE

Using this Verification Method or Acceptable Solution

The Ministry of Business, Innovation and Employment may amend parts of this document at any time. People using this document should check on a regular basis whether new versions have been published. The current version can be downloaded from www.building.govt.nz

Users should make themselves familiar with the preface to the New Zealand Building Code Handbook, which describes the status of Verification Methods and 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 document. Classified uses of buildings are explained in the Building Code Clause A1.

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New Zealand Government

Status of C/VM1 and C/AS1

This Verification Method C/VM1 and the Acceptable Solution C/AS1 in this document provide a means of compliance with the New Zealand Building Code Clauses C1-C6 Protection from Fire. C/VM1 and C/AS1 are issued under section 22 of the Building Act 2004 respectively as a Verification Method and an Acceptable Solution.

This Verification Method and Acceptable Solution provide 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/VM1 and C/AS1

This Acceptable Solution and Verification Method are effective from 5 November 2020. They can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire. They do not apply to building consent applications submitted before 5 November 2020.

The previous version, Amendment 4, of this Acceptable Solution and Verification Method can be used to show compliance with the Building Code Clauses C1-C6 Protection from Fire until 3 November 2021. It can be used for building consent applications submitted before 4 November 2021.

Document History

	Date	Alterations	
New document	Effective from 10 April 2012	C/VM1 and C/AS1 are 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	p. 5 Contents pp. 7–8 References p. 15 C/VM1 1.1.1 p. 17 C/AS1 Table 1.1	p. 19 C/AS1 1.3 pp. 25–26 C/AS1 5.1, 5.3.1, 5.3.2, 5.4, 5.5 p. 37 C/AS1 C4.1.2 and C5.1.1 p. 40 Index
Amendment 2	Effective from 19 December 2013 until 28 February 2015	p. 5 Contents p. 7 References p. 12 Definitions p. 17 C/AS1 1.1.1, Table 1.1 p. 18 C/AS1 Figure 1.1 p. 19 C/AS1 1.3 p. 21 C/AS1 Table 2.1 p. 22 C/AS1 3.4, Table 3.2	pp. 23–24 C/AS1 4.2, 4.3 pp. 25–26 C/AS1 5.1, 5.3.1, Table 5.1 p. 27 C/AS1 6.1 p. 29 C/AS1 7.2 p. 36 B2.1.1 p. 38 C6.1.2 p. 40 Index
Amendment 3	Effective from 1 July 2014 to 30 May 2017	p. 5 Contents pp. 7–8 References pp. 9 and 12 Definitions p. 17 C/AS1 1.1.1, Table 1.1 p. 19 C/AS1 1.3 p.20 C/AS1 2.2.1 p. 22 C/AS1 Table 3.2 pp.23–24 C/AS1 4.2, 4.3	pp.25–26 C/AS1 5.1, 5.3, Figure 5.1, Table 5.1 p. 27 C/AS1 6.1 p. 29 C/AS1 7.4 p. 37 C1.1, C2.1, C4.1.2, C5.1.1 p. 40 Index
Amendment 4	Effective from 1 January 2017 until 3 November 2021	p. 7 References p. 21 2.3.1 p. 22 C/AS1 Table 3.2	p. 25 C/AS1 5.1.2
Amendment 5	Effective from 5 November 2020	p. 5 Contents pp. 7–8 References pp. 9– 14 Definitions	pp. 16 – 19 C/AS1 1.1–1.3, Table 1.1 p. 39 Appendix C C.7.1.4 p. 40 Index

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References

For the purposes of New Zealand Building Code compliance, the New Zealand and other Standards, and other documents referred to in this Verification Method and 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 Verification Method and Acceptable Solution were 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	AS1 C5.1.1	
	Part 22: 1987	Methods for determination of the fire resistance of non-loadbearing elements of construction	AS1 C5.1.1	
	AS/NZS 1668:-	The use of ventilation and air conditioning in buildings	VM1 1.1.1	
	Part 1: 1998	Fire and smoke control in multi-compartment buildings	AS1 A2.1.1	
Errata 1 Feb 2013		*Amend: 1*		
	AS/NZS 2918: 2001	Domestic solid fuel burning appliances – installation	AS1 7.1.1, 7.1.2, 7.3.3 7.5.5, 7.5.10 Comment, Figure 7.2	
	NZS 4510: 2008	Fire hydrant systems for buildings	AS1 A2.1.1	
		Amend: 1		
	NZS 4512: 2010	Fire detection and alarm systems in buildings	AS1 Table 2.1, Table 3.2, A2.1.1, C6.1.6	
Amend 4 Jan 2017	NZS 4514:2009	Interconnected Smoke Alarms for houses	AS1 Table 3.2	
	NZS 4515: 2009	Fire sprinkler systems for life safety in occupancies of less than 2000 m^2	AS1 6.1.1, Table 2.1, Table 3.2, Table 5.1, B3.1.1	Amends 2 and 3
	NZS 4517: 2010	Fire sprinkler systems for houses	AS1 Table 3.2	
	NZS 4520: 2010	Fire resistant doorsets	AS1 C6.1.1	
	NZS 4541: 2013	Automatic fire sprinkler systems	B2.1.1	Amend 5 Nov 2020
	AS/NZS 5601:-	Gas installation	AS1 7.2.1, 7.2.2	
	Part 1: 2010	General installations		
		Amend: 1		
	AS/NZS 60598: 2001	Luminaires		
	Part 2.2	Particular requirements – Recessed luminaires	AS1 7.4.1	
Amend 2 Dec 2013		*Amend: AA*		

		Where quoted	
Standards Australia			
AS 1366:-	Rigid cellular plastics sheets for thermal insulation		
Part 1: 1992	Rigid cellular polyurethane (RC/PUR) *Amend: 1*	AS1 4.3	
Part 2: 1992	Rigid cellular polyisocyanurate (RC/PIR)	AS1 4.3	
Part 3: 1992	Rigid cellular polystyrene – moulded (RC/PS-M) *Amend: 1*	AS1 4.3	
Part 4: 1989	Rigid cellular polystyrene – extruded (RC/PS-E)	AS1 4.3	Amend 3 Jul 2014
AS 1530:-	Methods for fire tests on building materials, components and structures		
Part 1: 1994	Combustibility test for materials	Definitions, AS1 C4.1.1	
Part 2: 1993	Test for flammability of materials	AS1 C3.1	
Part 4: 2005	Fire-resistance tests of elements of building construction	AS1 C5.1.1	
AS 1691: 1985	Domestic oil-fired appliances – installation	AS1 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*	AS1 C5.1.2	Errata 1 Feb 2013
European Standards			Errata 1 Feb 2013
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)	AS1 C4.1.2, C7.1.1, C7.1.2	
Part 2: 2002	Smoke production rate (dynamic measurement)	AS1 C4.1.2	Errata 1 Feb 2013 Amend 5 Nov 2020
ISO 9239:-	Reaction to fire tests for flooring		
Part 1: 2010	Determination of the burning behaviour using a radiant heat source.	AS1 C2.1	
ISO 9705: 1993	Fire tests – Full scale room test for surface products	AS1 C4.1.2	Errata 1 Feb 2013
New Zealand Legislation			
Hazardous Substances and New Organisms Act 1996		AS1 1.14	Amend 5 Nov 2020

Definitions

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

Backcountry hut A *building* that—

a) is located on land that is administered by the Department of Conservation for conservation, recreational, scientifc, or other related purposes, including any land administered under any of the following:

i) the Conservation Act 1987;

ii) the National Parks Act 1980;

iii) the Reserves Act 1977; and

b) is intended to provide overnight shelter to any person who may visit and who carries his or her own food, bedding, clothing, and outdoor equipment; and

c) contains only basic facilities, which may include (but are not limited to) any or all of the following:

i) sleeping platforms or bunks;

ii) mattresses;

iii) food preparation surfaces;

iv) appliances for heating;

v) appliances for cooking;

vi) toilets; and

d) has been certifed by the Director-General as being in a location that wheelchair users are unlikely to be able to visit; and

e) is intended to be able to sleep—

i) no more than 20 people in its backcountry hut sleeping area; and

ii) no more than 40 people in total; and

f) does not contain any connection, except by radiocommunications, to a network utility operator.

Amend 5 Nov 2020

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 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.

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*.

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

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.

Amend 5 Nov 2020

Escape height The height between the floorlevel 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*. 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*.

Amends 3 and 5

Note that doors in an *escape route* are not considered to be obstructions provided they comply with this Acceptable Solution and D1/AS1.

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.

Amend 5 Nov 2020

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

Fire The state of combustion during which flammable materials burn producing heat, toxic gases, or smoke or flame or any combination of these.

Firecell Any space including a group of contiguous spaces on the same or different levels within a *building*, which is enclosed by any combination of *fire separations*, *external walls*, roofs, and floors.

Comment:
Floors, in this context, includes ground floors, and those in which the underside is exposed to the external environment (eg, when cantilevered). Note also that internal floors between *firecells* are *fire separations*.

Fire door A doorset, single or multi-leaf, having a specific *fire resistance rating*, and in certain situations a smoke control capability, and forming part of a *fire separation*. The door, in the event of *fire*, if not already closed, will close automatically and be self latching.

Fireplace A space formed by the c*himney back*, the *chimney jambs*, and the *chimney breast* in which fuel is burned for the purpose of heating the room into which it opens.

Fire resistance rating (FRR) The term used to describe the minimum *fire* resistance required of *primary* and *secondary elements* as determined in the *standard test* for *fire* resistance, or in accordance with a specific calculation method verified by experimental data from standard *fire* resistance tests. It comprises three numbers giving the time in minutes for which each of the criteria *structural adequacy*, *integrity* and *insulation* are satisfied, and is presented always in that order.

Comment:
Examples of FRRs are:

a) 60/60/30 indicating *structural adequacy* 60 minutes, *integrity* 60 minutes, *insulation* 30 minutes.

b) 30/-/- indicating *structural adequacy* 30 minutes, but no time requirement for *integrity* or *insulation*.

c) 60/30/x indicating *structural adequacy* of 60 minutes, *integrity* of 30 minutes, and a requirement for *insulation*.

Fire retardant A substance or a treatment, incorporated in or applied to a material, which suppresses or delays the combustion of that material under specified conditions.

Fire safety systems means the combination of all active and passive protection methods used in a *building* to—

(a) warn people of an emergency; and

(b) provide for safe evacuation; and

(c) provide for access by, and the safety of, firefighters; and

(d) restrict the spread of *fire*; and

(e) limit the impact of *fire* on structural stability

Fire separation Any *building element* which separates *firecells* or *firecells* and *safe paths*, and provides a specific *fire resistance rating*.

Fire stop A material or method of *construction* used to restrict the spread of *fire* within or through *fire separations*, and having a *FRR* no less than that of the *fire separation*.

Comment:
Fire stops are mainly used to seal around *penetrations*, but can also be used to seal narrow gaps between *building elements*.

Flammability index (FI) That index number for flammability, which is determined according to the *standard test* method for flammability of thin flexible materials.

Flue The passage through which the products of combustion are conveyed to the outside.

Flue liner Pipes or linings of *fire clay*, metal or *fire* brick that surrounds *flues*.

Flue system A series of interconnecting *flue* pipe casings which form a safe passage (*flue*) for conveying products of combustion from within an appliance to the outside of a *building* or structure.

Foamed plastics *Combustible* foamed plastic polymeric materials of low density (typically less than 100 kg/m^3) and are classified as cellular polymers which are manufactured by creating a multitude of fine void (typically 90 to 98%) distributed more or less uniformly throughout the product. Examples of *foamed plastics* are latex foams, polyethylene foams, polyvinyl chloride foams, expanded or extruded polystyrene foams, phenolic foams, ureaformaldehyde foams, polyurethane foams and polychloropene foams.

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

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

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

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

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

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

Household unit

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

(i) used, or intended to be used, only or mainly for residential purposes; and

(ii) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but

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

HVAC An abbreviation for heating, ventilating and airconditioning.

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

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

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

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

Amend 5 Nov 2020

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

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

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

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

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

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

Amend 2 Dec 2013

Multi-unit dwelling Applies to a *building* or use which contains more than one separate household or family.

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

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

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

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

Amend 3 Jul 2014

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

a) dividing the total floor area by the m^2 per person (occupant density) for the activity being undertaken, or

b) for sleeping areas, counting the number of sleeping (or care) spaces, or

c) for fixed seating areas, counting the number of seats.

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

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

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

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

Amend 3 Jul 2014

(ii) for the purposes of Building Act sections 32, 44, 92, 96, 97, and 176(c), any person who has agreed in writing, whether conditionally or unconditionally, to purchase the land or any leasehold estate or interest in the land, or to take a lease of the land, and who is bound by the agreement because the agreement is still in force.

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

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

Amend 2 Dec 2013

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

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*.

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*.

The Fire Safety and Evacuation of Buildings Regulations 2006 use the term *place of safety* and allow the *place of safety* to be within the *building* provided that it is protected with a sprinkler system. In this Acceptable Solution a *place of safety* can only be within a *building* in *Risk Group* SI.

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.

Safe place A place, outside of and in the vicinity of a single *building* unit, from which people may safely disperse after escaping the effects of a *fire*. It may be a place such as a street, *open space*, public space or an *adjacent building* unit.

Amend 5 Nov 2020

Secondary element A *building element* not providing load bearing capacity to the structure and if affected by *fire*, instability or collapse of the *building* structure will not occur.

Smokecell A space within a *building* which is enclosed by an envelope of *smoke separations*, or *external walls*, roofs, and floors.

Smoke control door A *doorset* that complies with Appendix C, C6.1.2 of this acceptable solution.

Stability In the context of *fire* protection is the support provided to a *building element* having a *FRR*, intended to avoid premature failure due to structural collapse as a result of applied load, dead and live loads or as a result of any additional loads caused by *fire.*

Standard test A test method which is recognised as being appropriate for the *fire* protection properties being assessed.

Comment:
A list of *standard test* methods is given in Appendix C.

Structural adequacy In the context of the standard test for *fire* resistance, is the time in minutes for which a prototype specimen has continued to carry its applied load within defined deflection limits.

Comment:
The *fire* design load should be as specified in B1/VM1.

Surface finish The combination of a surface coating and substrate material on surfaces of *building elements* exposed to view. It can be an applied decorative coating or the uncoated *building element* itself. For interior surfaces the requirements are evaluated in terms of a *Group Number*. For exterior surfaces the requirements are evaluated in terms of rate of heat release as determined by Appendix C, Paragraph C6.1.

Theatre A place of assembly intended for the production and viewing of performing arts, and consisting of an auditorium and stage with provision for raising and suspending stage scenery above and clear of the working area.

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Unprotected area In relation to an *external wall* of a *building*, this means:

a) Any part of the *external wall* which is not *fire* rated or has less than the required *FRR, and*

b) Any part of the *external wall* which has combustible material more than 1.0 mm thick attached or applied to its external face, whether for cladding or any other purpose.

Comment:
Unprotected area includes non-*fire* rated windows, doors, or other openings, and non-*fire* rated *external wall construction*.

Wharenui A communal meeting house having a large open floor area used for both assembly and sleeping in the traditional Māori manner.

Amend 5 Nov 2020

Verification Method C/VM1

1.1 Solid Fuel Appliances

Limiting heat transfer

Errata 1 Feb 2013

1.1.1 Compliance with NZBC Performances C2.2 and C2.3 may be verified for solid fuel burning appliances by meeting the appropriate test requirements of AS/NZS 2918.

Acceptable Solution C/AS1 Part 1: General

CONTENTS

1.1 Introduction and scope

1.2 Using this Acceptable Solution

1.3 Alterations and changes of use to buildings

1.1 Introduction and scope

This Acceptable Solution is one of three Acceptable Solutions that provide a means of establishing compliance with NZBC Clauses C1 to C6 Protection from Fire. It can be used for the *building* activities covered by *risk group* SH as specified in Paragraph 1.1.1 and described in Table 1.1.

For other *risk groups*, please refer to Acceptable Solution C/AS2.

For *backcountry huts*, please refer to Acceptable Solution BCH/AS1.

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.

Appendices to this Acceptable Solution have equal status to this Acceptable Solution. Note that the Appendices have been included in their entirety but not all requirements are relevant to *risk group* SH.

Figures are informative only; the wording of the paragraphs takes precedence.

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Comment:

1. 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.

The *fire* safety requirements for *risk group* SH do not depend on the *occupant load* of the *firecells*.

2. Outbuilding is a classified use (Building Code Clause A1). The term applies to a *building* or use which may be included within each of the other classified uses but is not intended for human habitation, and is accessory to the principal use of associated buildings. Examples: a carport, farm building, garage, greenhouse, machinery room, private swimming pool, public toilet, or shed.

Amend 3 Jul 2014

Amends 1, 2, 3

Table 1.1	Risk groups: scope and limitations	
	Risk group	**Applies to**
C/AS1	**SH Buildings with sleeping (residential) and outbuildings**	**Detached dwellings with a single *household unit* such as**: stand-alone houses **Low-rise *multi-unit dwellings* where each *household unit* has its own *escape route* that is independent of all other *household units such as*:** Attached townhouses. Stacked *household units* where there is no more than one *household unit* above another with each *household unit* having a single storey and an *escape height* less than 4.0 m. **Detached dwellings where fewer than six people (not including members of the residing family) pay for accommodation such as**: boarding houses, homestays, bed and breakfasts **Outbuildings**
Acceptable Solution C/AS2	**SM* Sleeping (non-institutional)** (Out of scope for Acceptable Solution C/AS1)	**Permanent accommodation such as:** Apartment *buildings* and other *buildings* which consist of more than one *household unit* (other than low-rise *multi-unit dwellings* in the scope of *risk group* SH). **Transient accommodation such as:** Hotels, motels, serviced apartments, hostels, backpackers, cabins at holiday parks. *Buildings* where six or more people pay for accommodation (such as boarding houses/homestays/ bed and breakfast). *Wharenui* and other community sleeping spaces such as halls (even if used occasionally). Sheltered housing such as refuges, reintegration for prisoners, homeless shelters etc. **Educational accommodation such as:** University halls of residence, school boarding hostels etc.
	SI* Care or detention (Out of scope for Acceptable Solution C/AS1)	**Care activities such as:** Institutions, hospitals including outpatients and day procedures (excluding special care facilities such as operating theatres, intensive care units, prisons, delivery and recovery rooms and hyperbaric chambers or other such places that require stay in place strategies). Aged care facilities. Residential care in institutions, hospices. Medical day treatment: i.e. medical centres and dental practices using sedation or treatment rooms where people are unable to self-evacuate without assistance; e.g. for dialysis or chemotherapy. Care in the community houses and homes. **Detention facilities (excluding prisons) such as:** Police stations, court *buildings* and hospitals with detention facilities.
	CA* Public access and educational facilities (Out of scope for Acceptable Solution C/AS1)	**Crowd activities such as:** Halls, *theatres* and cinemas. Recreation and event centres (including tiered seating for up to 2000 people and with any primary egress for more than 100 people at the level of the playing surface). Educational institutions without sleeping including schools and *early childhood centres*. Churches and other places of worship. Restaurants and cafes, shops and shopping malls. Exhibition, retail areas including car showrooms and trade fair space. Public libraries with less than 2.4 m storage height. Spaces for viewing open air activities (does not include spaces below a grandstand), open grandstands, roofed but unenclosed grandstand, uncovered fixed seating). **Personal service activities such as:** Dentists, doctors (except as included within *risk group* SI), banks, beautician and hairdressing salons.
	WB* Business, commercial and low level storage (Out of scope for Acceptable Solution C/AS1)	**Professional activities such as:** Offices (including professional services such as law and accountancy practices). Laboratories, workshops (including mechanics workshops). May contain storage with a capable height of storage of less than 3.0 m. **Industrial activities such as:** Factories, processing and manufacturing plants (excluding *foamed plastics*) with a capable height of storage of less than 3.0 m. **Storage activities such as:** *Buildings* or parts of *buildings* capable of storage no more than 5.0 m in height. Warehouses and storage *buildings* (other than those listed above), capable of storage more than 5.0 m in height, but a height to the apex no greater than 8.0 m and total floor area of no more than 4200 m^2. Temperature controlled storage with a capable height of storage of less than 3.0 m, other than some limited areas in processing areas, or up to a maximum area of 500 m^2 with a maximum capable of storage height of 5.0 m. **Intermittently occupied buildings (other than outbuildings) such as:** Light aircraft hangers, *buildings* containing fixed plant and or fixed machinery and spray painting operations, whether or not in a spray booth.

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Table 1.1	Risk groups: scope and limitations	
	Risk group	**Applies to**
Acceptable Solution C/AS2	**WS* High level storage or potential for fast fire growth** (Out of scope for Acceptable Solution C/AS1)	**Storage activities such as:** Warehouses with a capable height of storage of over 5.0 m or over 8.0 m to the apex and total floor area greater than 4200 m^2. Temperature controlled storage outside of the scope of *risk group* WB. **Service activities such as:** Trading and bulk retail wholesalers with a storage height greater than 3.0 m. Supermarkets with shelving over 3.0 m in height. Exhibition, retail areas and trade fair space with a storage height greater than 3.0 m.
	VP* Vehicle storage and parking (Out of scope for Acceptable Solution C/AS1)	**Vehicle parking – within a building or a separate building including:** Car parking *buildings*. Vehicle parking or stacking within *buildings*. Goods vehicle parking. Service vehicle and unloading areas. Car storage warehouses.
Note: * *Risk groups* SM, SI, CA, WB, WS and VP are outside the scope of Acceptable Solution C/AS1. Refer to C/AS2.		

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Scope

1.1.1 The scope of this Acceptable Solution is restricted to *risk group* SH. This covers *buildings* where people sleep including multi-unit residential with some restrictions on height and outbuildings (as described in Clause A1 7.0 of NZBC).

Amend 2 Dec 2013

Amend 3 Jul 2014

This includes the following:

a) Single *household units,* and

b) Low-rise *multi-unit dwellings* with no more than one *household unit* above another (see Figure 1.1) and where each *household unit* has an *escape route* independent of all other *household units*, and including associated garages or carports whether or not they are part of the same *building*. Where there is one *household unit* above another, each *household unit* shall be a single storey and the *escape height* shall be less than 4.0 m, and

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c) Detached dwellings used as boarding houses for fewer than six people (not including members of the residing family), and

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d) Garages that are part of a *household unit*, and

e) Garages shared by more than one *household unit*. The garage shall be *fire separated* from each adjacent *household unit* with *fire* rated *construction* of 30/30/30, and

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f) Outbuildings.

Outside the scope of this Acceptable Solution

1.1.2 *Buildings* or parts of *buildings* in *risk groups* other than SH are outside the scope of this Acceptable Solution (refer to Table 1.1 for other *risk groups)*.

1.1.3 If this Acceptable Solution cannot be followed in full, use another path to demonstrate compliance.

The control of hazardous substances is not covered by this Acceptable Solution

1.1.4 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.

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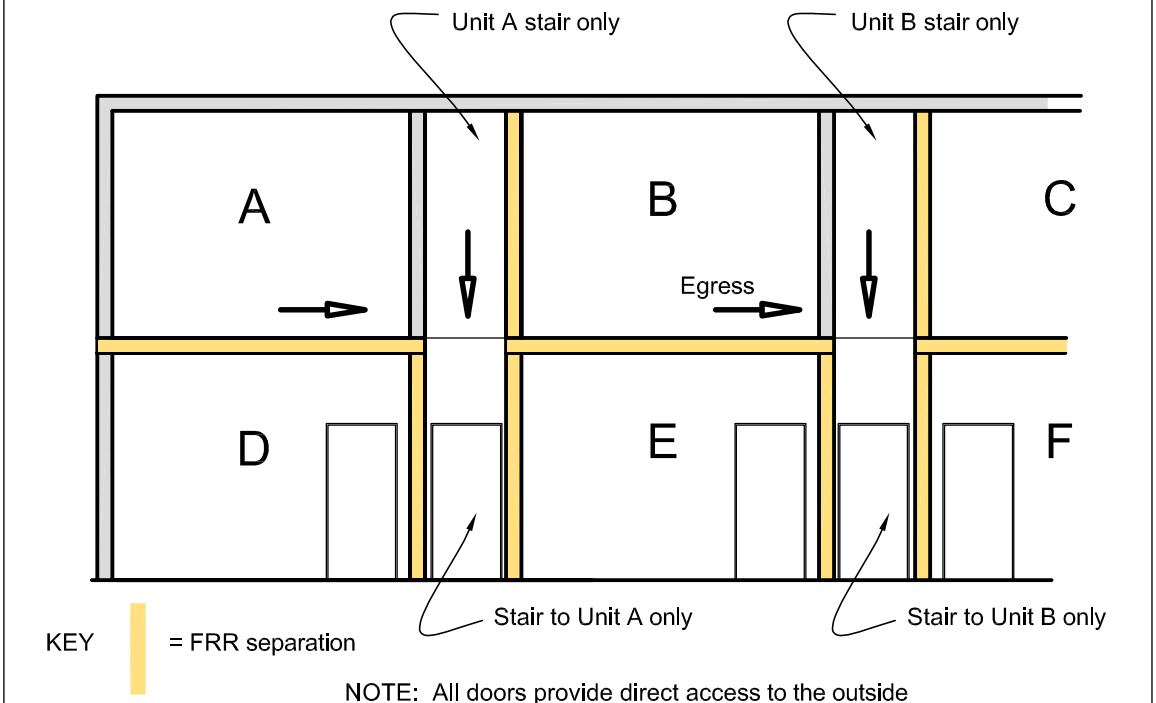
Acceptable Solution C/AS1

Figure 1.1 **Multi-unit dwellings in risk group SH**
Paragraph 1.1.1



Amend 2 Dec 2013

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 Solution applies

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 Acceptable Solution). If the activity is not listed explicitly, choose the nearest suitable *risk group*. If the *building* contains a *risk group* other than SH, use another path to demonstrate compliance.

Apply this Acceptable Solution for buildings only containing risk group SH by following Steps 2 and 3.

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Step 2: Determine the parameters for risk group SH

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

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Comment:
Applying the Acceptable Solution depends largely on the basic *building* measurements as above. Therefore, you 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 *building's* dimensions and features where required.

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1.3 Alterations and changes of use to buildings

1.3.1 This Acceptable Solution may be used to determine the compliance of building work (in relation to an existing building).

Errata 1 Feb 2013

Amends 2, 3, 5

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

CONTENTS

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

2.1 Provision of firecells

Firecell floor area limits

2.1.1 There are no requirements relating to *firecells* for *risk group* SH.

2.2 Fire safety systems

2.2.1 The *fire safety systems* required for *risk group* SH other than outbuildings are that each *household unit* shall be provided with Type 1 smoke alarms in accordance with Acceptable Solution F7/AS1. Alarm system types shall be as defined in Table 2.1.

Amend 3 Jul 2014

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 in 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 5.4.

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Comment:
The *non-combustible* classification represents a more onerous performance level than those required by Paragraph 5.4 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.

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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 C/VM1 and C/AS1

References are to the relevent paragraphs, figures or tables in **C/VM1 and C/AS1** unless otherwise stated. References to Appendices are prefixed by the Appendix letter.

Alterations and changes of use AS1 1.3

Control of external fire spread . . . . . AS1 Part 5
- Carports and similar structures AS1 5.5
- Exterior surface finishes . . . . . AS1 5.4, Table 5.1 (Errata 1 Feb 2013)
- Fire resistance ratings AS1 5.1
- Protection from a lower roof . . . . . AS1 5.3 (Errata 1 Feb 2013)
- Roof projections AS1 5.2

Control of internal fire and smoke spread . . . . . AS1 Part 4
- Fire separations AS1 4.1
- Foamed plastics or combustible insulating materials . . . . . AS1 4.3 (Amend 3 Jul 2014)
- Surface finishes . . . . . AS1 4.2 (Amend 2 Dec 2013)

Escape routes . . . . .
- Height and width AS1 3.3
- Length . . . . . AS1 3.4, Table 3.2
- Number AS1 3.2

Firecells . . . . . AS1 Part 2
- Provision AS1 2.1
  - Firecell floor area limits AS1 2.1.1

Firefighting . . . . . AS1 Part 6
- Fire Service vehicular access AS1 6.1

Fire resistance ratings . . . . . AS1 Part 2, 2.3, 5.1

Fire safety systems . . . . . AS1 Part 2, 2.2, Table 2.1, Appendix A
- Fire alarm and sprinkler systems AS1 A1.1
- Fire safety system descriptions AS1 A2.1
- Requirements common to alarm systems AS1 A1.2

Fire sprinkler systems . . . . . Appendix B
- Automatic fire sprinkler systems B2.1
- Introduction B1.1
- Residential fire sprinkler systems B3.1

General . . . . . AS1 Part 1
- Scope . . . . . AS1 1.1, 1.1.1, Table 1.1
  - Hazardous substances AS1 1.1.4
  - Outside the scope . . . . . AS1 1.1.2, 1.1.3 (Amend 5 Nov 2020)
- Using this Acceptable Solution AS1 1.2

Means of escape . . . . . AS1 Part 3