BUILDING PERFORMANCE

C

C Protection from Fire

Acceptable Solution C/AS2

Protection from fire for buildings other than risk group SH

SECOND EDITION | EFFECTIVE 28 JULY 2025

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Te Kāwanatanga o Aotearoa
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Preface

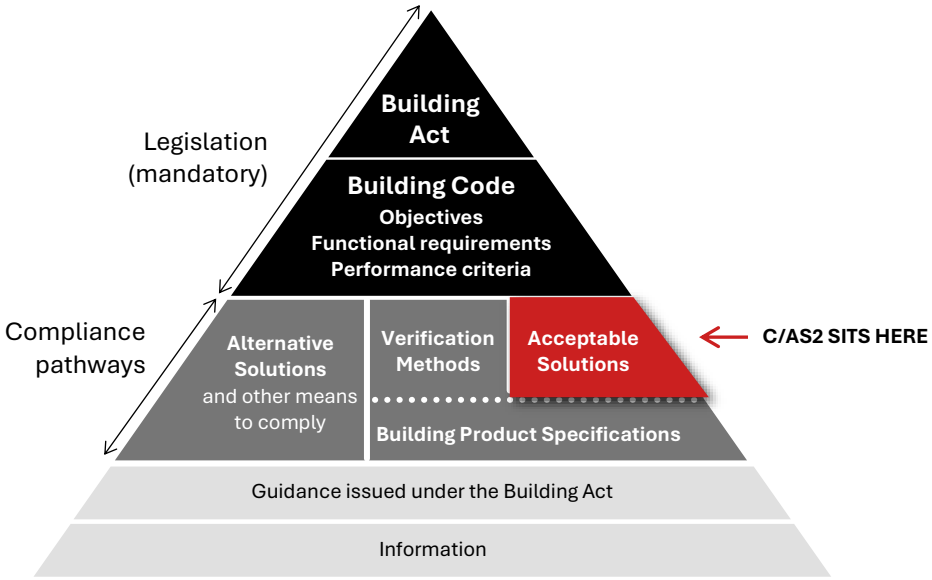
Document status

This document (C/AS2) is an acceptable solution issued under section 22 (1) of the Building Act 2004 and is effective on 28 July 2025. It does not apply to building consent applications submitted before 28 July 2025. The previous Acceptable Solution C/AS2 First Edition, as amended, can be used to show compliance until 31 July 2026 and can be used for building consent applications submitted before 1 August 2026.

Building Code regulatory system

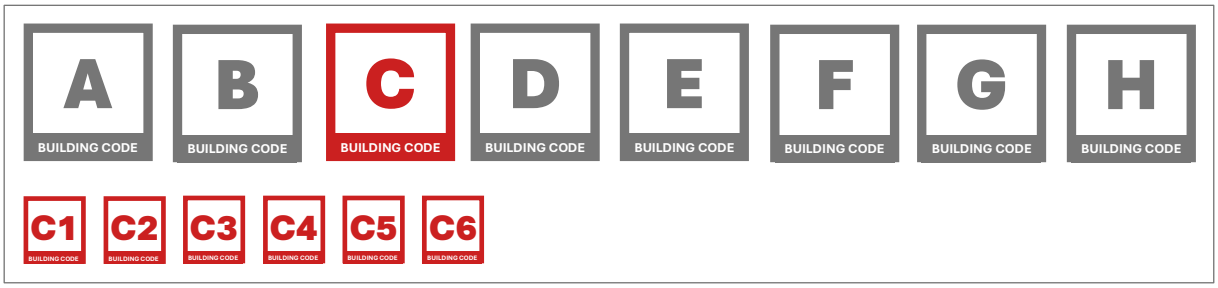
Each acceptable solution outlines the provisions of the Building Code that it relates to. Complying with an acceptable solution or verification method are ways of complying with that part of the Building Code. Other options for establishing compliance are listed in section 19 of the Building Act.

Schematic of the Building Code system



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

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



Further information about the Building Code, including objectives, functional requirements, performance criteria, acceptable solutions, and verification methods, is available at www.building.govt.nz.

Main changes in this version

This acceptable solution is the second edition of C/AS2. The main changes from the previous version are:

- The format and the layout has been revised to improve clarity. This includes using a common structure for headings and text throughout the acceptable solution.
- Minor amendments have been made to correct typos, grammar, cross-references, punctuation, wording, and formatting of the document. This includes changes to headings, paragraphs, tables and figures, table and figure notes, and definitions. These amendments do not affect the level of performance required in the document but may assist in the interpretation of the requirements.
- The acceptable solution now refers to the Building Product Specifications for the fire test methods and specification of building products in Paragraphs 2.3.2.1, 4.3.2.2, 4.3.6.1, 4.4.2.1, 4.4.5.2, 4.4.5.4, 4.12.2.1, 4.12.3.1, 4.12.6.1, 5.5.1.1, and 5.5.2.1. As a consequence, references to building product standards have been removed from the acceptable solution. This includes references to NZS/BS 476, AS/NZS 3837, NZS 4520, AS 1366, AS 1530, AS 4072, AS 5113, BS 8414, BS EN 13501, ISO 5660, and BRE 135. The previous appendix for fire test methods has also been removed from the document with the applicable specifications provided within the Building Product Specifications. More information on the Building Product Specifications is provided in Subsection 1.2.6.
- Headings have been consolidated with content reorganised in Part 3. Means of escape, Part 4. Control of internal fire and smoke spread, and Part 5. Control of external fire spread.
- References have been revised to reflect the documents cited in this acceptable solution in Appendix A.
- Definitions have been revised to reflect the consequential amendments of citing the Building Product Specifications. This includes revisions to the definitions for combustible, Group Number, limited combustible, non-combustible, smoke control door, and standard test in Appendix B.
- Minor amendments have been made to relocate the modifications to AS/NZS 2918 and AS 1691 from Part 7. Prevention of fire occurring to Appendix D.
- Horizontal fire spread tables have been relocated from Part 5. Control of external fire spread to a new Appendix E.

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

Features of this document

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

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

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

H **Housing**

Com **Commercial**

Out **Outbuildings**

CR **Communal residential**

Ind **Industrial**

Anc **Ancillary**

CN **Communal non-residential**

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

SH **Buildings with sleeping (residential) and outbuildings**

CA **Public access and educational facilities**

WS **High level storage or potential for fast fire growth**

SM **Sleeping (non-institutional)**

WB **Business, commercial and low level storage**

VP **Vehicle storage and parking**

SI **Care or detention**

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Part 1. General

1.1 Introduction

1.1.1 Scope of this document

1.1.1.1 This acceptable solution applies to all *risk groups* listed in Table 1.1.1.1 except for ***risk group* SH**. It covers *buildings* or parts of *buildings* where people:

a) sleep (**SM**); and

b) are unable to self-evacuate without assistance through requiring special care or treatment, or they are restrained, or their liberties are restricted (**SI**); and

c) congregate, participate in group activities, or where professional services or retail are provided (**CA**);

d) work (**WB**); and

e) store goods and other materials (**WS**);

f) park vehicles (**VP**).

1.1.2 Items outside the scope of this document

1.1.2.1 *Buildings* with complex features are outside the scope of this acceptable solution. Complex features include:

a) atriums; and

b) *intermediate floors* other than limited area *intermediate floors*; and

c) operating theatres, intensive care units, hyperbaric chambers, delivery rooms, and recovery rooms (SI); and

d) recreation and event centres (with tiered seating for more than 2000 people) (CA); and

e) *buildings* more than 20 storeys high; and

f) prison *buildings*.

1.1.2.2 *Buildings* that have features for which solutions are not provided within this acceptable solution are also deemed to be complex.

1.1.2.3 Other than where permitted for ***risk group* SI** and for *early childhood centres,* this acceptable solution allows for an 'all out' evacuation strategy. It does not provide features to facilitate a delayed evacuation strategy.

1.1.2.4 ***Risk group* SI** 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 *building* features that would be required for a stay-in-place strategy. This applies to activities such as:

a) operating theatres; and

b) intensive care units; and

c) hyperbaric chambers; and

d) delivery rooms; and

e) recovery rooms.

1.1.2.5 The control of hazardous substances is not covered by this acceptable solution and it does not provide for any use, storage or processing of hazardous substances. Compliance with Verification Method F3/VM1 and the Hazardous Substances and New Organisms Act 1996, and the Health and Safety at Work (Hazardous Substances) Regulations 2017 is required where applicable in addition to the requirements of this acceptable solution.

Table 1.1.1.1: Scope and limitations of risk groups (continued on next page)
Paragraph 1.1.1.1

Column heading	Applies to
SH **Building with sleeping (residential)** and **Outbuildings** (1)	**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 unit*s** such as**:** a) attached townhouses; and b) 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**
SM **Sleeping (non-institutional)**	**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, and so forth. **Educational accommodation** such as: University halls of residence, school boarding hostels, and so forth.
SI **Care or detention**	**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 such as medical centres and dental practices using sedation or treatment rooms where people are unable to self-evacuate without assistance (for example, dialysis or chemotherapy). Care in the community houses and homes. **Detention facilities (excluding prisons)** such as: Police stations, court buildings and hospitals with detention facilities.

Note: (1) This *risk group* is outside the scope of this acceptable solution. Refer to Acceptable Solution C/AS1.

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

Paragraph 1.1.1.1

Column heading	Applies to
CA **Public access and educational facilities**	**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**	**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 with 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.
WS **High level storage or potential for fast fire growth**	**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**	**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: (1) This *risk group* is outside the scope of this acceptable solution. Refer to Acceptable Solution C/AS1.

1.1.3 Compliance pathway

1.1.3.1 This acceptable solution is one option that provides a means of establishing compliance with the functional requirements and performance criteria in Building Code clause C1 to C6 Protection from Fire. It can be used to demonstrate compliance with clauses:

a) C1 Objectives of clauses C1 to C6 (protection from fire); and

b) C2 Prevention of fire occurring; and

c) C3 Fire affecting areas beyond the fire source; and

d) C4 Movement to place of safety; and

e) C5 Access and safety for firefighting operations; and

f) C6 Structural stability.

1.1.3.2 Compliance may also be established using:

a) Acceptable Solution BCH/AS1 for *backcountry huts*; or

b) Acceptable Solution C/AS2 for *risk groups* other than SH; or

c) Verification Method C/VM1 for solid fuel burning appliances; or

d) Verification Method C/VM2; or

1.1.3.3 If this acceptable solution cannot be followed in full, use an alternative means to demonstrate compliance.

1.2 Using this acceptable solution

1.2.1 Determining the classified use

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

1.2.2 Determining the risk groups and parameters for various risk groups

1.2.2.1 To use this acceptable solution, first determine the *risk group* for each of the activities carried out in the *building* (refer to Table 1.1.1.1). If the activity is not listed explicitly, choose the nearest suitable *risk group*.

1.2.2.2 If there is more than one *risk group* for a *firecell*, determine its primary *risk group* in accordance with Paragraph 1.2.3.2.

1.2.2.3 Once the *risk group* has been determined, for each *firecell*:

a) establish the relevant *building* measurements (these will include *building height*, floor area, wall openings and distances to *relevant boundaries*); and

b) determine the *occupant loads* for the relevant *occupied spaces* in accordance with Subsection 1.2.4.

1.2.3 Determining the fire safety requirements

1.2.3.1 Using the *risk groups* and parameters determined in Subsection 1.2.2, satisfy the *fire* safety requirements for each *firecell* using:

a) Part 2. Firecells, fire safety systems, and fire resistance ratings; and

b) Part 3. Means of escape; and

c) Part 4. Control of internal fire and smoke spread; and

d) Part 5. Control of external fire spread; and

e) Part 6. Firefighting; and

f) Part 7. Prevention of fire occurring.

1.2.3.2 If a *building* contains a number of different activities that 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. Other *risk groups* may be able to be incorporated within the same space provided these are ancillary to, and support, the primary *risk groups*.

1.2.3.3 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.

1.2.4 Determining occupant loads

1.2.4.1 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/or

b) a floor containing more than one *risk group*; and/or

c) a single *firecell*; and/or

d) each floor within a *firecell*.

1.2.4.2 *Occupant loads* shall be calculated from the *occupant load* factors given in Table 1.2.4.2 based on the floor area of the part of the *building* containing the activity. These values already allow for a proportion of the floor area appropriate to the activity being occupied by furniture, partitions, fixtures, and associated equipment. If a *building* space has alternative activity uses, the activity having the greatest *occupant load* shall be used. If an activity is not specifically described in Table 1.2.4.2, the nearest reasonable description shall be used.

1.2.4.3 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:

i) *exitways*, or

ii) areas such as lift lobbies or sanitary facilities that are used intermittently by people already counted elsewhere in the *building*.

1.2.4.4 For fixed seating, the determination of *occupant loads* shall take account of the actual arrangement and number of seats for fixed seating (see Subsection 3.4.7). Where additional floor area abuts the fixed seating, additional occupants are permitted in that floor area based on standing space density provided the *escape route* is not obstructed.

SM SI 1.2.4.5 For ***risk groups* SM** and **SI** with bed spaces, the requirements of this acceptable solution account for the fact that other people may be present in the *building* or *firecell* and additional calculations are not required when an *occupant load* is derived by bed spaces.

SI 1.2.4.6 For the purposes of ***risk group* SI** the term ‘bed’ means the number of people that are under care or detention. It can include people on:

a) beds; or

b) recliner or lounge chairs; or

c) dentist chairs; or

d) treatment tables; or

e) any other furniture where an occupant may be for a period of treatment in care or detention.

1.2.4.7 If, in a particular situation, the *occupant load* derived from Table 1.2.4.2 is clearly more than that which will occur, the basis of any proposal for a lesser *occupant load* shall be substantiated to the *building consent authority*.

1.2.4.8 If the maximum *occupant load* is greater than that calculated from Table 1.2.4.2, the higher number shall be used as the basis for the *fire* safety design and will need to be justified to the *building consent authority*.

1.2.5 Alterations and changes of use to buildings

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

1.2.6 Building Product Specifications

1.2.6.1 This acceptable solution refers to the Building Product Specifications for *building* product standards and specifications in relation to their manufacture, fabrication, testing, quality control, physical properties, performance, installation, and/or maintenance

1.2.6.2 The Building Product Specifications cannot be used in isolation to demonstrate compliance with any requirements of the Building Code. To comply with C/AS2, *building* products conforming to the Building Product Specifications must be used with the scope, limitations, and other applicable requirements set out in this acceptable solution.

Table 1.2.4.2: Occupant load factors (continued on next page)

Paragraphs 1.2.4.2, 1.2.4.7, and 1.2.4.8

Activity	Occupant load factor
Aircraft hangars	50 m^2/person
Airport baggage areas	2 m^2/person
Airport waiting areas and check-in	1.4 m^2/person
Airport terminal space	10 m^2/person
Areas without seating or aisles	1 m^2/person
Art galleries and museums	4 m^2/person
Bar sitting areas	1 m^2/person
Bar standing areas	0.5 m^2/person
Bleachers, pews, or bench-type seating	0.45 linear m/person
Boiler rooms and plant rooms	30 m^2/person
Bulk storage including racks and shelves	100 m^2/person
Bulk retail (trading stores, supermarkets, and similar)	5 m^2/person
Call centres	7 m^2/person
Care and detention	Bed spaces as per Paragraph 1.2.4.6
Classrooms	2 m^2/person
Commercial kitchens	10 m^2/person
Commercial laboratories and laundries	10 m^2/person
Computer server rooms	25 m^2/person
Consulting rooms (doctors, dentists, beauty therapy)	5 m^2/person
Dance floors	0.6 m^2/person
Daycare centres	4 m^2/person
Dining, restaurant, and cafeteria spaces	1.25 m^2/person
Early childhood centres	Based on Education (Early Childhood Services) Regulations 2008 plus the number of staff
Exhibition areas and trade fairs	1.4 m^2/person

Table 1.2.4.2: Occupant load factors (continued from previous page)

Paragraph 1.2.4.2

Activity	Occupant load factor
Fitness centres and weight rooms	5 m^2/person
Gaming and casino areas	1 m^2/person
Heavy industry	30 m^2/person
Indoor games areas and bowling alleys	10 m^2/person
Interview rooms	5 m^2/person
Library stack areas	10 m^2/person
Library other areas	7 m^2/person
Lobbies and foyers	1 m^2/person
Mall areas used for assembly uses	1 m^2/person
Manufacturing and process areas	10 m^2/person
Meeting rooms	2.5 m^2/person
Office spaces	10 m^2/person
Parking buildings and garages	50 m^2/person
Personal service facilities	5 m^2/person
Reading or writing rooms and lounges	2 m^2/person
Reception areas	10 m^2/person
Retail spaces and pedestrian circulation areas including malls and arcades	3.5 m^2/person
Retail spaces for furniture, floor coverings, large appliances, building supplies, and Manchester	10 m^2/person
Showrooms	5 m^2/person
Sleeping non-institutional	Bed spaces
Space with fixed seating	Number of seats
Space with loose seating	0.8 m^2/person
Space with loose seating and tables	1.1 m^2/person
Sports halls	3 m^2/person
Stadiums and grandstands	0.6 m^2/person
Staff rooms and lunchrooms	5 m^2/person
Stages for theatrical performances	0.8 m^2/person
Standing space	0.4 m^2/person
Swimming pool water surface area	5 m^2/person
Swimming pool surrounds and seating	3 m^2/person
Teaching laboratories	5 m^2/person
Technology classrooms (for example: woodwork, metalwork, food science, and sewing)	10 m^2/person
Workrooms and workshops	5 m^2/person

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

2.1 Provision of firecells

2.1.1 Firecell floor area limits

2.1.1.1 The floor area of firecells shall be limited in accordance with Table 2.1.1.1.

Table 2.1.1.1: Firecell floor area limits

Paragraph 2.1.1.1

Risk group	Firecell floor area limit (m^2) Unsprinklered	Firecell floor area limit (m^2) Sprinklered
SM	500	Unlimited(1)
SI	N/A	500
CA	5000	Unlimited(1)
WB	5000(2)	Unlimited(1)
WS	N/A	Unlimited(1)
VP	5000(2)	Unlimited(1)

Notes:

(1) Except where this acceptable solution requires *fire separations* or other area limitations.

(2) When 15 m or greater from a *relevant boundary*, the *firecell* floor area is unlimited except where this acceptable solution requires *fire separations* or other area limitations.

2.2 Fire safety systems

2.2.1 Fire safety system types

2.2.1.1 *Fire safety system* types as defined in Appendix C. , shall:

a) be installed as per the applicable standard(s) as specified in Appendix C. and Appendix D. ; and

b) be provided throughout *firecells*; and

c) be as specified for the various *risk groups* in Table 2.2.1.1.

2.2.2 Connection to a remote receiving centre

2.2.2.1 Where a *fire* alarm or sprinkler system is required, there shall be a connection to a *remote receiving centre* except for:

SM a) ***risk group* SM** permanent accommodation where there is an *escape height* of less than 10 m; or

CA b) ***risk group* CA** where:

i) there are no more than 250 occupants, and

ii) the *escape height* is less than 4 m, and

iii) the use is not a cinema or *theatre*; or

WB c) ***risk group* WB** where there are no more than 100 occupants and the *escape height* is less than 4 m; or

VP d) ***risk group* VP** where no vehicle stackers are installed; or

e) automatic heat or smoke detection systems that are provided as supplementary to the systems required by this acceptable solution.

2.2.3 Sprinkler requirements

SM SI 2.2.3.1 For ***risk group* SM** educational accommodation and ***risk group* SI**, the sprinkler component of a Type 7 may be substituted with an automatic sprinkler system that complies with NZS 4515 for life protection if the *building* is within the scope of NZS 4515.

2.2.4 Additional requirements for early childhood centres

2.2.4.1 In addition to Paragraph 2.2.1.1, the *fire safety systems* required for *firecells* in *early childhood centres* shall be as follows:

a) in single storey *early childhood centres*, dedicated sleeping areas shall be protected with supplementary smoke detectors. The alarm system and any smoke detection system shall comply with NZS 4512; and

b) where the *escape height* of the *early childhood centre* is greater than 2.0 m:

i) a Type 7 system shall be installed throughout the *building*, and

ii) at least two separate places of safety shall be provided, and

iii) each *place of safety* shall be separated with *fire separations* designed to the *property rating* and have direct access to a *safe path* or *final exit*.

2.2.5 Buildings containing more than one firecell

2.2.5.1 Where there is more than one *firecell* the most onerous requirements shall apply. Refer to Table 2.2.5.1, Figure 2.2.5.1A, and Figure 2.2.5.1B.

2.2.6 More than one risk group on a floor

2.2.6.1 Where *fire separations* are not needed between different *risk groups* on the same floor level, the *fire safety systems* adopted for the *firecell* shall be those of the primary *risk group* (as defined in Paragraph 1.2.3.2).

2.2.7 Same risk group on different floors

2.2.7.1 Where *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 of that *risk group*.

2.2.8 Activation of emergency warning systems

2.2.8.1 The alarm systems required in a *building* shall be configured to alert all *building* occupants in the event of *fire*. This does not apply to the activation of the local smoke detection component of a Type 5 system.

SI 2.2.8.2 In ***risk group* SI** alerting all *building* occupants in the event of *fire* is not required where it is deemed appropriate to alert management and staff without notifying other occupants.

Table 2.2.1.1: Fire safety systems by type required for each risk group

Paragraph 2.2.1.1

Risk group	Occupant type	Escape height 0 m	Escape height < 4 m	Escape height 4 m to < 10 m	Escape height 10 m to < 25 m	Escape height ≥ 25 m
SM	Permanent	1, 2[1a],18[2]	1, 2[1a],18[2]	1, 2[1a],18[2]	5, 15, 18[2]	7, 9, 15, 18
	Transient	5[1a], 18[2]	5, 18[2]	5, 18[2]	5, 15, 18[2]	7, 9, 15, 18
	Education	7, 9, 18[2]	7, 9, 18[2]	7, 9, 18[2]	7, 9, 15, 18[2]	7, 9, 15, 18
SI	Care or detention	7[3], 9, 18[2]	7[3], 9, 18[2]	7[3], 9, 18[2]	7[3], 9, 15, 18[2]	7[3], 9, 15, 18
Risk group	**Occupant load**	**Escape height 0 m**	**Escape height < 4 m**	**Escape height 4 m to < 10 m**	**Escape height 10 m to < 25 m**	**Escape height ≥ 25 m**
CA[4]	**< 100**	2[1b], 18[2]	2, 18[2]	4[5], 9, 18[2]	4[5], 9, 15, 18[2]	7, 9, 15, 18
	100 to 250	2, 18[2]	2, 18[2]	4[5], 9, 18[2]	4[5], 9, 15, 18[2]	7, 9, 15, 18
	251 to 1000	4[5], 18[2]	4[5], 18[2]	4[5], 9, 18[2]	4[5], 9, 15, 18[2]	7, 9, 15, 18
	> 1000	7, 9, 18[2]	7, 9, 18[2]	7, 9, 18[2]	7, 9, 15, 18[2]	7, 9, 15, 18
WB[6]	**< 100**	2[1c], [7], 18[2]	2[1c], [7], 18[2]	4[5], 9, 18[2]	4[5], 9, 15, 18[2]	7, 9, 15, 18
	100 to 1000	4[5], [8], 18[2]	4[5], [8], 18[2]	4[5], 9, 18[2]	4[5], 9, 15, 18[2]	7, 9, 15, 18
	> 1000	7, 9, 18[2]	7, 9, 18[2]	7, 9, 18[2]	7, 9, 15, 18[2]	7, 9, 15, 18
WS	**≤ 1000**	6, 18[2]	6, 18[2]	6, 18[2]	6, 15, 18[2]	6, 15, 18
	> 1000	7, 18[2]	7, 18[2]	7, 18[2]	7, 15, 18[2]	7, 15, 18
Risk group	**Escape height < 10 m**	**Escape height ≥ 10 m**	**Vehicle stacker**			
VP	2[1d], [9], [10], 18[2]	3[9], 15, 18[2]	6, 18[2]			

Notes: *Fire safety systems* are as specified in Paragraph 2.2.1.1 and Appendix C. and Appendix D.

(1) This system is not required where:
(a) For ***risk group* SM**, the *escape routes* serve no more than 10 beds, or where the exit doors from sleeping area *firecells* open directly into a *safe place* or external *safe path*. For ***risk group* SM** transient accommodation, where a Type 5 system is not required, each *suite* shall be provided with Type 1 smoke alarms.
(b) For ***risk group* CA**, in single level *buildings* where the *escape routes* serve no more than 50 people.
(c) For ***risk group* WB**, in single level *buildings* with a storage height is less than 3.0 m and the *escape route* serves no more than 50 people.

(d) For ***risk group* VP**, if there are fewer than 50 occupants and fewer than 10 vehicles.

(2) Not required where the height from Fire and Emergency New Zealand vehicular access to any floor is less than 15 m and the hose run distance to any point on any floor is less than 75 m, as measured from Fire and Emergency New Zealand vehicular access.

(3) For ***risk group* SI**, if there are more than 100 people receiving hospital care of in detention, the water supply for the sprinkler must be a dual supply and must comply with NZS 4541, with one of the supplies being independent of the public reticulated main.

(4) Refer to Subsection 2.2.4 for additional requirements that apply to *early childhood centres*.

(5) For ***risk groups* CA** and **WB**, where the environment is challenging for smoke detection, a Type 4 may be substituted with a Type 6 or a Type 3 with supplementary smoke detection to avoid unwanted alarm activations.

(6) Refer to Table 1.1.1.1 for limitations on capable height of storage for ***risk group* WB**.

(7) A Type 3 system is required where the storage height exceeds 3.0 m.

(8) A Type 3 system is permitted to be provided in *firecells* used for storage where the storage height is over 3.0 m.

(9) In ***risk group* VP** where a *firecell* is unsprinklered and there is parking for more than 10 vehicles, each of those *firecells* within that *building* must have natural cross ventilation. Refer to Paragraphs 4.1.2.2 and 4.1.2.3.

(10) If ***risk group* VP** is within a *building* that is protected with an automatic *fire* alarm system, the ***risk group* VP** *firecell* must have at the minimum a Type 3 system.

Table 2.2.5.1: Minimum required types of fire safety systems for other firecells within a building

Paragraph 2.2.5.1

Risk group	Fire safety system type required by Table 2.2.1.1	Minimum type for other SM firecells in the building	Minimum type for other CA firecells in the building	Minimum type for other WB firecells in the building	Minimum type for other VP firecells In the building
SM	1,2	1,2	5(1)	5(1)	3(2)
	5	5	5(1)	5(1)	3(2)
	7	7	7(1)	7(1)	6(2)
SI	7	7	7	7	6(2)
CA	2	5(1)	2	2	2
	3	5(1)	3	3	3
	4	5(1)	4(1)	4(1	3(2)
	6	7	6	6	6
	7	7	7(1)	7(1)	6(2)
WB	2	5(1)	2	2	2
	3	5(1)	3	3	3
	4	5(1)	4(1)	4(1)	3(2)
	6	7	6	6	6
	7	7	7(1)	7(1)	6(2)
WS	6	7	6	6	6
	7	7	7(1)	7(1)	6(2)
VP	2	1,2(2)	2	2	2
	3	5(2)	3	3	3
	6	7(2)	6	6	6

Notes:

(1) In **risk groups CA**, **WB**, or **WS**, in areas where the environment is challenging for smoke detection, smoke detectors may be substituted with heat detectors or, for Type 7, sprinkler heads. Smoke detection must be maintained in *firecells* with ***risk groups*** **SM** and **SI**.

(2) ***Risk group*** **VP** *firecells* may have a different type than other *firecells* in the *building* as smoke detection does not need to extend into ***risk group*** **VP** *firecells*.

Figure 2.2.5.1A: Design sequence for determining fire safety systems where there is more than one firecell in a building

Paragraph 2.2.5.1

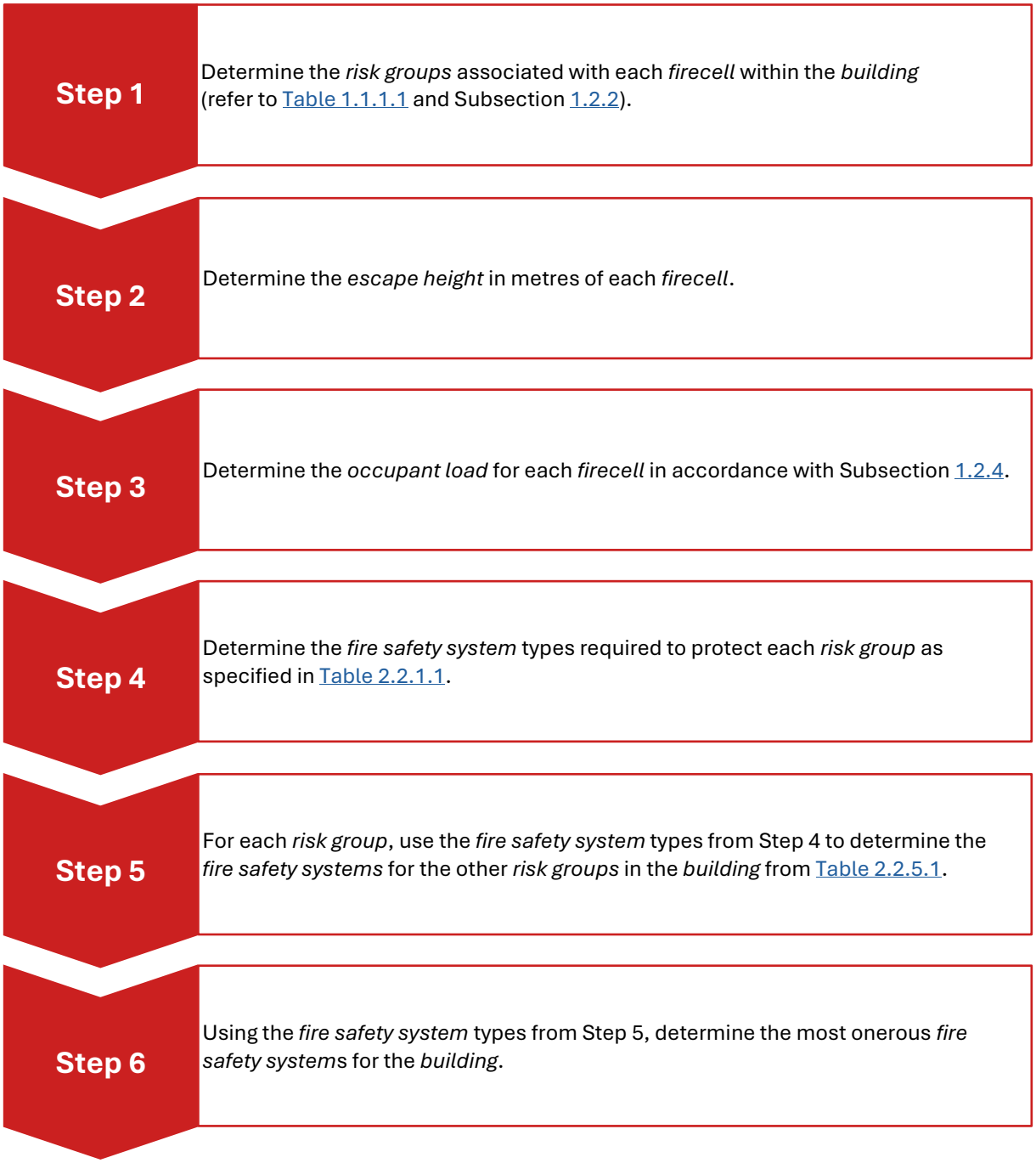
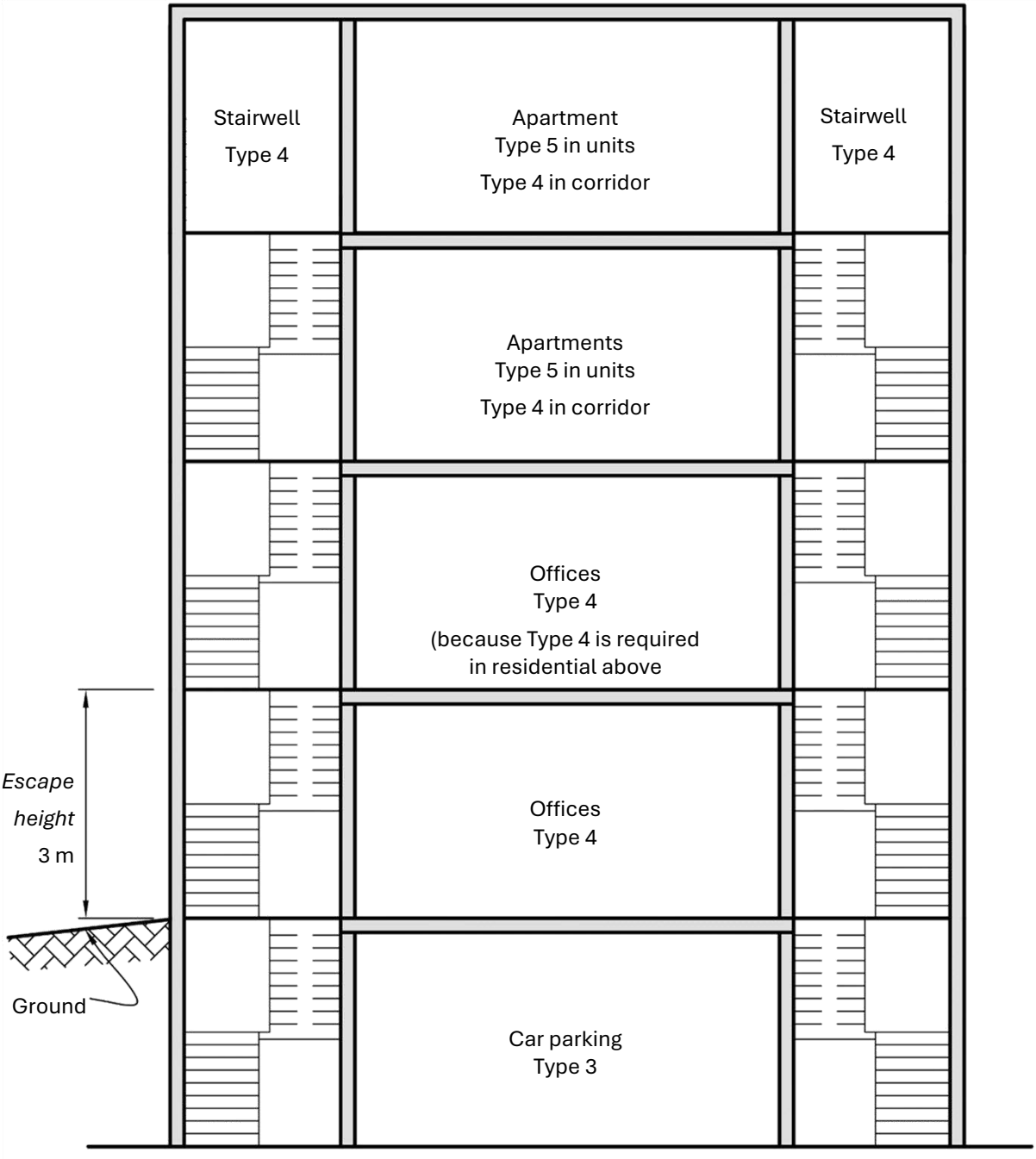


Figure 2.2.5.1B: Fire safety systems throughout a building

Paragraph 2.2.5.1



2.3 Fire resistance ratings

2.3.1 FRR values

2.3.1.1 Unless explicitly stated otherwise in this acceptable solution, the fire resistance ratings (*FRRs*) that apply for each *risk group* shall be in accordance with Table 2.3.1.1.

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

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

2.3.2 General requirements for FRRs

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

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

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

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

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

2.3.2.6 Except as stated in Paragraph 2.3.2.7, areas of *external wall* not permitted to be *unprotected areas* shall be *fire* rated from the inside only

2.3.2.7 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 m of a *relevant boundary*; or

b) the *building height* is more than 10 m; or

SM SI c) the *final exit* is two or more floor levels below any ***risk group*** **SM** or **SI** occupancy.

2.3.2.8 *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*.

2.3.2.9 Structural framing members connected to *building elements* with an *FRR* shall:

a) be rated at no less than the *building elements* to which they are connected; or

b) have their connections and supports designed so that their collapse during *fire* will not cause collapse of the *fire* rated elements.

2.3.3 Applying insulation component in FRR

2.3.3.1 *Insulation* ratings shall apply to:

a) all *fire separations*, except as noted in Paragraph 2.3.3.2; and

b) parts of *external walls* that are not permitted to be *unprotected areas*; and

c) parts of *external walls* that are adjacent to an external *exitway* where it is a single *means of escape from fire* (refer to Subsection 3.6.2 to determine when a *fire* rating is required).

2.3.3.2 Insulation ratings are not required to apply to:

a) glazing that is exempt in accordance with Subsection 4.4.3; or

b) elements where sprinklers are installed throughout the *building*, in accordance with either NZS 4541 or NZS 4515 as appropriate; or

c) *fire stops* in accordance with Paragraph 4.3.2.5; or

d) *fire dampers* and damper blades in accordance with Paragraph 4.4.5.2; or

e) *fire resisting glazing* in accordance with Paragraph 5.2.3.2.

Table 2.3.1.1: Life rating and property ratings in minutes

Paragraph 2.3.1.1

Risk group	Unsprinklered life rating	Unsprinklered property ratin	Sprinklered life rating	Sprinklered life rating
SM	60	60	30	30
SI	–	–	60	60
CA	60(1)	120	30(1)	60
WB	60(1)	120 (180(2))	30(1)	60 (90(2))
WS	–	–	60(1)	180
VP	60(1)	60	30(3)	30(3)

Notes:

(1) When the *escape height* is greater than 10 m, the *exitways* shall have *fire separations* with an *FRR* meeting the *property rating* (refer to Paragraph 4.7.1.3.

(2) Where the *building* is less than 15 m to the *relevant boundary* and the storage height is greater than 3.0 m, the *FRR* shall be 90 minutes where sprinklered and 180 minutes where unsprinklered.

(3) The sprinkler system can be substituted for cross ventilation in accordance with Paragraph 4.1.2.2.

Part 3. Means of escape

3.1 General principles

3.1.1 Overview

3.1.1.1 All *buildings* shall have *means of escape from fire* that include *escape routes*. An *escape route* shall provide protection to any occupant escaping to a *safe place* from a *fire* within a *building*.

3.1.1.2 The components of an *escape route*, in ascending order of protection (see Figure 3.1.1.2), include:

a) *open paths*; and

b) *exitways* comprising of

i) *smoke lobbies*, and/or

ii) *safe paths*; and

c) *final exits*.

3.1.1.3 Two or more of these components will be necessary depending on the total *travel distance*.

3.1.1.4 An *escape route* shall not pass from a higher to lower level of protection in the direction of escape.

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

3.1.1.6 *Escape routes* shall comply with Building Code clause D1 Access. Ramps, stairs, ladders, landings, *handrails*, doors, vision panels, and openings shall comply with Acceptable Solution D1/AS1.

3.1.1.7 *Fire* safety related features shall have signs complying with Acceptable Solution F8/AS1.

3.1.1.8 Additional requirements are provided for:

a) the number of *escape routes* in Subsection 3.1.2; and

b) the height and width of *escape routes* in Section 3.2; and

c) the length of *escape routes* in Section 3.3; and

d) *open paths* in Section 3.4; and

e) *exitways* in Section 3.5; and

f) external *escape routes* in Section 3.6; and

g) *final exits* in Section 3.7; and

h) single *escape routes* in Section 3.8; and

i) doors subdividing *escape routes* in Section 3.9.

3.1.2 Number of escape routes

3.1.2.1 The minimum number of *escape routes* shall be in accordance with Paragraphs 3.1.2.2 and 3.1.2.3 except where Section 3.8 allows the use of *single escape routes*.

3.1.2.2 Every *occupied space* in a *building* shall be served by two or more *escape routes* (see Figure 3.1.2.2).

3.1.2.3 The minimum number of *escape routes* from a floor level shall be based on the number of occupants in accordance with Table 3.1.2.3.

Figure 3.1.1.2: Escape route components

Paragraph 3.1.1.2

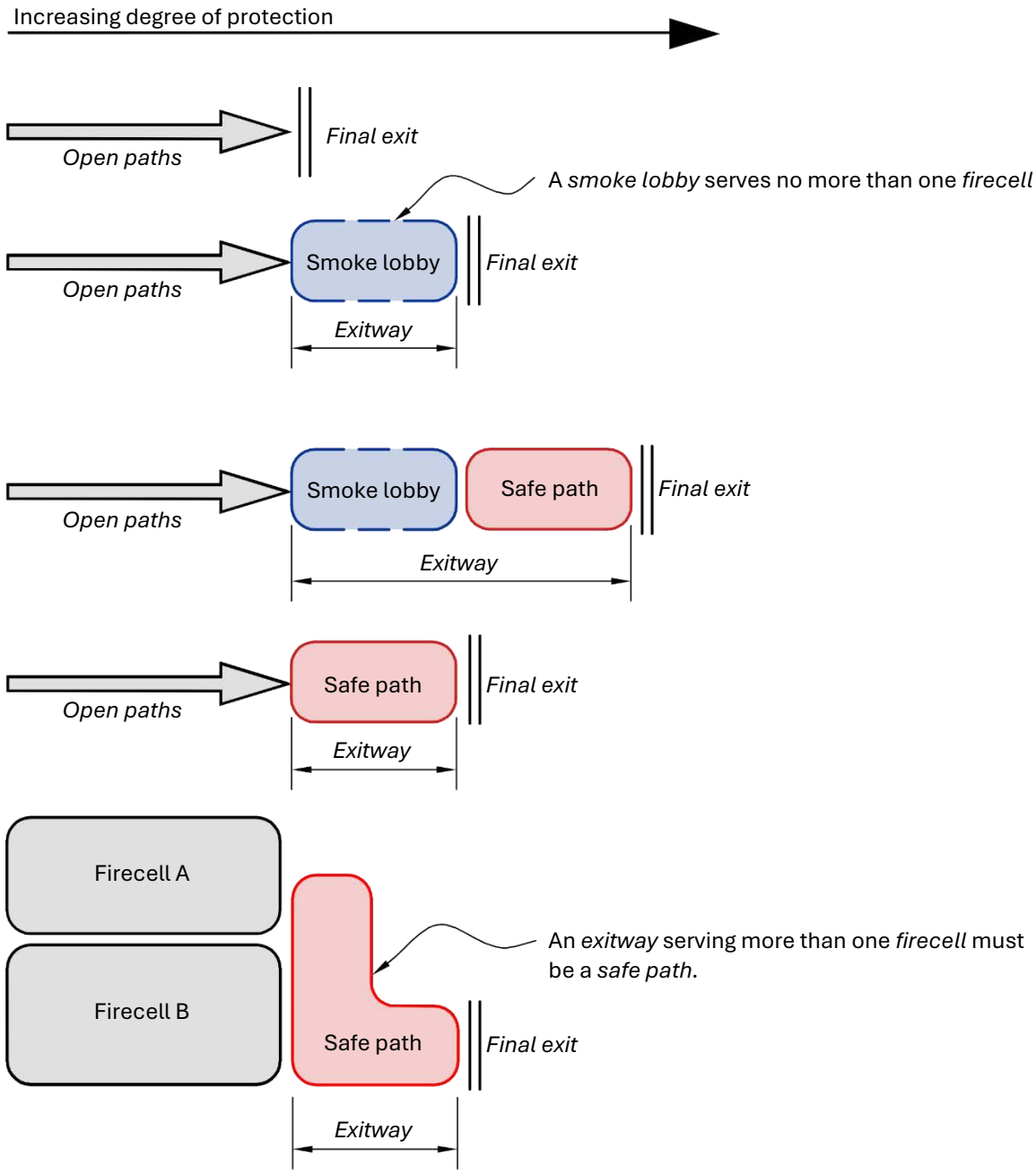
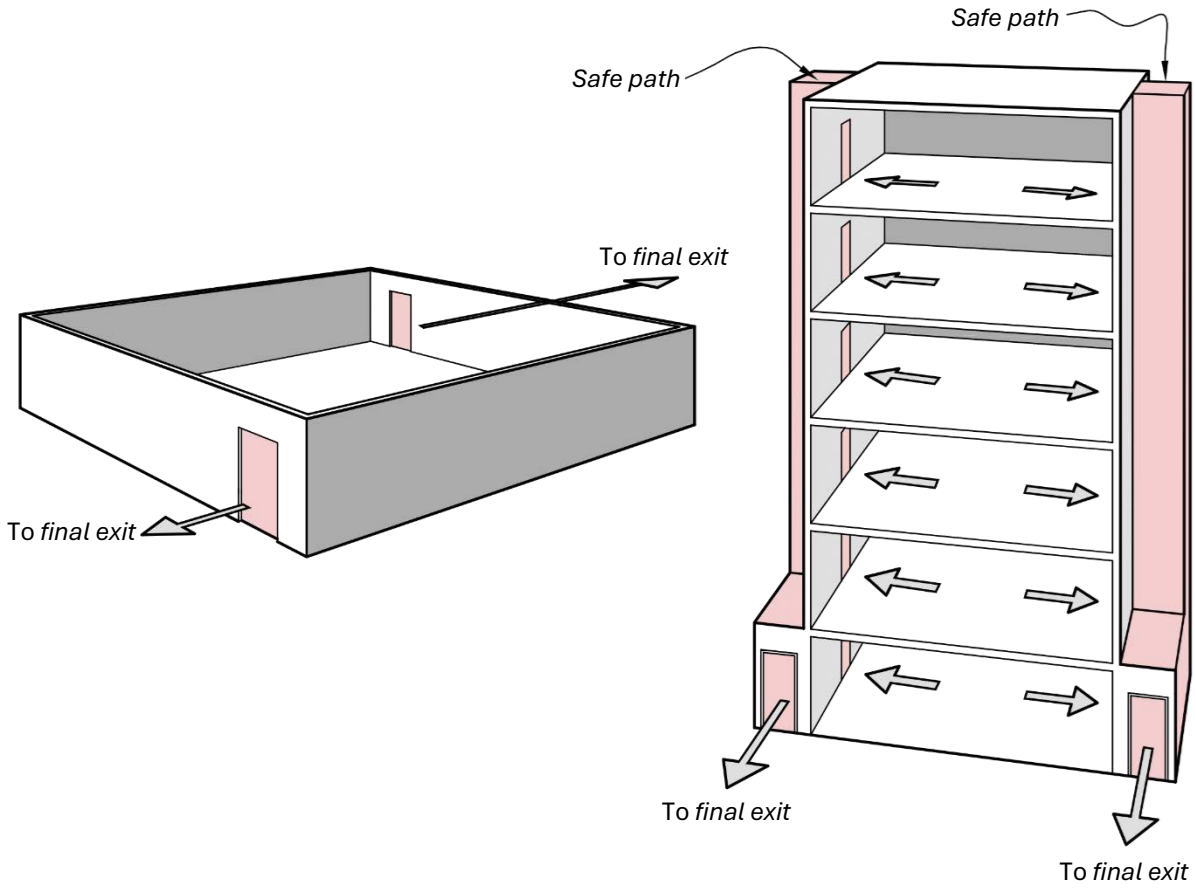


Figure 3.1.2.2: Minimum number of escape routes

Paragraph



Note: (1) Unless permitted by Section 3.8, no *building* shall have fewer than two *escape routes*.

Table 3.1.2.3: Minimum number of escape routes from a floor level or firecell for increasing numbers of occupants

Paragraph 3.1.2.3

Risk group	≤ 50	51 to 100	101 to 150	151 to 200	201 to 250	251 to 300	301 to 500	501 to 1000	1001 to 2000	2001 to 4000	4001 to 7000
SM	1(1)	2	3	3	4	4	–	–	–	–	–
SI	2	3	3	4	4	–	–	–	–	–	–
CA	1(1)	2	2	2	2	2	2	3	4	5	6
WB	1(1)	2	2	2	2	2	2	3	4	5	6
WS	1(1)	2	2	2	2	2	2	3	4	5	–
VP	1(1)	2	2	2	2	2	2	3	4	5	6

Note: (1) Refer to Section 3.8 for limitations.

3.2 Height and width of escape routes

3.2.1 Height

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

a) the clear height shall be no less than that required by Acceptable Solution D1/AS1; and

b) any door opening within, or giving access to, any *escape route* shall have a clear height of no less than 1955 mm for the required width of the opening.

3.2.2 Width

3.2.2.1 *Escape route* widths shall be in accordance with Table 3.2.2.1.

Table 3.2.2.1: Minimum clear width of escape routes excluding ladders (mm)

Paragraph 3.2.2.1

Risk group	Element	Horizontal open path (mm)(1)	Vertical open path (mm)(1)	Horizontal exitway (mm)	Vertical exitway (mm)
SM	Escape route	850	1000	1000	1000
	Door	760	760	875	875
SI	Escape route	850(2)	1000	1200	1500
	Door	760(2)	760	950	1200
CA WB WS VP	Escape route	850	1000	1000	1000
	Door	760	760	875	875

Notes:

(1) *Escape route* widths may be reduced for single *escape routes* as permitted by Paragraph 3.2.2.3(a)(ii).

(2) Additional minimum clear widths are provided in Paragraphs 3.9.4.2 and 3.9.4.6 where the movement of beds is required.

3.2.2.2 The total combined width of all available *escape routes* shall:

a) allow for 7 mm/person for horizontal travel and 9 mm/person for vertical travel; and

SI b) for ***risk group* SI**, allow for 8 mm/person for horizontal travel and 10 mm/person for vertical travel.

3.2.2.3 The width of individual *escape routes* shall:

a) be no less than 850 mm for horizontal travel and 1000 mm for vertical travel, except in the following cases:

i) if an *escape route* is within an *exitway*, its width shall be no less than 1000 mm, and

ii) if an *escape route* is within an *open path* and a single *escape route* is permitted, its width may be reduced to 700 mm for horizontal travel and 850 mm for vertical travel; and

SI b) for ***risk group* SI**:

i) be no less than 1200 mm for horizontal travel and 1500 mm for vertical travel, and

ii) comply with Paragraph 3.9.4.2 for the widths of doors required for the passage of beds.

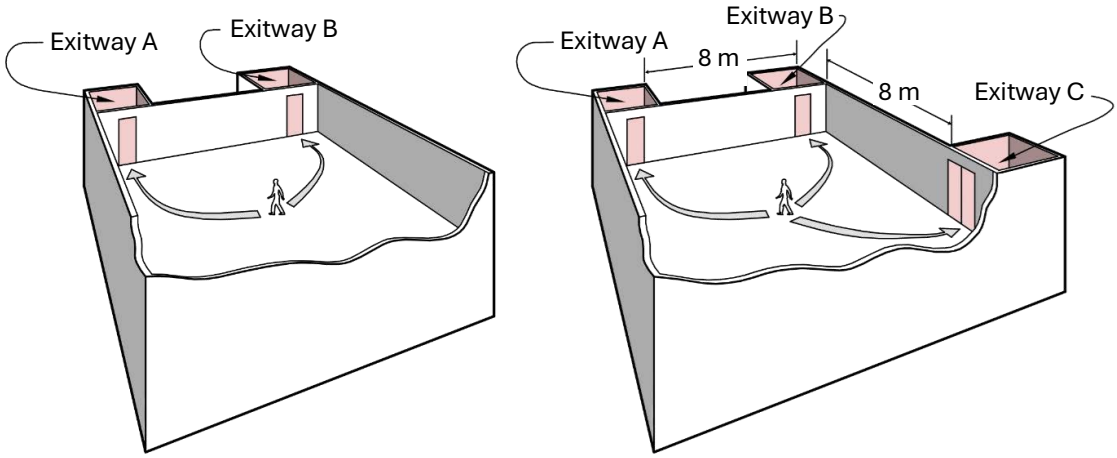
3.2.2.4 The total required width of *escape routes* shall be maintained in the event that the widest *escape route* becomes unusable due to *fire* or any other reason (see Figure 3.2.2.4). However, this does not apply where:

a) *dead ends* and single *escape routes* are permitted; or

b) the *firecell* is sprinklered.

Figure 3.2.2.4: Exitway widths in unsprinklered firecells

Paragraph 3.2.2.4



Exitways A and B are each wide enough to take the full *occupant load*.

The combined width of the two narrowest *exitways* must be wide enough to take the full *occupant load*.

3.2.2.5 For horizontal *escape routes* with a single direction of escape, the *escape route:*

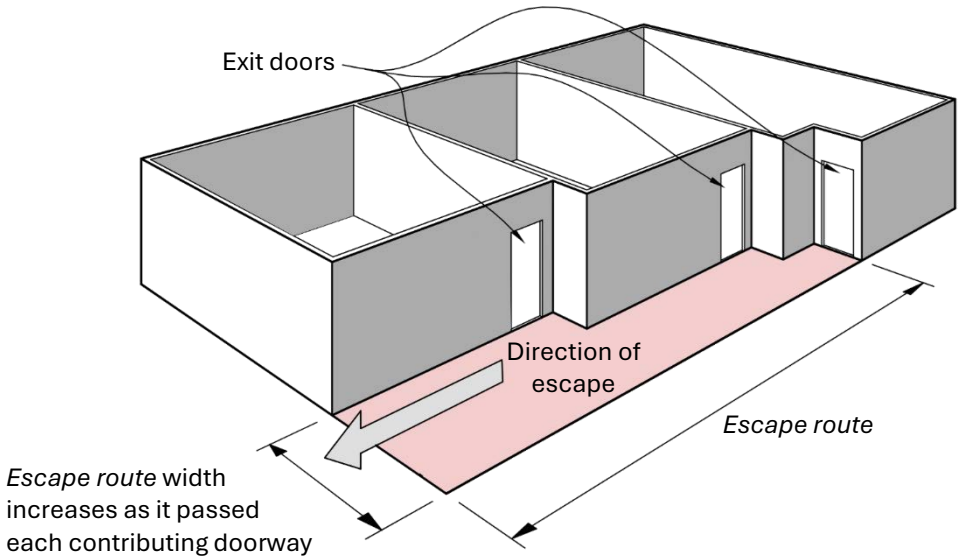
a) shall be wide enough at any point to take the full *occupant load* from all contributing *occupied spaces*; and

b) may have its width increased progressively as it passes the exit from each *occupied space* (see Figure 3.2.2.5).

3.2.2.6 For horizontal *escape routes* with two directions of escape, the *escape route* shall have sufficient width for the full length of the route to allow for the *occupant load* from all contributing *occupied spaces*. However, this shall not apply if the requirements of Paragraph 3.4.3.2(e) are met for escape through adjacent *firecells*.

Figure 3.2.2.5: Increase in width for horizontal escape routes having a single direction of escape

Paragraph 3.2.2.5



3.2.2.7 For *firecells* containing an intermediate floor, both the vertical and horizontal parts of the *open path escape route* shall be wide enough to take the full *occupant load* from all contributing *occupied spaces*.

3.2.2.8 Vertical *safe paths* shall have minimum widths at any point determined only by the largest total *occupant load* passing that point in the direction of escape from:

a) any single level (where not part of an intermediate floor firecell); and

b) all levels in a *firecell* where it spans more than one level.

SM CA 3.2.2.9 When applying the exception permitted in Paragraph 4.12.4.1 i) to marae *buildings* using traditional Māori construction materials in ***risk groups* SM** and **CA**, the required *escape route* widths required shall be doubled.

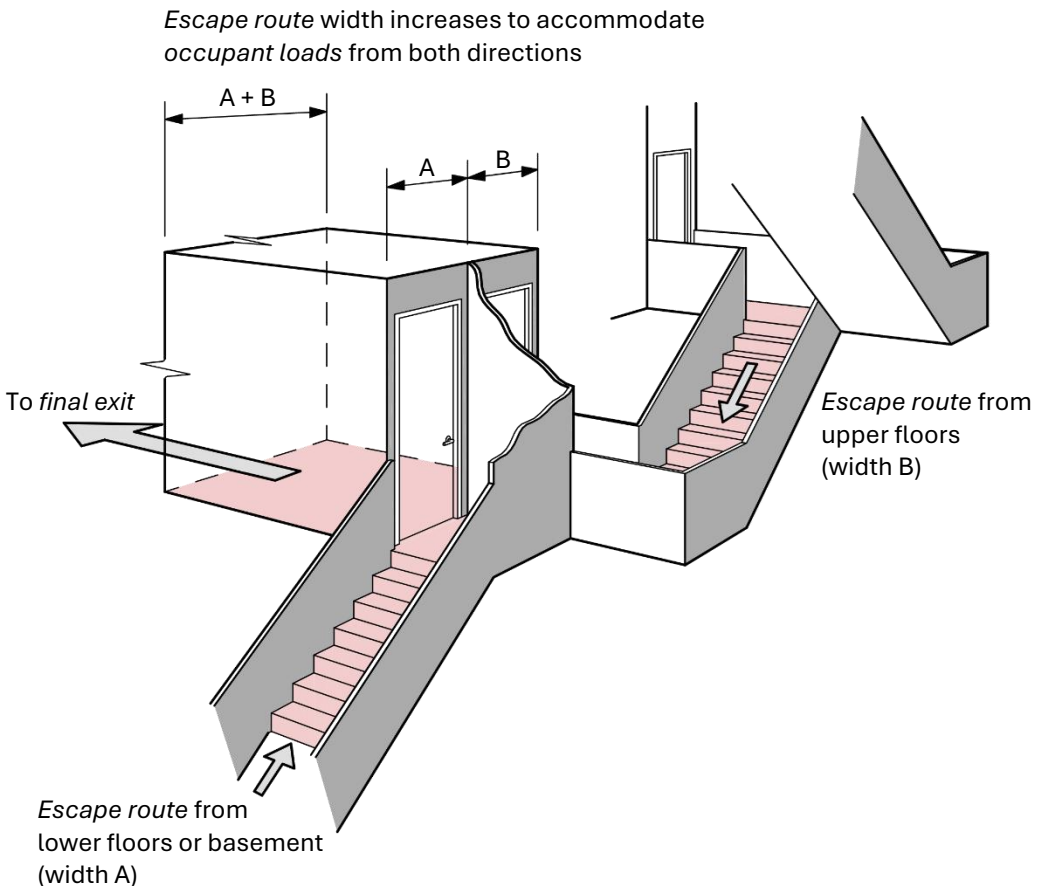
3.2.2.10 If an *escape route* from upper floors is joined at the level of a *final exit* by an *escape route* from a *basement* or lower floors, the *escape route* width at the point they combine shall be increased to accommodate the *occupant loads* from both directions (see Figure 3.2.2.10).

3.2.2.11 The width requirements of Paragraph 3.2.2.3(a) do not apply to ladders where their use is permitted in this acceptable solution.

CA 3.2.2.12 For fixed or loose seating in ***risk group* CA**, the width requirements of Paragraphs 3.2.2.2, 3.2.2.3, and 3.2.2.4 do not apply to fixed or loose seating.

Figure 3.2.2.10: Escape routes from lower and upper floors

Paragraph 3.2.2.10



3.2.3 Handrails and limitations to stairway widths

3.2.3.1 For safe evacuation on stairs, all *stairways* shall have at least one *handrail*. Furthermore:

a) *stairways* in *escape routes* wider than 1500 mm shall have *handrails* on both sides; and

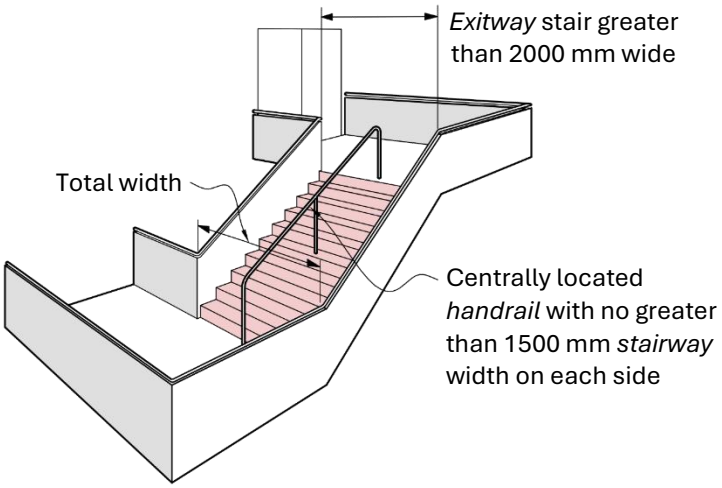
b) *stairways* in *escape routes* wider than 2000 mm (see Figure 3.2.3.1) shall also be provided with intermediate *handrails* that are equally spaced and that provide a width not greater than 1500 mm for each section of the *stairway*.

3.2.3.2 If the *escape height* exceeds 35 m, no more than 1500 mm shall be credited to the width of any *stairway* when calculating *stairway* capacity for an *escape route*.

3.2.3.3 Where curved or spiral stairs form part of an *escape route*, the required width of such stairs is to be measured across the tread where the tread depth meets the requirements for the tread depth in Acceptable Solution D1/AS1.

Figure 3.2.3.1: Limitations to stairway widths

Paragraph 3.2.3.1



Note: The capacity of the stair is the total width. Subdividing *handrails* less than 100 mm wide are not counted as an obstruction (refer to Paragraph 3.2.4.1(b)).

3.2.4 Obstructions

3.2.4.1 The following minor obstructions are acceptable within the width of an *escape route*:

a) minor projections complying with the requirements of Acceptable Solution D1/AS1 such as signs, switches, alarm sounders, and similar projections; and

b) *handrails*:

i) complying with Acceptable Solution D1/AS1 and projecting no more than 100 mm into the width, and

ii) subdividing wide stairways that reduce the width by no more than 100 mm (refer to Paragraph 3.2.3.1); and

c) door assemblies that reduce the width of an *exitway* by:

i) no more than 125 mm when the door is fully open (see Figure 3.9.4.1), or

ii) as permitted by Table 3.2.2.1; and

CA

d) in ***risk group* CA** fixed seating (at the start of an *escape route*) that complies with the requirements of Paragraph 3.4.5.1 and Table 3.4.7.1 for the width of aisles and space between rows.

3.2.4.2 Except as permitted by Paragraph 3.9.6.1, *escape routes* shall not be obstructed by access control systems.

3.3 Length of escape routes

3.3.1 Travel distance on open paths

3.3.1.1 An *escape route* may be any length but:

a) the lengths of *dead ends* and total *open paths* shall not exceed the *travel distances* given in Table 3.3.1.1 adjusted as necessary for:

VP

i) reductions on intermediate floors (refer to Subsection 3.3.3), apart from ***risk group* VP** *firecells* with adequate cross ventilation in accordance with Paragraph 4.1.2.2, and

ii) reductions on stairs and ladders (refer to Subsection 3.3.4); and

b) if the *travel distance* to the *final exit* exceeds the allowable length for total *open paths*, the remainder of the *escape route* shall be a *safe path* (refer to Paragraph 3.5.3.4 for *safe path* length restrictions within a single floor level).

Table 3.3.1.1: Travel distances on open paths (metres)

Paragraph 3.3.1.1

Risk group	Portion of the escape route	No system and Type 2 system	Type 3(2) system	Type 4(1),(2) and Type 5(1),(2),(3) systems	Type 6(2) system	Type 7(1),(2) system
SM	Dead end open path	20	–	30	30	40
	Total open path	50	–	75	75	100
SI	Dead end open path	–	–	–	–	20
	Total open path	–	–	–	–	50
CA	Dead end open path	20	20	40	40	50
	Total open path	50	50	100	100	120
WB	Dead end open path	25	35	50	50	75
	Total open path	60	75	120	120	150
WS	Dead end open path	–	–	–	50	75
	Total open path	–	–	–	120	180
VP	Dead end open path	35	45	–	70	–
	Total open path	90	110	–	180	–

Notes:

(1) If *open path* length increases for a Type 4, Type 5, or Type 7 system are being applied, where NZS 4512 allows heat detectors to be substituted for smoke detectors, not less than 75% of the *firecell* shall be protected with smoke detectors.

(2) If smoke detection systems or heat detection systems are installed in order to extend permissible *travel distance* in accordance with this table and are not a requirement of Paragraph 2.2.1.1, then a connection to a *remote receiving centre* is not required.

(3) Type 5 systems are only for ***risk group* SM**.

3.3.2 Open paths

3.3.2.1 *Open path* lengths, including any *dead end*, shall be determined in accordance with Paragraphs 3.3.2.1, 3.3.2.2, 3.3.2.3, 3.3.2.4, 3.3.2.5, 3.3.2.6, and 3.3.2.7.

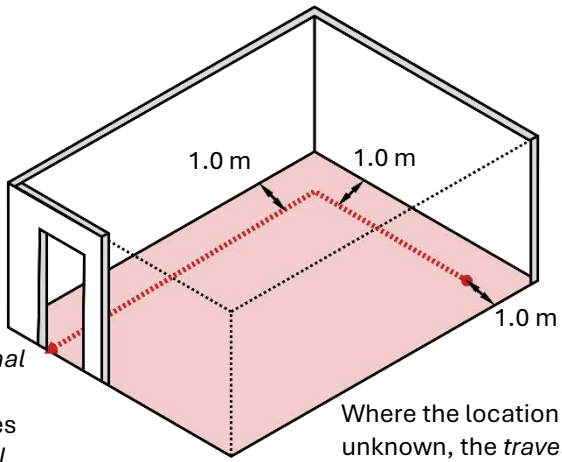
3.3.2.2 The start point of the *open path* length shall be measured from no more than 1.0 m from the most remote point in a space.

3.3.2.3 Where there are multiple *risk groups*, the lengths specified in Table 3.3.1.1 shall apply to all *risk groups*. When other *risk groups* with different allowable maximum *open paths* lengths use the same open path, the *open path* length for the *risk group* with the shortest maximum length shall apply.

3.3.2.4 Allowance shall be made for the *travel distance* around obstructions such as furniture, fittings, and office equipment located in the *open path* (see Figure 3.3.2.4(a)). If the location of such obstructions is not known, then the allowable travel distance shall be measured orthogonally (see Figure 3.3.2.4(b)).

Figure 3.3.2.4: Length of open paths

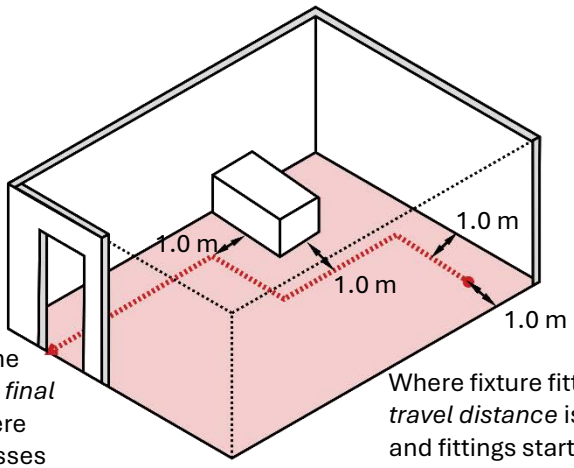
Paragraph 3.3.2.4



Open path ends at the start of an *exitway*, a *final exit*, or the point where the *escape route* passes into an adjacent *firecell* on the same level.

Where the location of obstructions are unknown, the *travel distance* is measured orthogonally starting 1.0 m from the most remote point in the space and following a path located 1.0 m from walls.

(a) Fixture and fitting positions are unknown



Open path ends at the start of an *exitway*, a *final exit*, or the point where the *escape route* passes into an adjacent *firecell* on the same level.

Where fixture fitting positions are known, the *travel distance* is measured around furniture and fittings starting 1.0 m from the most remote point in the space and following a path located 1.0 m from the obstructions.

(b) Fixture and fitting positions are known

Note:

(1) Unless permitted by Section 3.8, every occupant shall have access to two *escape routes*. *Open path* lengths shall not exceed the distances in Table 3.3.1.1.

3.3.2.5 If two or more *escape routes* are required, *open path* lengths shall not exceed the lengths specified in Table 3.3.1.1 from any point on a floor to no fewer than two exits from the *firecell*.

3.3.2.6 When applying the exception permitted in Paragraph 4.12.4.1 i) for marae *buildings* using traditional Māori construction materials, the permitted length of the *open path* specified in Table 3.3.1.1 shall be halved.

3.3.2.7 The *open path* shall end either at:

a) the start of an *exitway*; or

b) a *final exit*; or

c) the point where the *escape route* passes into an adjacent *firecell* on the same level (refer to Paragraph 3.4.9.7).

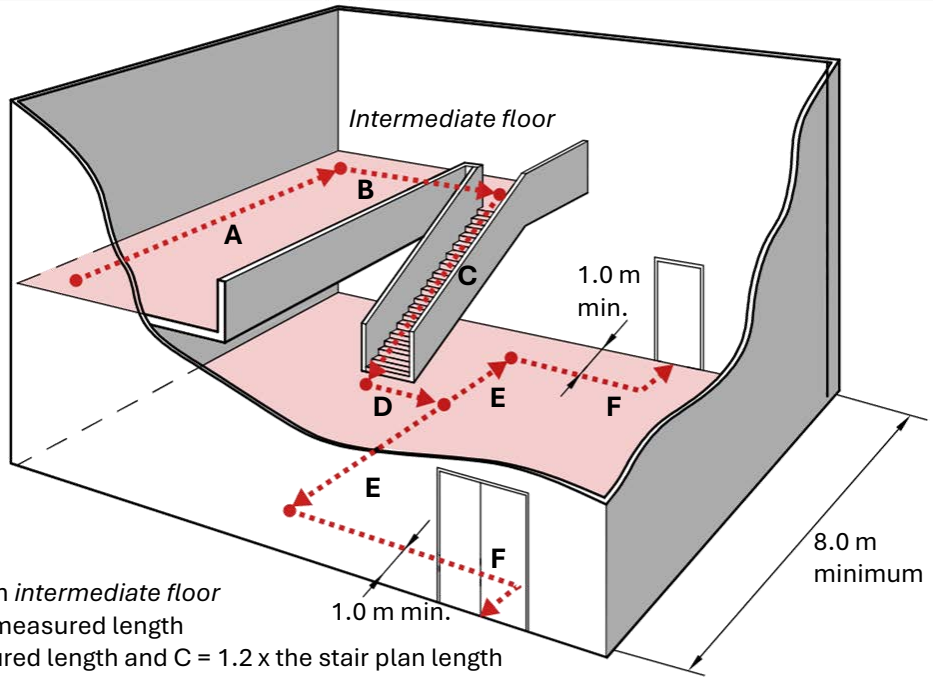
3.3.3 Intermediate floors

3.3.3.1 On *intermediate floors*, the *open path* length shall be taken as 1.5 times the measured length in accordance with Paragraph 3.3.2.4 (see Figure 3.3.3.1).

3.3.3.2 The measured length may be used where the *intermediate floor* is a *smokecell* and an *escape route* is available from the *intermediate floor* without passing through any lower space in the same *firecell*.

Figure 3.3.3.1: Intermediate floor open path length

Paragraph 3.3.3.1



Dead end open path on *intermediate floor*
assessed as 1.5 x the measured length
A + B = 1.5 x the measured length and C = 1.2 x the stair plan length
A + B + C + D must not exceed the maximum permitted *dead end open path* length
A + B + C + D + E + F must not exceed the maximum permitted total *open path* length

Note: (1) The maximum *open path* distances are given in Table 3.3.1.1.

3.3.4 Stairs and ladders

3.3.4.1 Stairs and ladders occurring in an *open path* (see Figure 3.3.4.1) shall have their *open path* length taken as:

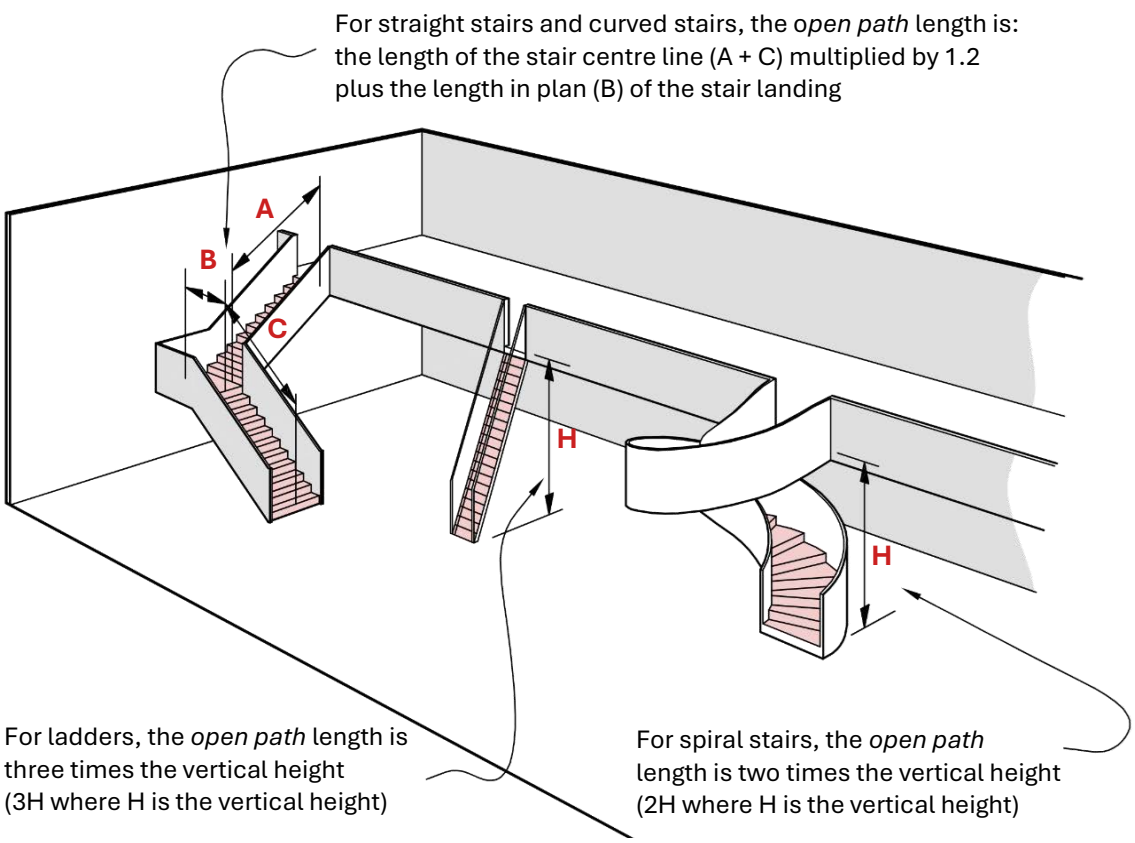
a) for straight and curved stairs: the plan length measured on the stair centreline multiplied by 1.2, plus the plan length of each landing; and

b) for spiral stairs: twice the vertical height; and

c) for ladders: three times the vertical height.

Figure 3.3.4.1: Stairs and ladders

Paragraph 3.3.4.1



3.3.5 Sloping floors and ceilings

3.3.5.1 The *open path* length permitted by Table 3.3.1.1 shall be reduced by 50% in any space where the following conditions apply:

a) both the floor and the ceiling slope in the same direction at an angle of more than 4° from the horizontal, and any *escape route* from the space is up the slope; and

b) the clear ceiling height at any point is less than 4.0 m; and

c) the *occupant load* in the space is more than 50; and

d) the space is unsprinklered.

3.3.6 Escape through adjoining building

3.3.6.1 An *escape route* may be via an adjoining *building* (see Figure 3.3.6.1), provided the following conditions are satisfied:

a) the *escape route* through the adjoining *building* meets all *escape route* requirements for the *occupant load* from the *fire* affected *building* requiring to use that route; and

b) unless the *escape route* passes directly to a *safe path* in the adjoining *building*, access shall be through a *smoke lobby* before passing through the *external walls*; and

c) the opening through the *external wall* having the higher *FRR* has a *fire door* with an *FRR* of no less than that wall; and

d) *escape routes* in the adjoining *building* comply with the Building Code and have sufficient capacity to carry the *occupant load* from the *building* or *buildings* being evacuated; and

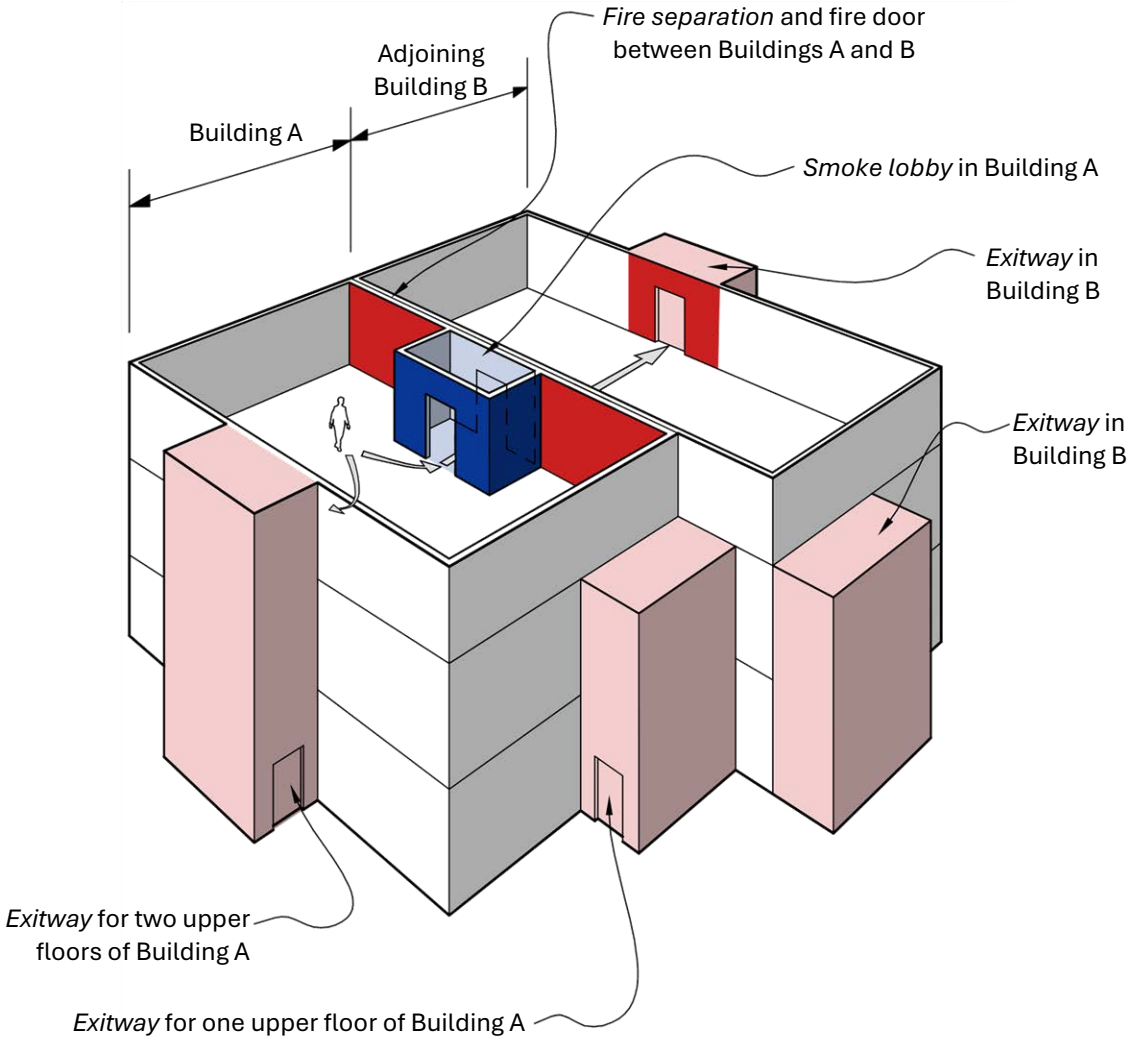
e) the *escape route*:

i) does not re-enter the first *building* at any point, and

ii) is freely available at all times.

Figure 3.3.6.1: Escape through adjoining building

Paragraphs 3.3.6.1 and 4.4.2.6



3.4 Open paths

3.4.1 Open path separation

3.4.1.1 If two or more *open paths* are required, they shall be separated from each other, and remain separated until reaching an *exitway* or *final exit* (see Figure 3.4.1.1).

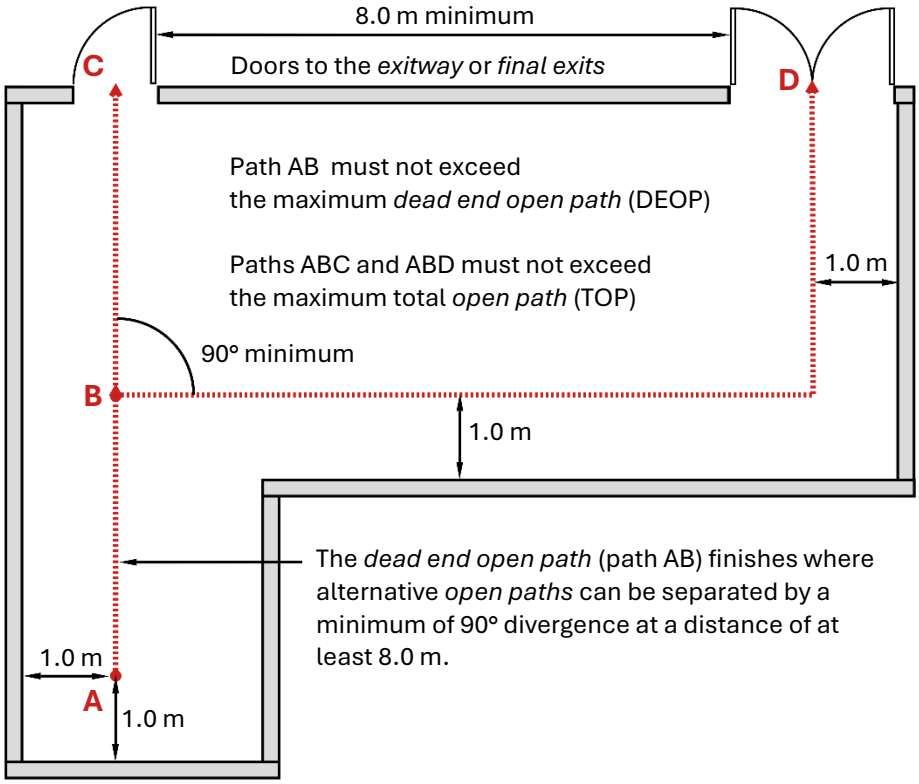
3.4.1.2 Separation shall be achieved by diverging at an angle of no less than 90° from the point where two *escape routes* are required until separated by:

a) a distance of at least 8.0 m; or

b) *smoke separations* and *smoke control doors*.

Figure 3.4.1.1: Alternative open path separation

Paragraph 3.4.1.1



Note: The lengths of *open paths* shall not exceed the distances given in Table 3.3.1.1.

3.4.2 Education buildings

3.4.2.1 If a *building* contains classrooms, laboratories, and/or spaces used for home economics, art and crafts, workshops, or similar teaching activities:

a) one *open path* may be via a connecting corridor; and

b) the alternative *open path* may be via connecting doors between adjacent teaching spaces.

3.4.2.2 In these cases, the separation requirements of Subsection 3.4.1 need not apply provided that:

a) the number of occupants in each teaching space does not exceed 100; and

b) the *escape route* does not pass through a space that may be locked.

3.4.3 Passing into an adjacent firecell

3.4.3.1 If an *escape route* passes through a number of *fire separations*, the *escape route* is permitted to continue as an *open path* provided the cumulative travel distance does not exceed the permitted distance specified in Table 3.3.1.1.

3.4.3.2 An *open path* may pass into an adjacent *firecell* on the same level (see Figure 3.4.3.2) and recommence as a new *open path* provided that:

a) all *firecells* on the *escape route* have no fewer than two directions of escape, separated as required by Subsection 3.4.1; and

b) adjacent *firecells* into which evacuation may take place have an available floor area to accommodate not only their own occupants, but also the occupants from the adjacent *firecell*. This shall be calculated on the basis of the *occupant load* of the two *firecells* with not less than 1.0 m^2 of space provided for each occupant. Refer to Paragraph 4.5.1.4 for additional requirements for ***risk group* SI**; and

SI

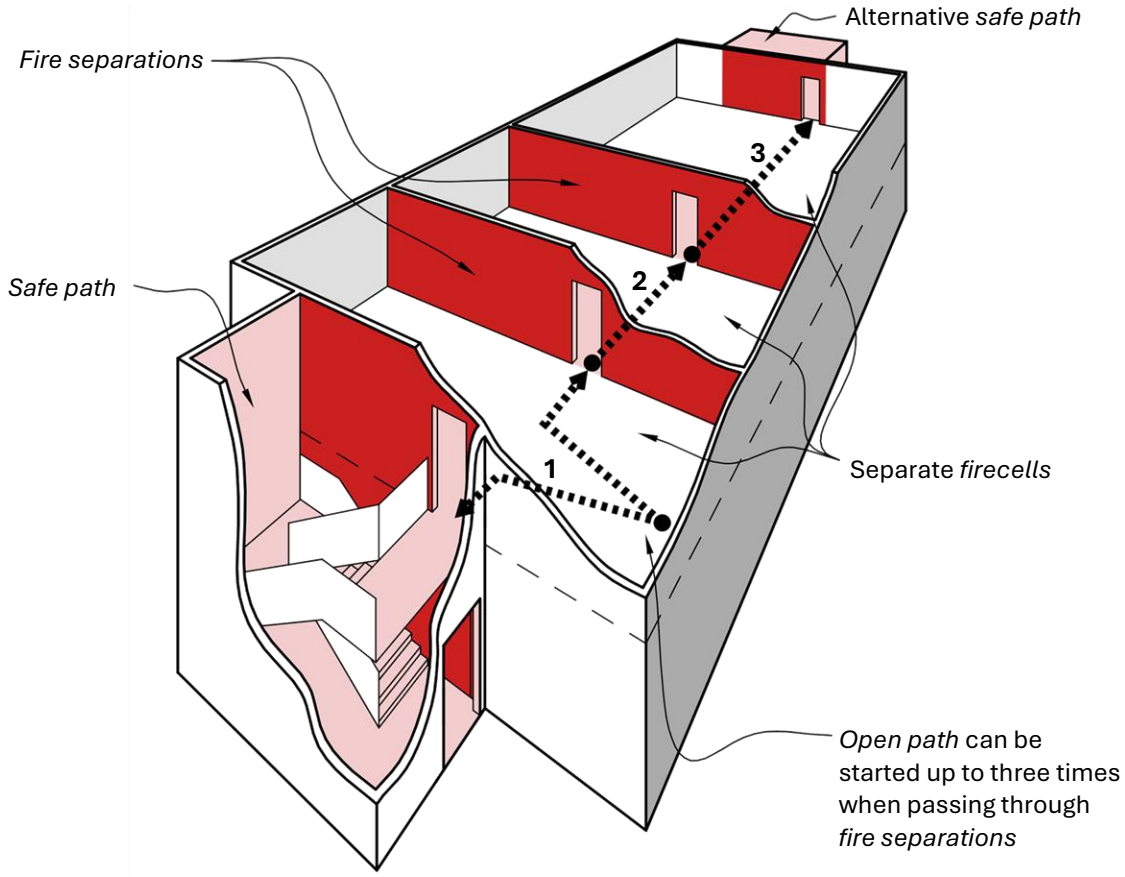
c) each *firecell* has at least one other *escape route* independent of the route into the adjacent *firecell*. This other route may be by way of a *final exit* or via a third *firecell* provided that the exit from that third *firecell* is independent of exits from the other two *firecells*; and

d) the *escape route* does not pass through more than three *fire separations* before entering an *exitway* or *final exit*, and

e) the *escape route* width meets the requirements of Subsection 3.2.2 for the *firecell* on the *escape route* that has the greatest *occupant load*.

Figure 3.4.3.2: Open path passing into adjacent firecells

Paragraph 3.4.3.2



3.4.4 Separate tenancy

3.4.4.1 *Open paths* shall only pass through spaces containing different tenancies if:

a) doors leading to an *exitway* or *final exit* can be readily opened by all persons for whom the *open path* is their *escape route*.

3.4.5 Escape via an intermediate floor

3.4.5.1 For all ***risk groups* excluding SI**, an *open path* may pass from a *firecell* on to an *intermediate floor* and recommence as an *open path* provided that:

a) where two or more *escape routes* are required from that *firecell*, only one *escape route* is via the *intermediate floor*; and

b) the *intermediate floor open path* length does not exceed the requirements of Subsection 3.3.3; and

c) the *intermediate floor* is served by at least two *escape routes*, separated as required by Subsection 3.4.1, and terminating at any of the following:

i) separate *firecells*, or

ii) separate *exitways*, or

iii) *final exits*.

3.4.6 Open paths via unenclosed stairs

SM 3.4.6.1 In ***risk group* SM** other than within a *household unit* or *suite*, unenclosed stairs in *escape routes* shall not exceed a height of 4.0 m within the *firecell*. This includes stairs that are not *smoke separated* or *fire separated* from other spaces.

3.4.6.2 Where the height exceeds 4.0 m, the *escape route* from that level shall be a *safe path* until it reaches a *final exit*.

3.4.7 Fixed seating

3.4.7.1 Except for within *household units* or *suites*, fixed seating that includes seating that is moveable or foldaway shall be arranged so that:

a) direct access to the aisles is available; and

b) the number of seats in a row is no greater than that specified in Table 3.4.7.1; and

c) the clear walkway width between rows is no less than that specified in Table 3.4.7.1; and

d) the area occupied by each seat plus the walkway in front of it has a total dimension of at least 760 mm from seat back to seat back measured horizontally at right angles to the rows of seats (see Figure 3.4.7.1). The seat width must be at least:

i) 500 mm where arms are provided (see Figure 3.4.7.1), and

ii) 450 mm where arms are not provided.

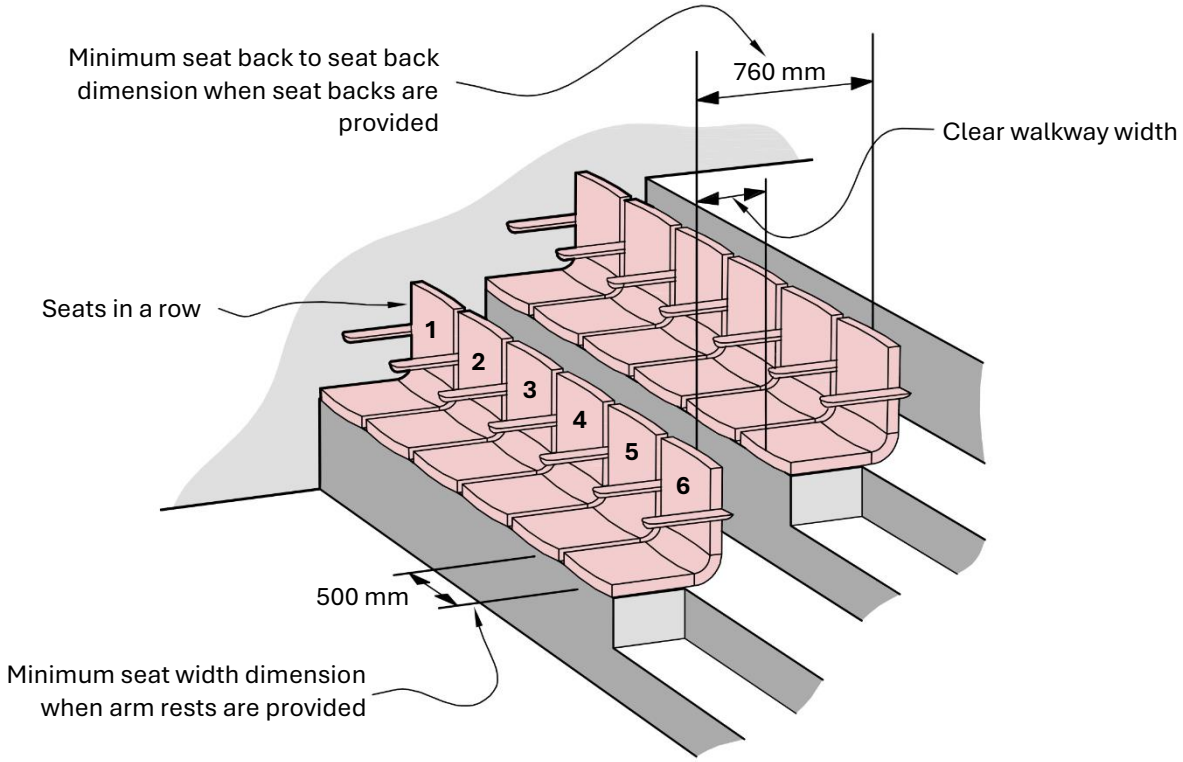
Table 3.4.7.1: Walkways in fixed seating

Paragraph 3.4.7.1

Minimum walkway width (mm)	Maximum number of seats in any row for one aisle	Maximum number of seats in any row for aisles on both sides
300	7	14
340	9	16
380	9	18
420	10	20
460	11	22
500	12	24

Figure 3.4.7.1: Fixed seating with backs

Paragraph 3.4.7.1



Note: (1) The maximum number of seats and the minimum walkway width are provided in Table 3.4.7.1.

3.4.8 Loose seating

3.4.8.1 Except for within *household units* or *suites*, loose seating is permitted only on level floors. The layout shall follow the requirements of Subsection 3.4.9.

3.4.8.2 Where the number of seats exceed 250, loose seating shall be interconnected to prevent overturning.

3.4.9 Aisles seating

3.4.9.1 Except within *household units* or *suites*, aisles serving fixed or loose seating shall provide access to *final exits* or *escape routes* (see Figure 3.9.4.1). The width of the *final exits* or *escape routes* shall be the greater of the:

a) aisle width as required by Paragraph 3.4.9.2; or

b) width required by Subsection 3.2.2.

3.4.9.2 Aisle widths shall be no less than:

a) 750 mm when serving up to 60 seats; or

b) 900 mm when serving over 60 seats on one side only; or

c) 1100 mm in all other cases.

3.4.9.3 The minimum width shall occur at:

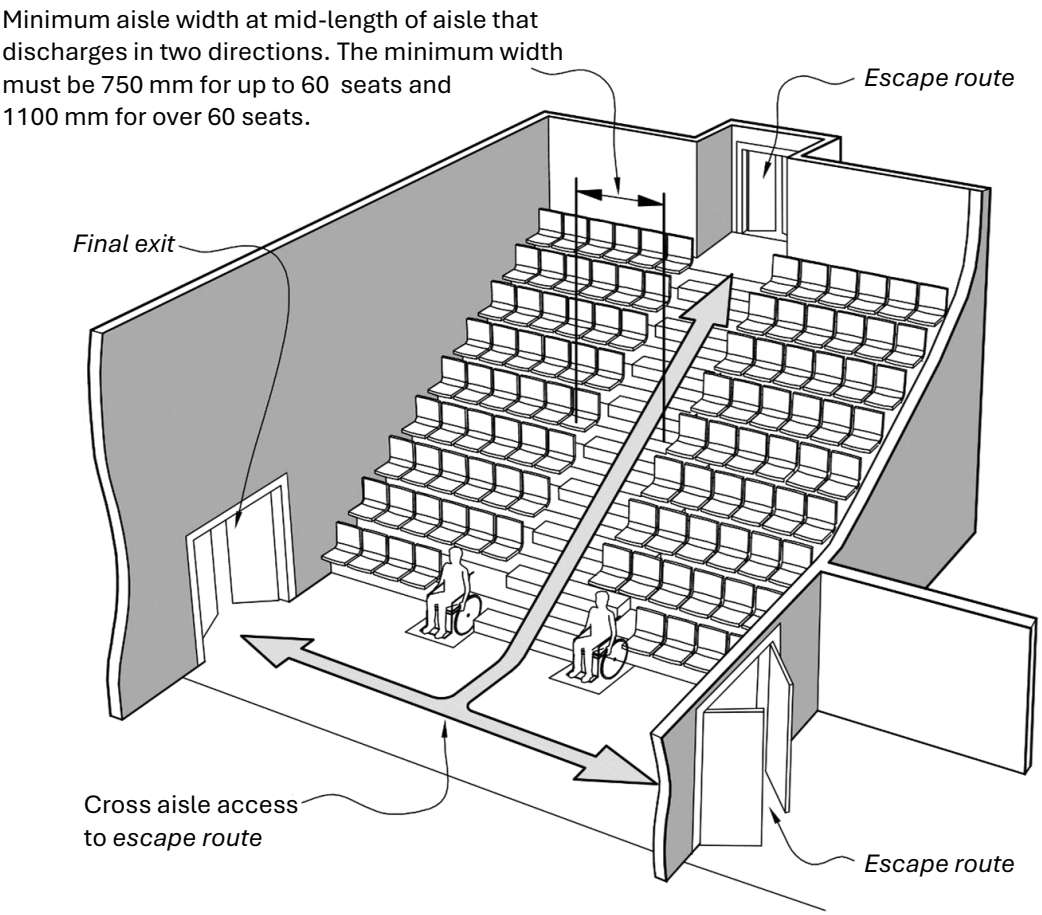
a) if discharge is in one direction only, the point furthest from the exit door in aisles; or

b) if discharge is in two directions, the mid-length of an aisle to separate cross aisles or to separate exit doors.

3.4.9.4 There is nothing to prevent an aisle being made wider than the minimum required. However, to avoid restrictions, this shall be done only in the direction of travel.

Figure 3.4.9.1: Aisles serving fixed seating

Paragraph 3.4.9.1



3.4.9.5 Each cross-aisle shall have a width of no less than that of the widest aisle it serves plus 50% of the sum of the widths of all other aisles served.

3.4.9.6 The *travel distance* from any seat to an adjacent *firecell*, a *final exit*, or *exitway* shall be no greater than allowed for an *open path* in Table 3.3.1.1. If there are sloping ceilings and floors, refer to Subsection 3.3.5 for further restrictions.

3.4.9.7 Any side of an aisle that does not provide access to seating shall have barriers complying with Acceptable Solution F4/AS1 and *handrails* complying with Acceptable Solution D1/AS1.

3.4.9.8 Steps in aisles shall have consistent riser heights and tread depths, both complying with the requirements of Acceptable Solution D1/AS1. Landing lengths in aisles shall be equal in each block of seating between cross-aisles, but may be less than the minimum length required by Acceptable Solution D1/AS1.

3.4.10 Dead ends

3.4.10.1 A *dead end* terminates where the *escape route* reaches:

a) a point in the *open path* that offers alternative directions of travel; or

b) a *final exit*; or

c) an *exitway*.

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

3.4.10.3 For all ***risk groups* excluding SM** and **SI**, the *escape route* from a *dead end* may be a ladder complying with Acceptable Solution D1/AS1 if:

a) it serves only support activities or provides the same function in support of other *risk groups*; and

b) if the *occupant load* does not normally exceed four.

3.4.10.4 Ladders are not permitted as *escape routes* in any other circumstances (see also Subsection 3.3.4).

3.5 Exitways

3.5.1 Components of exitways

3.5.1.1 *Exitways* consist of either:

a) *smoke lobbies* in accordance with Subsection 3.5.2; or

b) *safe paths* in accordance with Subsection 3.5.3; or

c) both.

3.5.2 Smoke lobbies

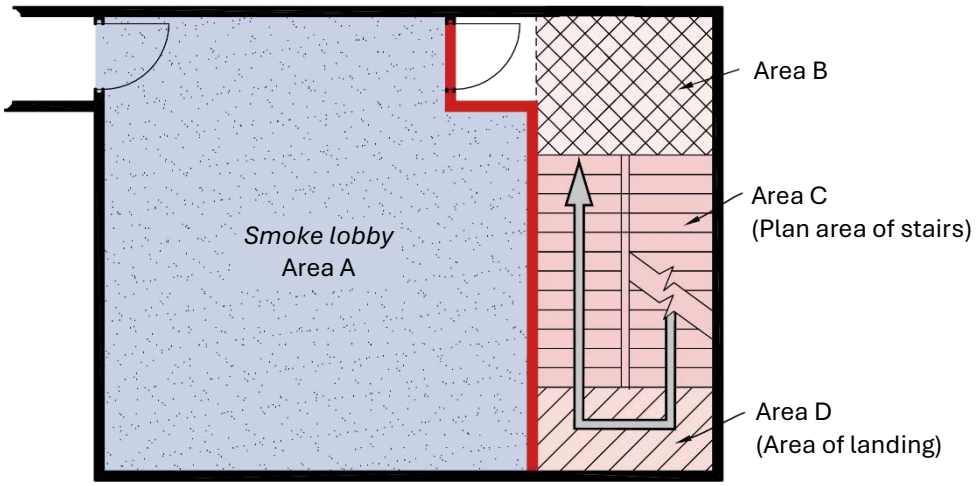
3.5.2.1 If a *smoke lobby* is required preceding a vertical *safe path* (see Paragraphs 3.5.2.2, 3.5.2.3, 3.8.1.1 and Figure 3.5.2.1 and Figure 3.5.2.3), its floor area shall be calculated for the *occupant load* using that *smoke lobby* and its size shall be at least that required by the doors and opening requirements of Acceptable Solution D1/AS1, on the basis that:

a) part of the *occupant load* will be accommodated in the vertical *safe path* between the level being considered and the next level in the direction of escape, with the remaining occupants accommodated in the *smoke lobby*; and

b) the *occupant load* factor for calculating the required holding area shall be 0.25 m^2/person. The usable floor area within the stairwell shall be taken as the area of the first landing, plus the plan area of the flights of stairs between the two floor levels, plus the areas of any intermediate landings. Additional space shall be provided for door swings.

Figure 3.5.2.1: Sizing of smoke lobbies

Paragraph 3.5.2.1



The required size of *smoke lobby* (Area A) =
(Number of persons to be accommodated x 0.25) minus (Area B + Area C + Area D)
The size shall be at least that required by Acceptable Solution D1/AS1.

SM CA 3.5.2.2 For ***risk groups* SM** and **CA**, entrances to vertical *safe paths* shall be preceded by *smoke lobbies* (refer to Paragraph 3.5.2.1 for the required area of the smoke lobby) except where:

a) the *safe path* from an upper floor or intermediate floor serves only that floor; or

b) the *firecell* is sprinklered; or

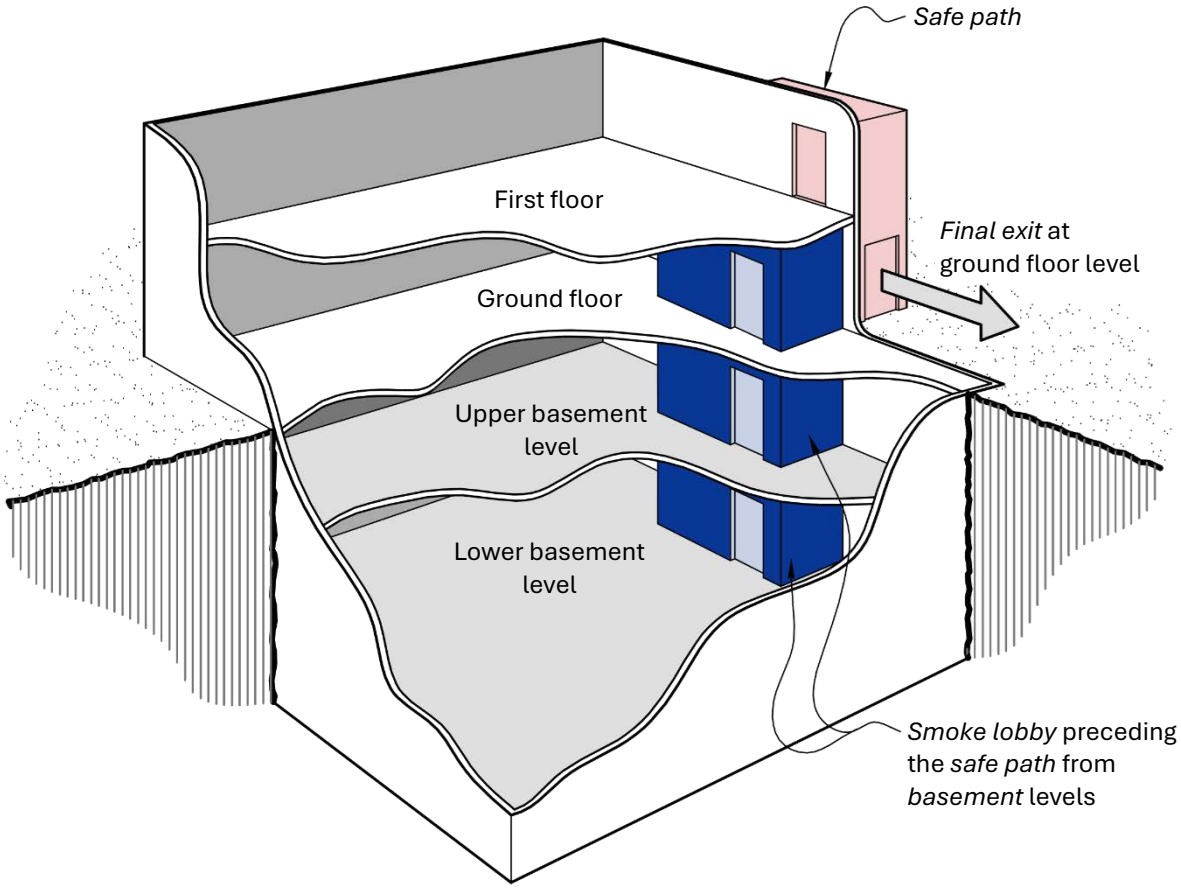
c) the *occupant load* of the *firecell* is less than 150; or

d) the vertical *safe path* is preceded by a horizontal *safe path*.

3.5.2.3 Except in cases where there are two or more *escape routes* serving only the *basement firecells* and each terminates in a *safe place*, *safe paths* serving *basement firecells* shall be preceded by a *smoke lobby* that shall have a plan area in accordance with Paragraph 3.5.2.1 (see Figure 3.5.2.3).

Figure 3.5.2.3: Single escape from basement levels

Paragraphs 3.5.2.1, 3.5.2.3, and 3.8.1.1



Notes:

(1) A single *escape route* is permitted only when there are no more than two basement levels and the *occupant load* at each *basement* is no greater than 50.

(2) Refer to Paragraph 3.8.1.1(e) for additional requirements for *smoke lobbies* on the ground floor and floors above the ground floor.

3.5.3 Safe paths

3.5.3.1 *Escape routes* from *firecells* shall enter directly into a *safe path* or *final exit*, except where Subsection 3.4.3 permits *open paths* to continue from one *firecell* to another.

3.5.3.2 *Safe paths* shall be separated from each other and from all spaces by:

a) *fire separations*; or

b) if they are external to the *building*, by distance or appropriate *construction* (see Section 3.6).

SM SI

3.5.3.3 Except where the conditions for escape via an external *escape route* (see Section 3.6) or successive *open paths* (see Subsection 3.4.3) apply, exit doors from sleeping area *firecells* in ***risk group* SM** and **SI** shall open directly onto:

a) a horizontal *safe path*; or

b) a *final exit*.

3.5.3.4 There is no limit on the length of a vertical *safe path*. Horizontal *safe paths* shall be no longer than specified in Table 3.5.3.4.

Table 3.5.3.4: Travel distances on horizontal safe paths (metres)

Paragraph 3.5.3.4

Risk group	Number of directions of travel	No system and Type 2 system	Type 3(2) system	Type 4(1),(2) and Type 5(1)(2) systems	Type 6(2) system	Type 7(1),(2) system
SM	Single direction	25	–	40	40	50
	More than one direction	180	–	Unlimited	Unlimited	Unlimited
SI	Single direction	–	–	–	–	20
	More than one direction	–	–	–	–	150
CA	Single direction	20	–	40	40	60
	More than one direction	150	–	Unlimited	Unlimited	Unlimited
WB	Single direction	25	–	50	50	80
	More than one direction	180	–	Unlimited	Unlimited	Unlimited
WS	Single direction	–	–	–	50	75
	More than one direction	–	–	–	Unlimited	Unlimited
VP	Single direction	25	45	–	50	–
	More than one direction	180	110	–	Unlimited	–

Notes:

(1) If *open path* length increases for a Type 4, Type 5, or Type 7 system are being applied, where NZS 4512 allows heat detectors to be substituted for smoke detectors, not less than 75% of the *firecell* shall be protected with smoke detectors. However, it is not permitted to substitute smoke detection in *exitways*.

(2) If smoke detection systems or heat detection systems are installed in order to extend permissible *travel distance* in accordance with this table and are not a requirement of Paragraph 2.2.1.1, then a connection to a *remote receiving centre* is not required.

(3) Type 5 systems are only for ***risk group* SM**.

3.5.3.5 Horizontal *safe paths* shall terminate at any of the following:

a) the entrance to an internal *stairway* which is a separate *safe path*; or

b) an external balcony leading to either an open or enclosed *stairway*; or

c) an opening in an *external wall* that enters onto a bridge leading to an open or enclosed *stairway*; or

d) a *final exit*.

3.5.3.6 *Fire doors* with smoke control capability shall be provided where *open paths* and horizontal *safe paths* provide access to internal vertical *safe paths*.

3.5.3.7 Glazing in *safe paths* shall comply with the requirements of Subsection 4.4.3.

SI 3.5.3.8 For ***risk group* SI** only, at least half the *safe paths* shall terminate in a *safe place* without being combined with an *escape route* from any other *risk group*.

SM 3.5.3.9 *Safe paths* from ***risk group* SM** may also serve other *risk groups* where:

a) a single *escape route* complying with Section 3.8 is permitted; or

b) alternative *escape routes* that are *safe paths* are provided.

3.5.3.10 Paragraph 3.5.3.9 shall also apply to all *firecells* on lower floors using the same *escape routes*.

3.5.4 Control of exitway activities

3.5.4.1 *Exitways* shall not be used for:

a) any storage of goods, solid waste or solid waste containers; or

b) entry points to solid waste chutes, or

c) the location of furniture or other combustibles; or

d) storage of cloaks or linen; or

e) a cleaner's cupboard not *fire separated* from the exitway; or

f) the location of an electrical switchboard or similar; or

g) any activity other than as permitted by Paragraph 3.5.4.2.

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

a) an alternative *escape route* is available from all *firecells* served by the *safe path* in which the activities occur; and

b) for *buildings*:

i) with an *occupant load* of not more than 500 where a Type 4 or 5 system is installed, or

ii) with an *occupant load* of more than 500 where a Type 7 system is installed; and

c) the *escape route* is not impeded by the activity or the occupants involved in that activity; and

d) those activities:

i) are visible to users of the *exitway* except in the case of sanitary fixtures, and

ii) are a *direct support function* of the *risk group* served by the *exitway*, and

iii) occupy a total floor area of not more than 6.0 m^2 except in the case of sanitary fixtures.

3.5.5 Lifts

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

a) the lift shaft and all its openings are located entirely within a single *firecell* containing the vertical *safe path*; and

b) passenger access into and from the lift car takes place entirely within the *safe path*; and

c) no other activity occurs within the vertical *safe path*; and

d) the lift is provided with a machine room that is a separate *firecell* and:
   i) the openings for lift ropes through the *fire separation* are as small as practicable, and
   ii) any penetrations, such as for electrical cables, are *fire stopped* in accordance with Subsection 4.3.2.

3.5.5.2 Except where the *building* is protected with a Type 7 system or the lift shaft has a pressurisation system designed to AS 1668.1, the lift landings shall:

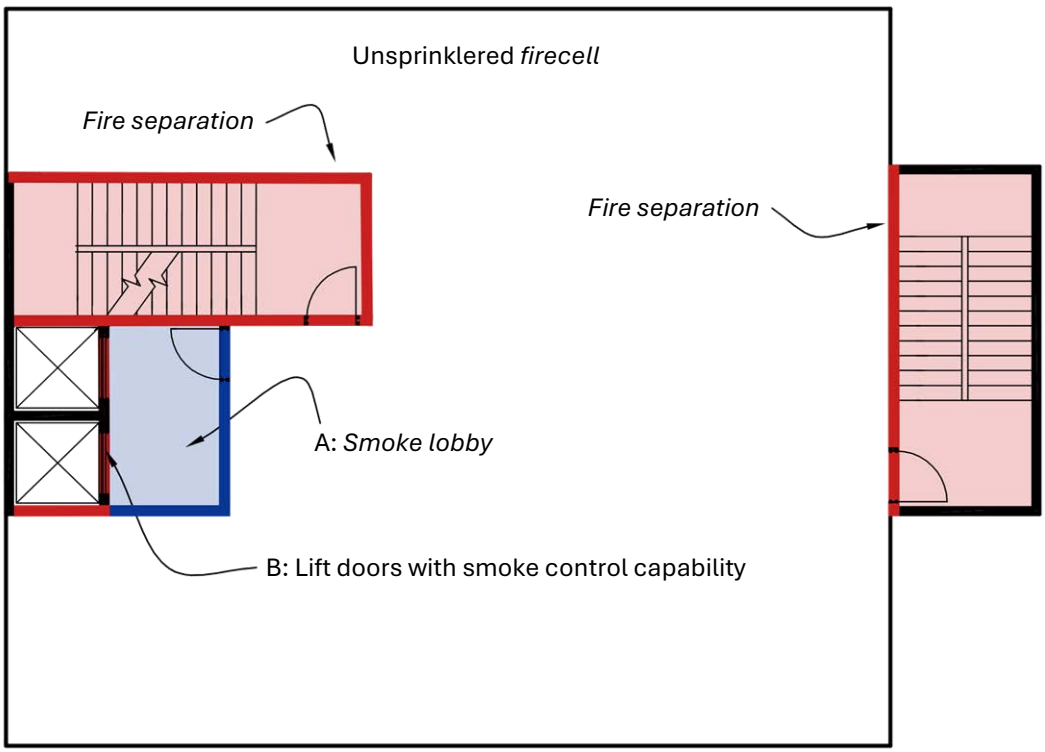
a) not open into or be located between *open paths* (see Figure 3.5.5.2A and Figure 3.5.5.2B); and

b) be provided with either:
   i) a *smoke lobby* separated from all other areas including horizontal *safe paths*, or
   ii) lift landing doors with smoke control capability.

3.5.5.3 Lift doors shall be as specified in Paragraphs 4.4.2.2 and 4.4.4.2.

Figure 3.5.5.2A: Lifts and smoke lobby on an open path

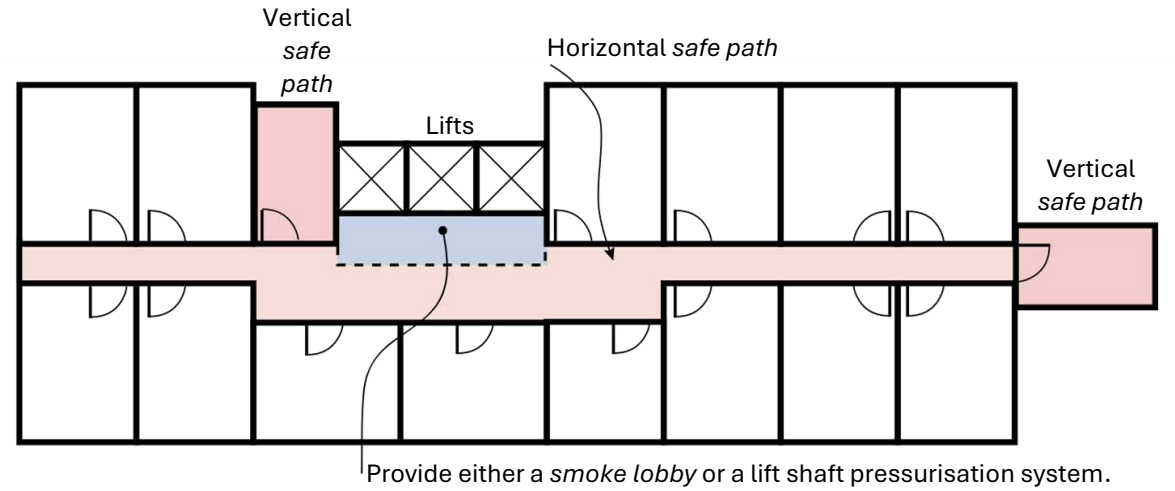
Paragraph 3.5.5.2



Note: Either A or B is required.

Figure 3.5.5.2B: Lifts and smoke separations when landing on an unsprinklered horizontal safe path

Paragraph 3.5.5.2



3.6 External escape routes

3.6.1 Escape routes entering open air

3.6.1.1 If an *escape route* enters a space exposed to the open air (for example: an open *stairway*, a balcony, across a roof, or a ground level path), it shall meet the requirements of a *safe path* between that point and the *final exit*.

3.6.1.2 *Safe path* separation requirements shall be achieved by providing either:

a) distance as specified in Subsection 3.6.2; or

b) *fire* rated *construction* between the *escape route* and adjacent *firecells* as specified Subsections 3.6.3 and 3.6.4.

3.6.2 Separation by distance

3.6.2.1 Separation by distance shall be achieved as follows:

a) if there is only one direction of escape, roofs and *external walls* shall not have *unprotected areas* closer to an external *escape route* than:

i) 2.0 m if unsprinklered (see Figure 3.6.2.1), or

ii) 1.0 m if all *firecells* passed by the external *escape route* are sprinklered; or

b) the *escape route* shall be located so that it diverges from *external walls* (refer to Paragraph 3.6.2.2); or

c) where alternative directions of escape are provided from the point where the *escape route* passes through an *external wall* and becomes an external *escape route* (refer to Paragraph 3.6.2.2(b)), unprotected areas are permitted.

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

a) the direction of escape to a single *final exit* diverges from the *external wall* at an angle of no less than 45° in plan; or

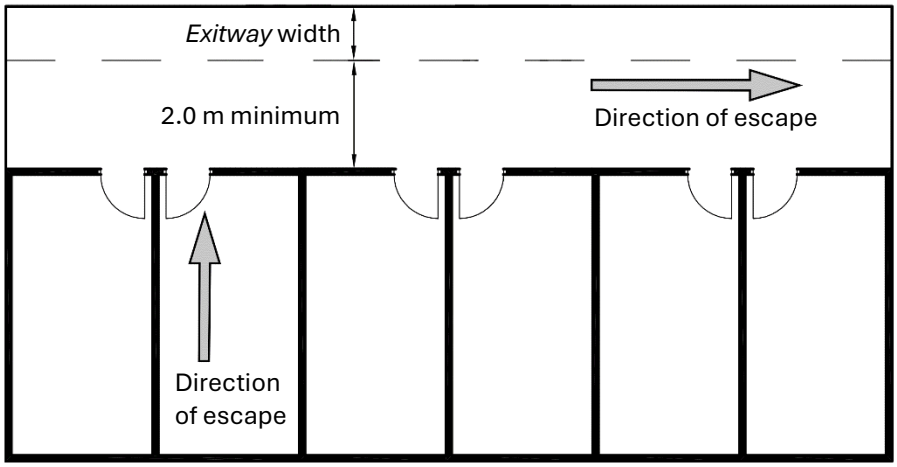
b) the directions of escape to alternative *final exits* diverge from each other at an angle of no less than 90° in plan and the *escape routes* subsequently do not both pass the same *firecell* (other than the *firecell* from which they originated); or

c) where *household units* and *suites* have full height glazing adjacent to a balcony which may be the only means of access and egress. The balcony shall provide the occupants with more than one *escape route* from the exit door, enabling them to escape without passing a unit containing a *fire*; or

d) for shopfronts, if the *final exit* is onto the footpath it is not required to be *fire* rated.

Figure 3.6.2.1: Single external escape routes in unsprinklered buildings

Paragraph 3.6.2.1



Note: (1) The minimum *exitway* width is given in Subsection 3.2.2.

3.6.3 Separation by fire rated construction

3.6.3.1 For external *escape routes* where the separation distance requirements of specified in Subsection 3.6.2 have not been achieved, *fire* rated *construction* shall be provided and comply with Paragraphs 3.6.3.2, 3.6.3.3, 3.6.3.4, and 3.6.3.5.

3.6.3.2 *External walls* and roofs adjacent to external *escape routes* shall

a) comply with the *FRR* requirements of Subsection 5.2.2, 5.4.2, and 5.4.3; and

b) have no *unprotected areas*, except that glazing for *safe paths* complying with Subsection 4.4.3 shall be permitted.

3.6.3.3 If the *escape route* is a balcony with a single direction of escape, and the vertical distance between the underside of the balcony and the closest *unprotected area* in the *external wall* below is less than 5.0 m (see Figure 3.6.3.3), balcony barriers shall:

a) have no openings; and

b) for ***risk group* SI** be protected with a material having a *Group Number* of 1; and

c) for all other ***risk groups* (SM**, **CA**, **WB**, **WS** and **VP)** achieve a *Group Number* no greater than 2.

3.6.3.4 If the vertical separation between the underside of an external *escape route* and *unprotected areas* in the *external wall* below is less than 5.0 m:

a) the floor of an external *escape route* closer to an *external wall* than required by Subsection 3.6.2 shall have an *FRR* of no less than required by Section 2.3; and

b) treads and risers of stairs on external *escape routes* shall either be:

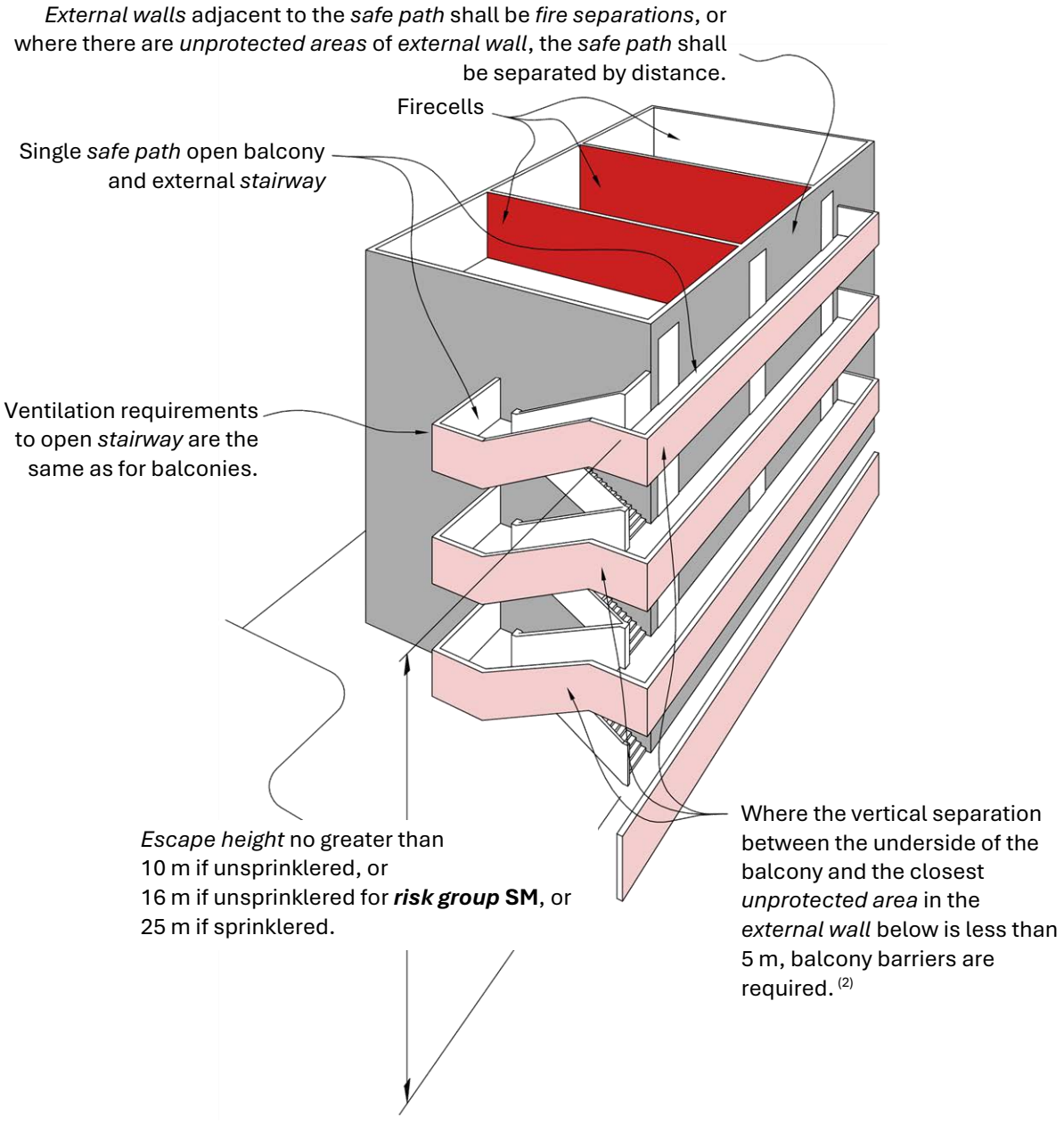
i) *constructed* from a material which has a critical radiant flux of no less than 2.2 kW/m^2, or

ii) shall be protected on the underside with a material having a *Group Number* of no greater than 2; and

3.6.3.5 If a single *escape route* comprises external horizontal and internal vertical *safe paths*, a *smoke separation* shall be provided between them.

Figure 3.6.3.3: Single escape routes for direct access to balcony and stairway

Paragraphs 3.6.3.3 and 3.8.4.2



Notes:

(1) Refer to Subsection 3.6.4 for ventilation requirements for open *stairways* and balconies.

(2) Refer to Paragraph 3.6.3.3 for the requirements for balcony barriers.

3.6.4 Ventilation openings

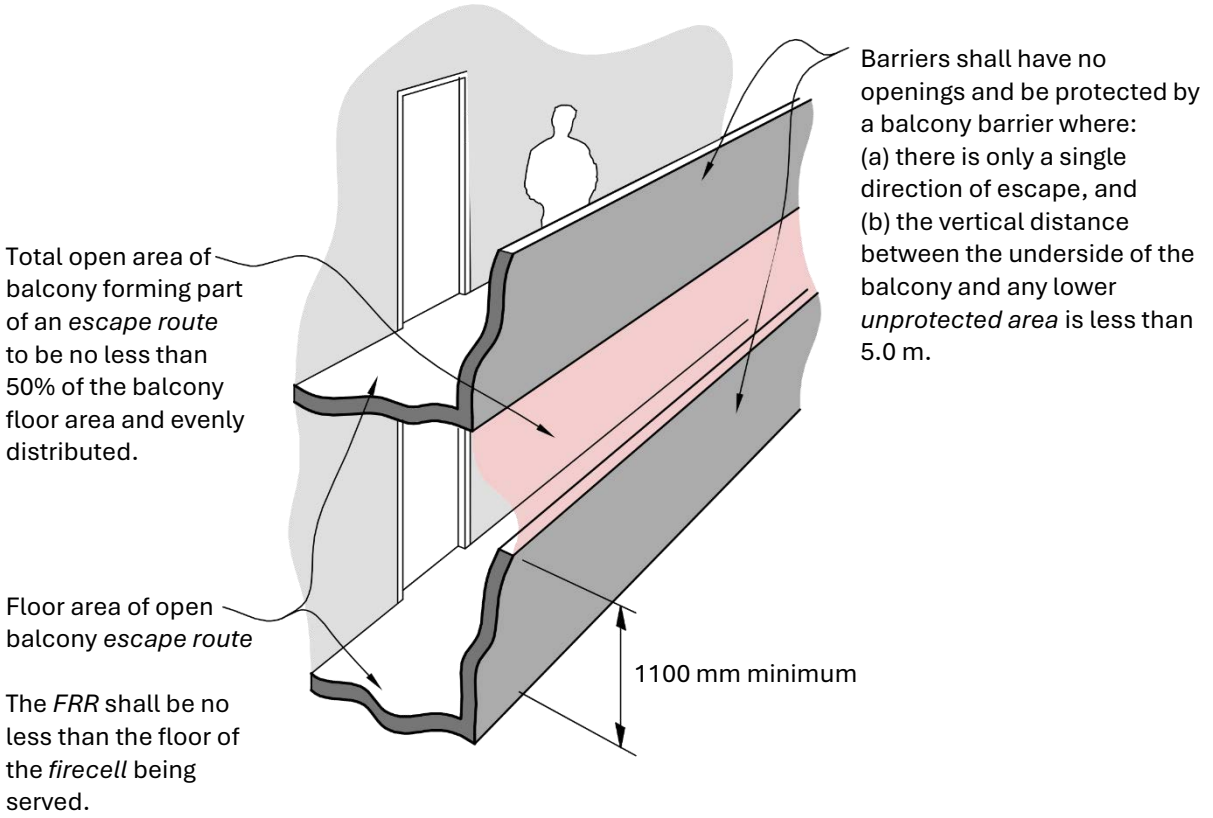
3.6.4.1 The open area of a balcony or bridge shall be no less than 50% of the balcony floor area and shall be evenly distributed along the open sides and any approach ramp (see Figure 3.6.4.1).

3.6.4.2 Where an *escape route* on a balcony is served by an open *stairway*, similar ventilation shall be provided on the *stairway*.

3.6.4.3 Open sides shall not be enclosed except that a fixed open grille may be used if it provides the required free air space.

Figure 3.6.4.1: Open balconies

Paragraph 3.6.4.1



3.6.5 Open air auditoriums

CA 3.6.5.1 For ***risk group* CA**, open tiered seating decks shall:

a) have the number of *escape routes* required by Table 3.3.1.1 for the *occupant load*; and

b) comply with Subsections 3.4.7, 3.4.8, and 3.4.9 for aisles and walkways between seats (Table 3.4.7.1 seat numbers are permitted to be doubled in this use), and

c) have *exitways* spaced at no more than:

i) 60 m apart where the space below the seating deck is required to be *fire separated* (see Paragraph 4.6.3.2), or

ii) 20 m apart where the space below requires no *fire separation*; and

d) be served by *escape routes* completely open to the air where the seating deck is not a *fire separation*.

3.6.5.2 If the seating deck is required to be a *fire separation*, an *escape route* may pass through the deck and the space below provided that part of the *escape route* is a *safe path* with an *FRR* in accordance with Section 2.3.

3.7 Final exits

3.7.1 Final exit separation

CA WB VP 3.7.1.1 For ***risk groups* CA**, **WB**, and **VP**, *final exits* that open onto the same *safe place* shall be spaced no closer than 5.0 m centre-to-centre. This applies to both internal and external *exitways*.

3.8 Single escape routes

3.8.1 Single escape routes in all risk groups

3.8.1.1 Single *escape routes* shall be permitted if:

a) the *dead end open path* length does not exceed the limits specified in Table 3.3.1.1; and

b) for all ***risk groups excluding SI***, the total *occupant load* from all *firecells* on each level served by the *escape route* is no greater than 50; and

c) the *escape height* is no greater than:

i) 10 m if unsprinklered, or

ii) 25 m if sprinklered; and

d) there are no more than two *basement* levels and the vertical *safe path* from the *basement* levels is preceded by a *smoke lobby* (see Figure 3.5.2.3); and

e) in *buildings* with two or more floors, the vertical *safe path* is preceded by a *smoke lobby* on all floors except the topmost floor (refer to Paragraph 3.5.2.1 to determine the *smoke lobby* floor area).

3.8.2 Additional provisions for single escape routes in risk group CA

CA 3.8.2.1 In addition to the requirements of Paragraph 3.8.1.1, in ***risk group* CA**, a single *escape route* from the *firecell* is permitted provided that the number of preschool children per floor receiving child care (including those using workshops and dining rooms) is not greater than 10.

3.8.3 Additional provisions for single escape routes in risk group WS

WS 3.8.3.1 In addition to the requirements of Paragraph 3.8.1.1, in ***risk group* WS**, a single *escape route* from the *firecell* is permitted provided that the *firecell* is on the ground floor.

3.8.4 Additional provisions for single escape routes in risk group SM

SM 3.8.4.1 In addition to the requirements of Paragraph 3.8.1.1, in ***risk group* SM**, a single *escape route* from a floor is permitted provided that:

a) the number of *people with disabilities* on any floor is not greater than 10; and

b) the *escape route* within each *firecell* terminates at a *final exit* or opens onto a *safe path* that complies with the requirements of Subsection 3.5.3; and

c) the particular requirements for *stairways*, balconies, and split level *exitways*, given in Subsection 3.4.6 and 3.8.4.2, are satisfied; and

d) the length of any *safe path* on a floor does not exceed the maximum *dead end* length permitted by Table 3.3.1.1.

SM 3.8.4.2 In ***risk group* SM**, balconies, bridges, and external stairways (see Figure 3.6.3.3) may be part of a single external *escape route* where:

a) the *escape height* is no greater than:

i) 16 m if unsprinklered, or

ii) 25 m if sprinklered; and

b) the *escape route* on the balcony, bridge, and stairway meets the requirements of Section 3.6 for protection, *construction*, and ventilation; and

c) the *external wall* within 3.0 m of the *stairway* is provided with an *FRR* in accordance with Section 2.3, or the length of any bridge between the *external wall* and *stairway* is no less than 3.0 m.

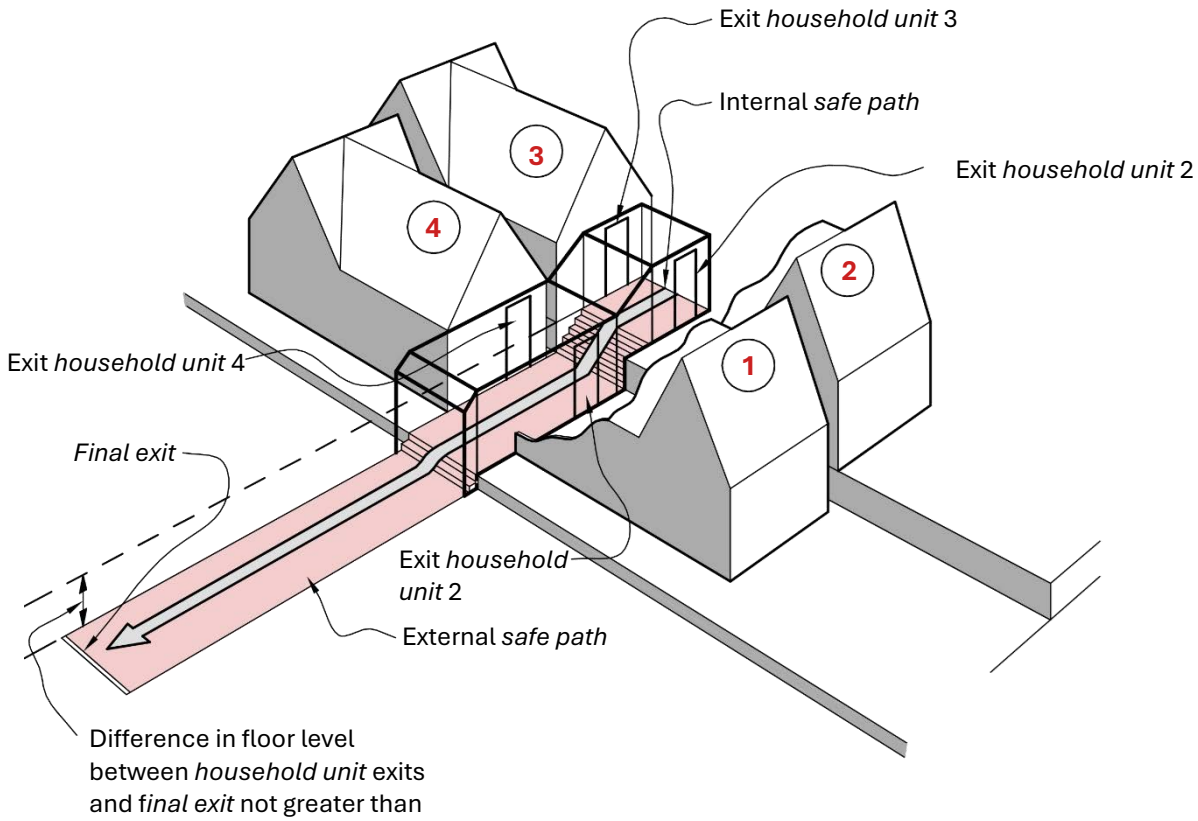
SM 3.8.4.3 In ***risk group* SM**, where a *building* is effectively of single storey *construction* but contains individual *household units* at slightly different levels (see Figure 3.8.4.3, a single internal *escape route* is permitted provided that:

a) the *escape route* is a *safe path* leading directly to a *final exit*; and

b) the difference in floor level between the *final exit* and any exit from a *household unit* is not greater than 2.0 m. *The safe path* is considered to be a horizontal *safe path* in this instance.

Figure 3.8.4.3: Single escape routes for split level exits

Paragraph 3.8.4.3



SM 3.8.4.4 In ***risk group* SM**, where the level difference is greater than 2.0 m, the relevant provisions for stairs shall apply (refer to Paragraphs 3.8.4.1 and 3.8.4.2).

3.9 Doors subdividing escape routes

3.9.1 Door closers and latching

3.9.1.1 Doors on *escape routes* shall comply with this subsection except as permitted by Paragraph 3.9.6.1 for revolving doors, automatic doors, and access control systems.

3.9.1.2 Doors on *escape routes* shall be hinged or pivoted on one vertical edge only, except that sliding doors may be used where the space, including an *exitway*, has an *occupant load* of less than 20.

3.9.1.3 Roller shutter doors or tilt doors shall not be used as *escape routes* width unless they are open at all times the space is occupied. A roller shutter door or tilt door is permitted to be the only *access route* to an intermittently *occupied space* where the roller shutter door is open at all times the space is occupied.

3.9.1.4 *Fire doors* and *smoke control doors* shall be self-closing. The self-closing device shall either be:

a) active at all times; or

b) activated by releasing a *hold-open device* in response to operation of a smoke detector (refer to Paragraph 3.9.7.2); or

c) a self-closer that is activated by operation of a smoke detector but allows the door to swing freely at other times. The smoke detector requirements shall be the same as for a *hold-open device* (refer to Paragraph 3.9.7.2).

3.9.1.5 If doors on *escape routes* are required to be secure, they shall:

a) be fitted with simple fastenings that can be readily operated from the direction approached by people making an escape complying with Paragraph 3.9.8.4; and

b) not be fitted with any locking devices unless these comply with Subsection 3.9.2.

3.9.1.6 Doors on *escape routes* shall have door handles that satisfy the requirements of Acceptable Solution D1/AS1 for use by *people with disabilities*.

3.9.1.7 Doors on *escape routes* shall be *constructed* to ensure that the forces required to open these doors do not exceed those able to be applied:

a) with a single hand to release the latch (where fitted); and

b) using two hands to set the door in motion; and

c) using a single hand to open the door to the minimum required width.

3.9.2 Locking devices

3.9.2.1 This subsection applies to locking devices if the *building* is occupied.

3.9.2.2 Locking devices shall be:

a) clearly visible; and

b) located where such a device would be normally expected; and

c) in the event of *fire*, designed to be easily operated without a key or other security device and allow the door to open in the normal manner; and

d) 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 Building Code clause F8 Signs.

3.9.2.3 Locking devices shall not prevent or override the direct operation of panic fastenings fitted to any door.

3.9.2.4 If locking devices are of an electromechanical type, in the event of a power failure or door malfunction, they shall either:

a) automatically switch to the unlocked fail-safe condition; or

b) be readily opened by an alternative method satisfying the requirements of Paragraph 3.9.2.2.

3.9.2.5 If the *escape height* is greater than 25 m, occupants in the vertical *safe path* shall be able to re-enter a floor at a maximum interval of 4 floors. 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.

3.9.3 Direction of opening

3.9.3.1 Doors shall be hung to open in the direction of escape if the door serves a room or area with more than 50 occupants. This includes doors:

a) located on an *open path*; and

b) leading into or within an *exitway*; and

c) at *final exits*.

3.9.3.2 If escape is in either direction, doors shall be capable of swinging both ways.

3.9.3.3 For manual sliding doors, refer to Paragraph 3.9.1.2.

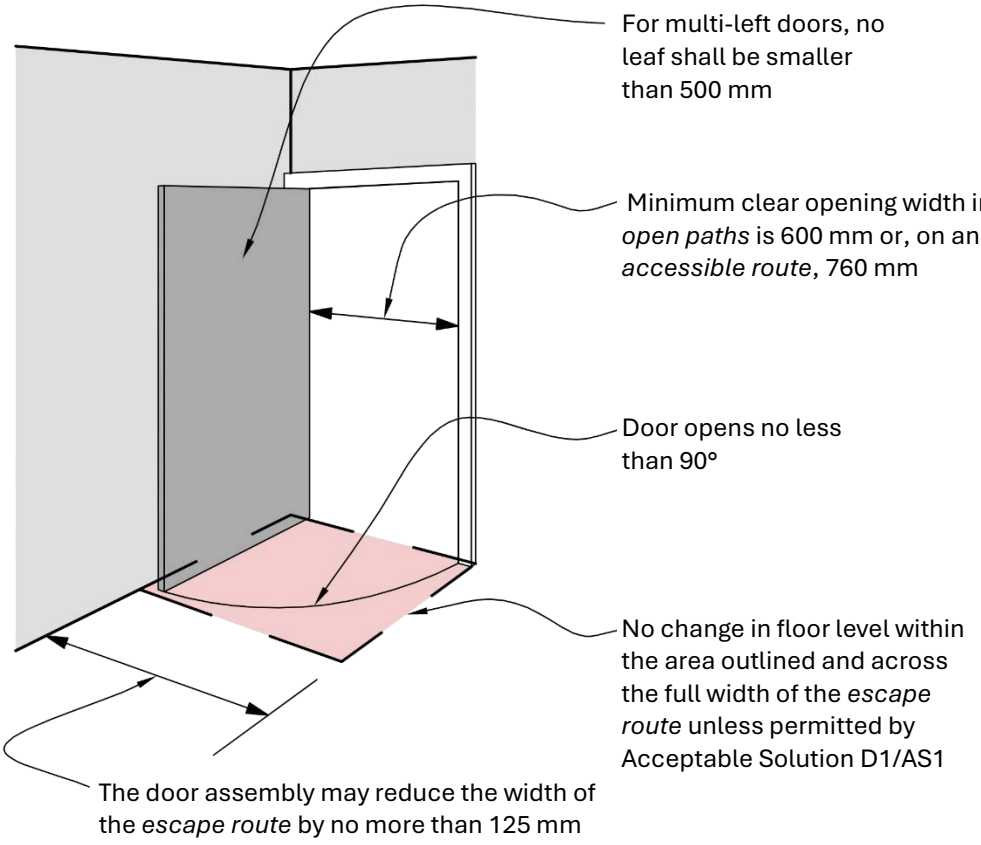
SI 3.9.3.4 In ***risk group* SI,** manual doors (excluding bedroom doors) used for the passage of beds in care and detention activities shall be capable of swinging in both directions.

3.9.4 Degree and width of opening

3.9.4.1 This subsection includes provisions for the degree and width of doors on *escape routes* (see Figure 3.9.4.1).

Figure 3.9.4.1: Degree and width of openings

Paragraphs 3.2.4.1, 3.4.9.1, and 3.9.4.1



3.9.4.2 In *open paths*, doors on *escape routes* shall:

a) provide an unobstructed opening width of:

i) no less than 760 mm (refer to Table 3.2.2.1), or

ii) 950 mm where the movement of beds is required; and

b) when multi-leaf, have no single leaf less than 500 mm wide.

3.9.4.3 The minimum door opening width may be reduced to 600 mm if it is not required to be an *accessible route*.

3.9.4.4 Within *exitways* (including entry and *final exit* doors), doors on *escape routes* shall not reduce the minimum *exitway* width required by Subsection 3.2.2 to a width less than permitted under Table 3.2.2.1.

3.9.4.5 Doors on *escape routes* shall:

a) open no less than 90°; and

b) open onto a floor area that:

i) extends for a distance of no less than the arc of the door swing, and

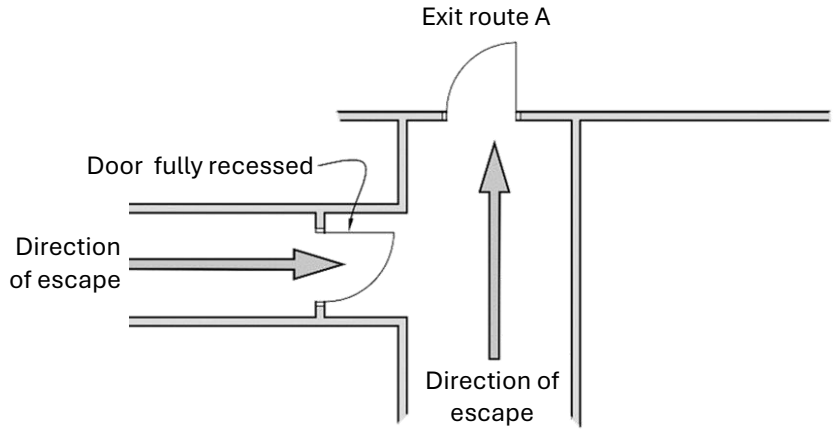
ii) is at the same level on both sides of the door for the full width of the *escape route* unless permitted by Acceptable Solution D1/AS1; and

c) when opened, not cause the door swing to obstruct the minimum required width of any escape route (see Figure 3.9.4.5); and

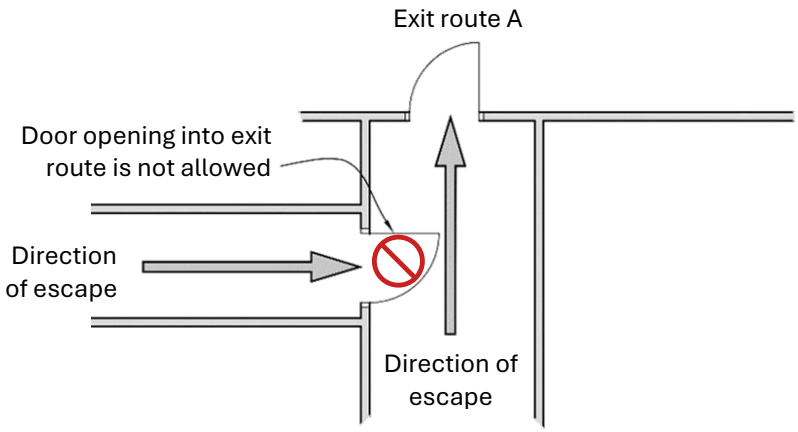
3.9.4.6 In the case of care patients, doors on *escape routes* shall be of sufficient width to allow the passage of a bed and essential patient life support equipment.

Figure 3.9.4.5: Door swing into an escape route

Paragraph 3.9.4.5



(a) Correct door opening



(b) Incorrect door opening

3.9.5 Vision panels

3.9.5.1 Vision panels shall be provided on doors that:

a) are hung to swing both ways; or

b) subdivide corridors used in *escape routes*; or

c) lead into or are within *exitways*, except where:

i) the door is the egress for a sleeping space (such as a ward bedroom or *suite*) or a sanitary facility for use by a single person, or

ii) the door serves an unoccupied space, such as a closet.

3.9.6 Revolving doors, automatic doors, and access control systems

3.9.6.1 Revolving doors (see Figure 3.9.6.1(a)), automatic doors (of all types), and access control systems shall:

a) not be allowed across an *escape route* at any point leading into or within an *exitway*; but

b) be allowed in an *open path* or at a *final exit*, provided that in the event of a power failure or malfunction, the doors or access control systems:

i) continue to provide a safe *means of escape from fire* without reducing the required width by automatically opening and remaining open, or

ii) can be readily pushed to the outward open position by the *building* occupants in an emergency (see Figure 3.9.6.1).

3.9.6.2 Paragraph 3.9.6.1(b) does not apply if alternative swing doors of the required width are provided immediately adjacent to the revolving or sliding doors. Refer to Paragraph 3.1.1.7 for signage requirements.

3.9.7 Hold-open devices

3.9.7.1 Smoke detector activated hold-open devices shall be fitted to *fire doors* or *smoke control doors required*:

a) between *open paths* and *exitways* if the *occupant load* of the *building* is greater than 1000; and

b) for subdividing long corridors (refer to Subsection 4.7.3); and

c) in *fire separations* where an *escape route* passes into an adjacent *firecell* (refer to Subsection 3.4.3); and

d) in locations where, due to the type or volume of occupant traffic using the doors, the doors may be kept open by unauthorised means; and

e) in *early childhood centres* located on upper floors of multi-storey *buildings*.

3.9.7.2 Detectors for releasing *hold-open devices* shall be smoke detectors which are:

a) integral with the *hold-open device* and comply with Paragraph 3.9.7.3; or

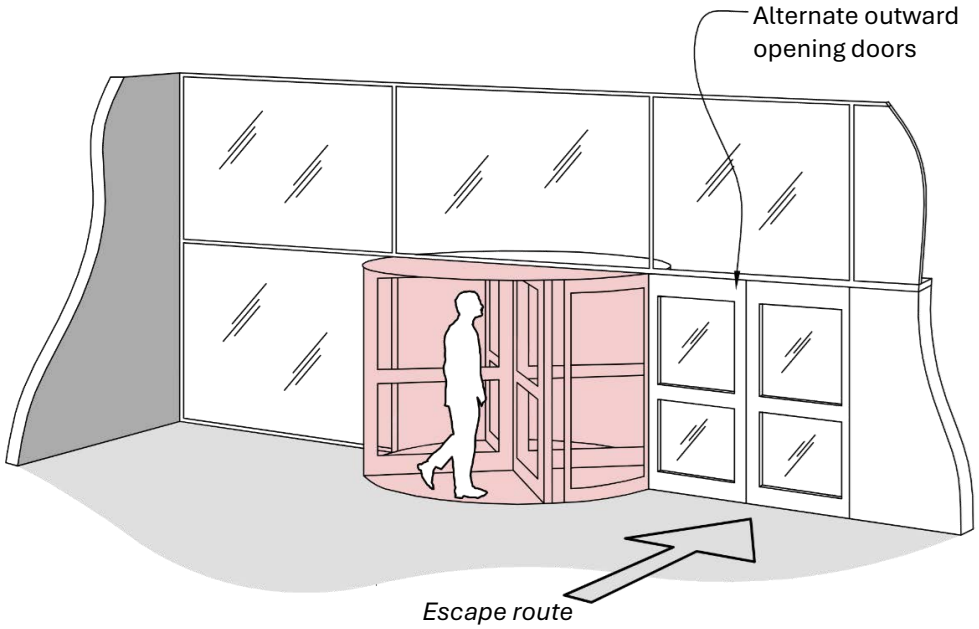
b) located on the ceiling adjacent to the doorset on both sides of the *doorset*; or

c) part of an automatic smoke detection system on both sides of the *doorset*.

3.9.7.3 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.

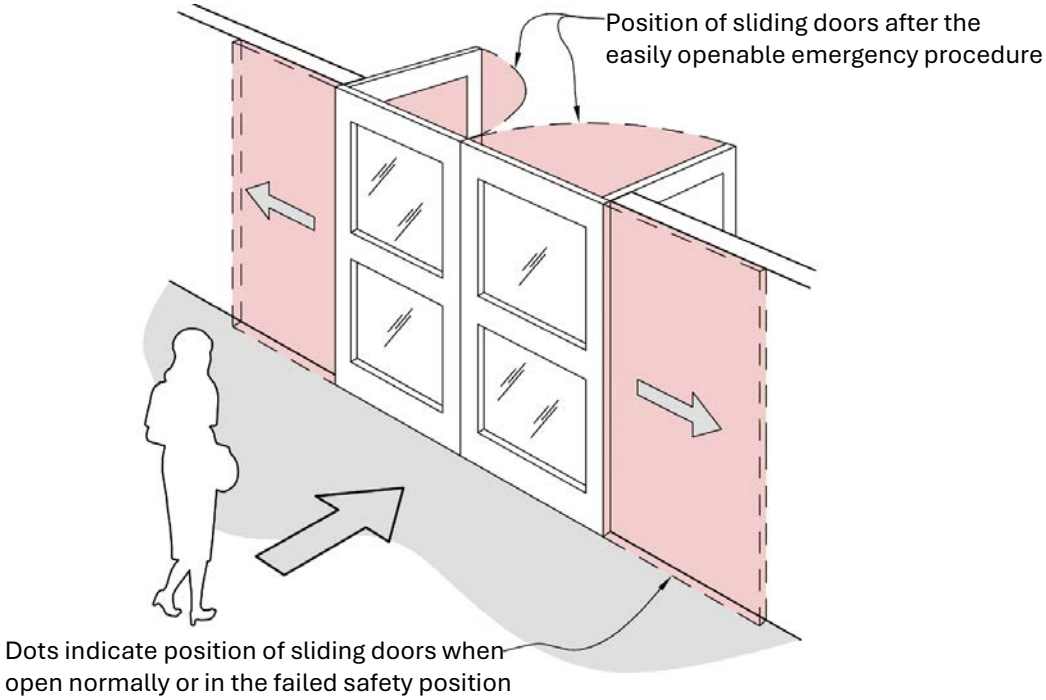
Figure 3.9.6.1: Revolving and automatic sliding doors

Paragraph 3.9.6.1



Note: (1) Revolving doors are permitted across an *open path* or *final exit* provided they are constructed to fail safely in an emergency. Revolving doors are not allowed across an *escape route* leading to or within an *exitway*. Alternatively, outward opening doors shall be provided immediately adjacent to the revolving doors.

(a) Revolving doors



(b) Sliding doors

3.9.8 Fastenings

3.9.8.1 Delayed action unlocking devices on *escape routes* shall be installed only if:

a) the *firecell* is protected by a Type 4 or Type 7 system; and

b) *fire* alarm activation instantly overrides any delay; and

c) the delay in operation does not exceed 15 seconds; and

d) signage warning of the delay in operation and complying with Acceptable Solution F8/AS1 is provided.

CA

3.9.8.2 In retail areas serving more than 500 occupants and in crowd activities (as described by ***risk group* CA**) of more than 100 people, panic fastenings shall be fitted on doors on the *escape route* including *exitways* and *final exits*.

3.9.8.3 Panic fastenings are latching devices that shall meet the following requirements:

a) the actuating portion shall consist of a horizontal bar or panel that:

i) extends across no less than half the width of the door leaf, and

ii) is located between 800 mm and 1200 mm above the floor; and

b) when a horizontal force of that able to be applied using one hand to the bar or panel the door lock, shall release allowing the door to swing open freely.

3.9.8.4 Doors on escape routes (whether or not the doors are *fire doors*) shall be fitted with simple fastenings that can be easily operated from the direction from which people approach when making their escape.

Part 4. Control of internal fire and smoke spread

4.1 Firecells

4.1.1 Adjoining firecells

4.1.1.1 Adjoining *firecells* are required to be *fire separated* from each other by the highest:

a) *life rating* specified in Table 2.3.1.1 if both *firecells* are under common ownership; or

b) *property rating* specified in Table 2.3.1.1 if:

i) both *firecells* are under different ownership, or

ii) a property boundary exists between the two *firecells*, or

iii) where explicitly stated in this acceptable solution.

4.1.1.2 *Firecells* shall be *fire separated* from each other by the higher of the two *FRRs* if the adjoining *firecell* has a higher *FRR* (refer to Section 2.3).

4.1.2 Firecells in vehicle parking

VP 4.1.2.1 ***Risk group* VP** *firecells* shall be separate *firecells* within the *building* and:

a) *firecells* shall be *fire separated* from other *firecells* by either:

i) the *fire resistance rating* specified in Table 2.3.1.1 if the *firecell* is categorised in ***risk group* VP**, or

ii) the higher of the two *fire resistance ratings* specified in Table 2.3.1.1 if it is categorised in any other *risk group*; and

b) within the ***risk group* VP** *firecell*, all floors (including intermediate floors) and their supporting structures shall achieve a *fire resistance rating* of at least the:

i) *life rating*, or

ii) the *property rating* where necessary to achieve protection from spread of *fire* to neighbouring property (see Figure 4.1.2.1); and

c) within the ***risk group* VP** *firecell*, where the parking spaces and other areas of that *firecell* are unit titled, it is permitted to have the parking spaces (and an associated storage area limited to plan area of 3.0 m^2 and maximum height 3.0 m) unseparated from adjacent titles; and

d) within the ***risk group* VP** *firecell*, other spaces (such as a ticket office, a gate booth or a storeroom not greater than 10 m^2) are permitted when they are necessary for the operation of the ***risk group* VP** *firecell*; and

e) service vehicle and unloading areas may be part of other support activity *firecells*.

VP 4.1.2.2 In ***risk group* VP** where a *firecell* is unsprinklered and there is parking for more than 10 vehicles, each of those *firecells* within that *building* must have natural cross ventilation (see Figure 4.1.2.1). This shall be achieved by providing perimeter walls on each floor with permanent openings to the outside environment. The size of those openings shall either be:

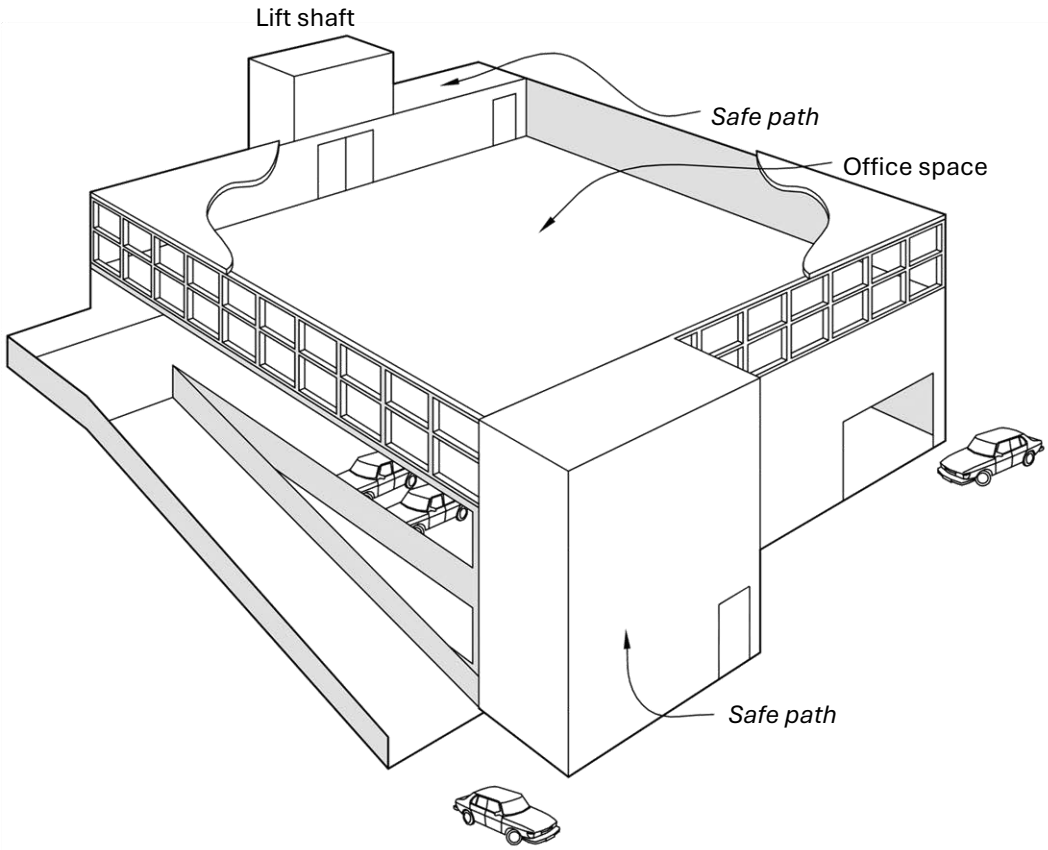
a) no less than 50% of the wall area in each of any two opposing walls; or

b) no less than 50% of the total perimeter wall area, with those openings distributed uniformly along at least half the total perimeter wall length.

4.1.2.3 Where natural cross ventilation or sprinklers are provided the limitations of Paragraphs 4.10.2.2, 4.10.2.3, and 4.10.2.4 on *intermediate floor* area do not apply.

Figure 4.1.2.1: Vehicle parking

Paragraphs 4.1.2.1 and 4.1.2.2



Notes:

(1) Where not protected with s sprinkler system, vehicle parking floors and supporting structure shall have an *FRR* of 60/60/60.

(2) Where natural cross-ventilation is provided, it shall be on every vehicle parking floor by means of permanent openings comply with Paragraph 4.1.2.2.

4.2 Structural stability during fire

4.2.1 Stability of building elements having an FRR

4.2.1.1 To avoid premature failure, the structural *stability* of *primary elements* with an *FRR* is to be retained for the duration of that *FRR*.

4.2.1.2 *Primary elements* located entirely within a *firecell* and providing support to *fire separations* may need to be evaluated for *fire* exposure from multiple sides simultaneously.

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

a) the design dead and live loads required by Building Code Clause B1 Structure; and

b) any additional loads caused by the *fire*.

4.2.2 Unrated primary elements permitted

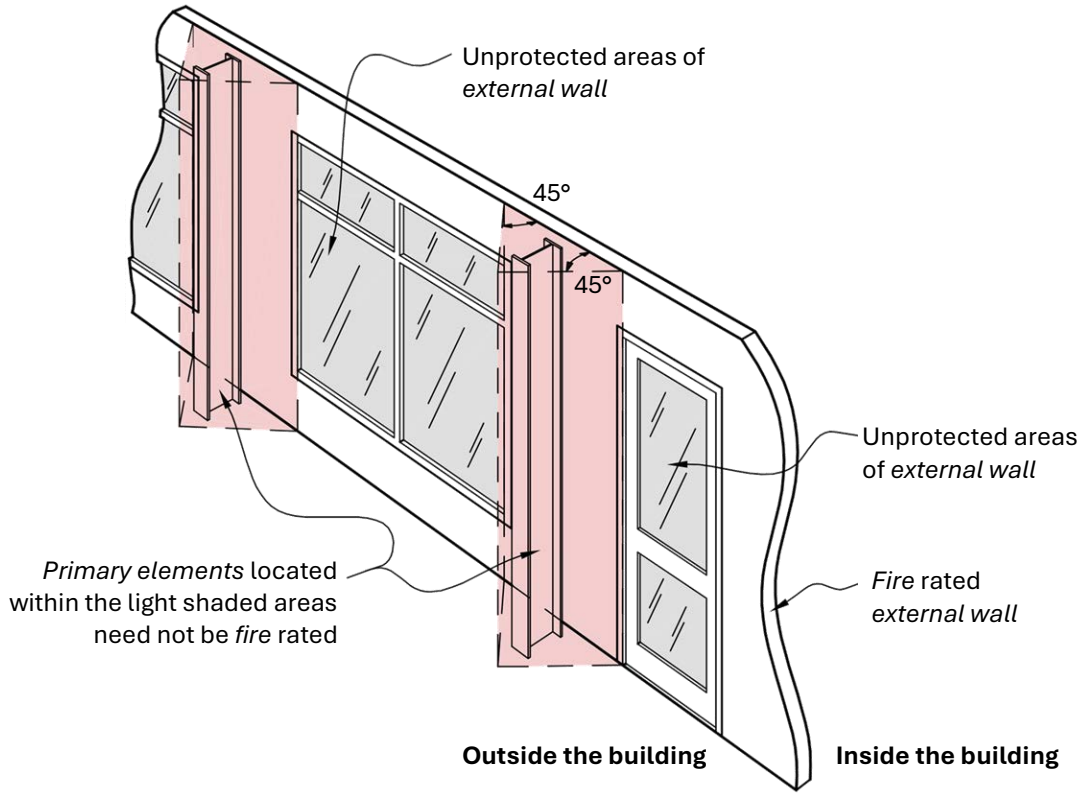
4.2.2.1 In many cases *primary elements* are rated for *structural adequacy*, and sometimes for integrity and insulation. However, *primary elements* need not have an *FRR* where any of the following circumstances exist:

a) they are located outside an *external wall* that is 2.0 m or more from the *relevant boundary*, and are shielded from the effects of fire by protected areas of the wall (see Figure 4.2.2.1); or

b) they are added to strengthen an existing *building* and are required only to carry horizontal loads induced by wind or earthquake.

Figure 4.2.2.1: Permissible positioning of unrated primary elements

Paragraph 4.2.2.1



4.2.3 Providing vertical stability

4.2.3.1 *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 (such as walls and columns) shall be rated for *structural adequacy*; and/or

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

4.2.4 Providing horizontal stability

4.2.4.1 *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; and/or

b) be supported within the *firecell* by other *building elements* having an *FRR* of 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; and/or

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

4.3 Firecell construction

4.3.1 Overview

4.3.1.1 Each of the *building elements* enclosing a *firecell* is permitted to have a different *FRR*, as this rating will depend:

a) on the characteristics of the *firecell*; and

b) the reason for the *FRR*; and

c) the *risk groups* contained on either side of any *fire separation*.

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

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

a) penetrations complying with Subsection 4.3.2; and

b) for closures such as *fire doors*, *smoke control doors*, *fire* curtains or smoke curtains, *fire shutters*, *fire dampers*, and *smoke dampers*; and

c) for glazing permitted by Subsection 4.4.3.

4.3.1.4 *Firecell* and *smokecell* effectiveness shall be maintained by ensuring continuity of *fire separations* and *smoke separations*:

a) at separation junctions; and

b) around joints where closures, *protected shafts*, and *penetrations* occur.

4.3.2 Fire stopping

4.3.2.1 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*.

4.3.2.2 *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 Paragraph 8.2.1.3 of the Building Product Specifications.

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

4.3.2.4 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*.

4.3.2.5 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.

4.3.3 Junctions of fire separations

4.3.3.1 Where *fire separations* meet other *fire separations* or *external walls*, they shall either be bonded together or have the junction *fire stopped* over its full length (see Figure 4.3.3.1A, Figure 4.3.3.1B, and Figure 4.3.3.1C).

4.3.3.2 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.

4.3.4 Junctions with roof

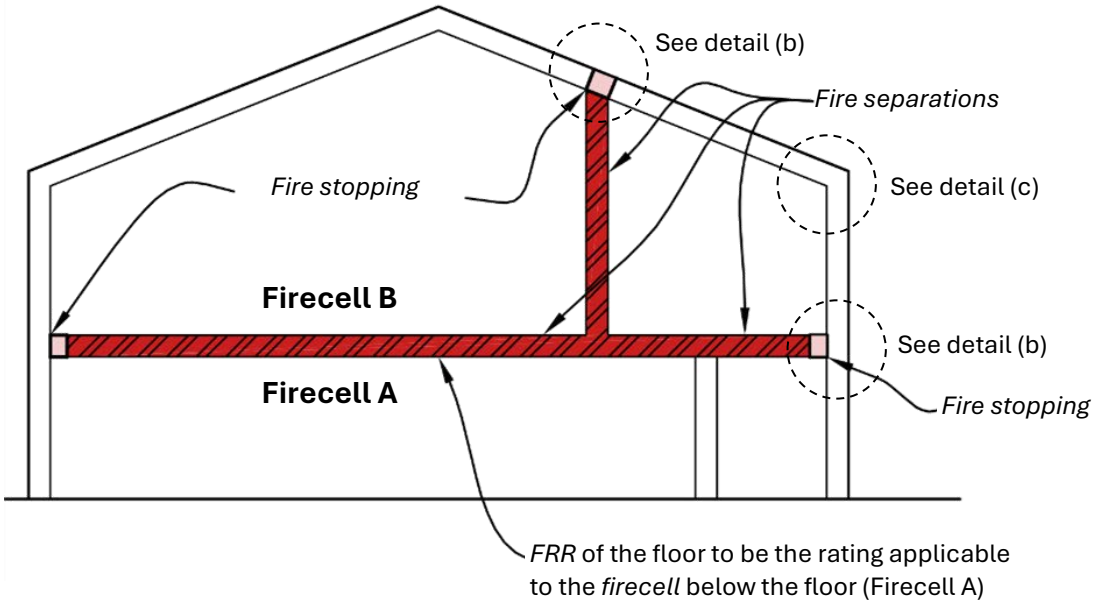
4.3.4.1 Vertical *fire separations* and *external walls* shall either:

a) terminate as close as possible to the external roof cladding and *primary elements* providing roof support, with any gaps fully *fire stopped* (see Figure 4.3.3.1A and Figure 4.3.3.1B); or

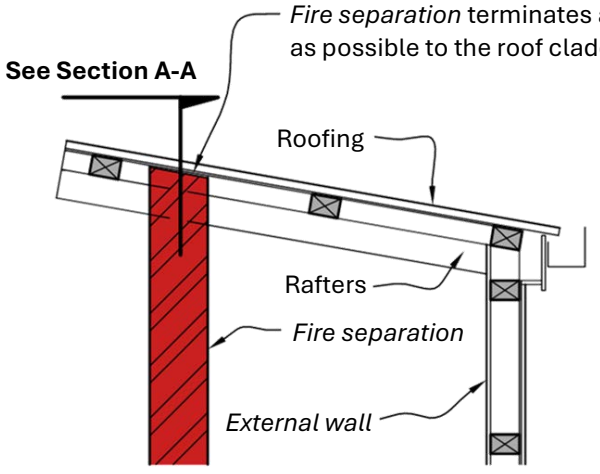
b) extend not less than 450 mm above the roof to form a parapet.

Figure 4.3.3.1A: Junctions of fire separations

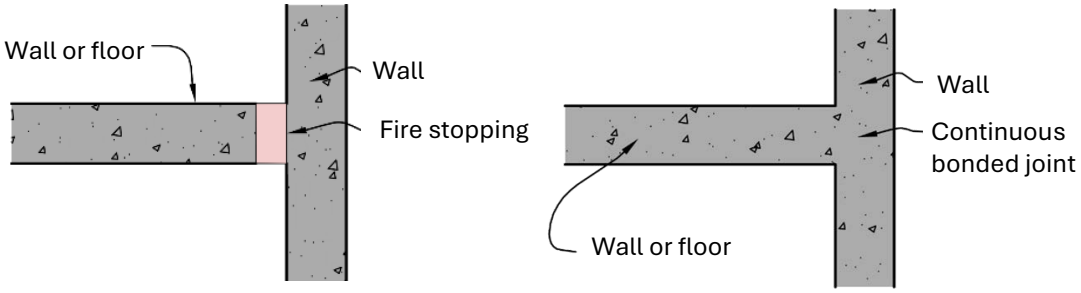
Paragraphs 4.3.3.1, 4.3.4.1, and 4.11.2.1



(a) Section of *building* showing the *fire separations* and junctions



(b) Sections showing the junction between the *fire separation* wall and roofing



(c) Plan or sections showing the junction of the *fire separation* wall and floor

Figure 4.3.3.1B: Junctions of fire separations with details of roofing from Section A-A

Paragraphs 4.3.3.1 and 4.3.4.1

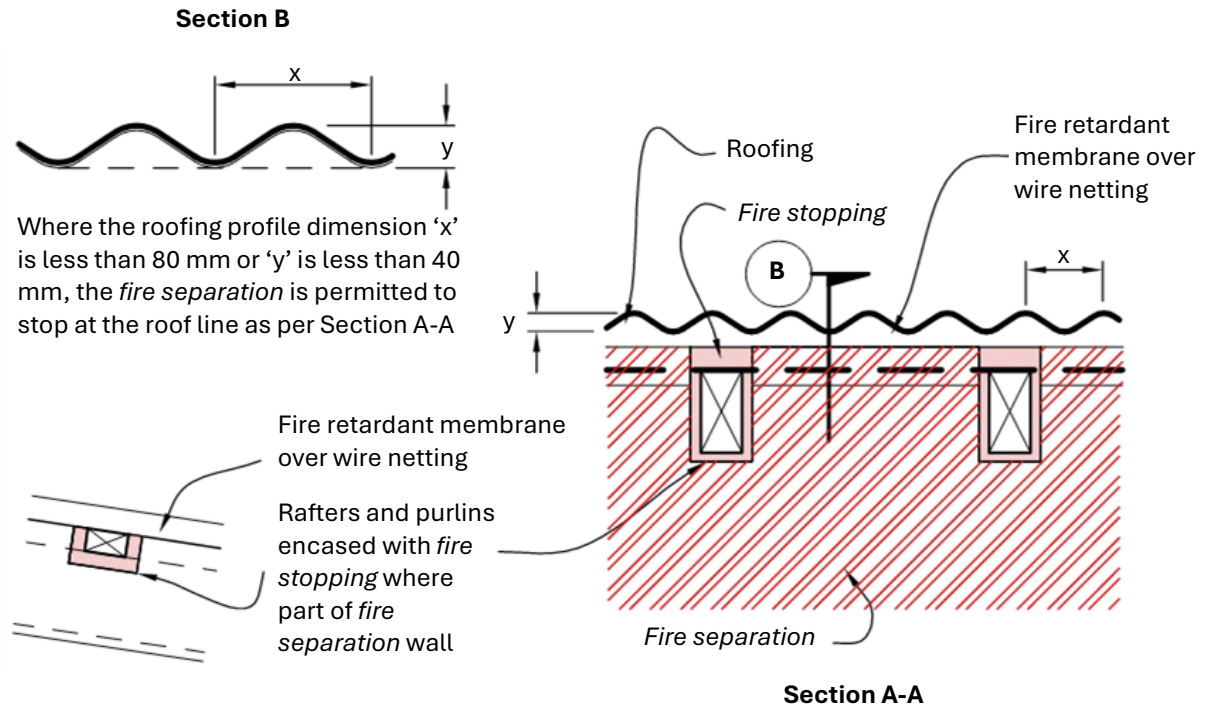
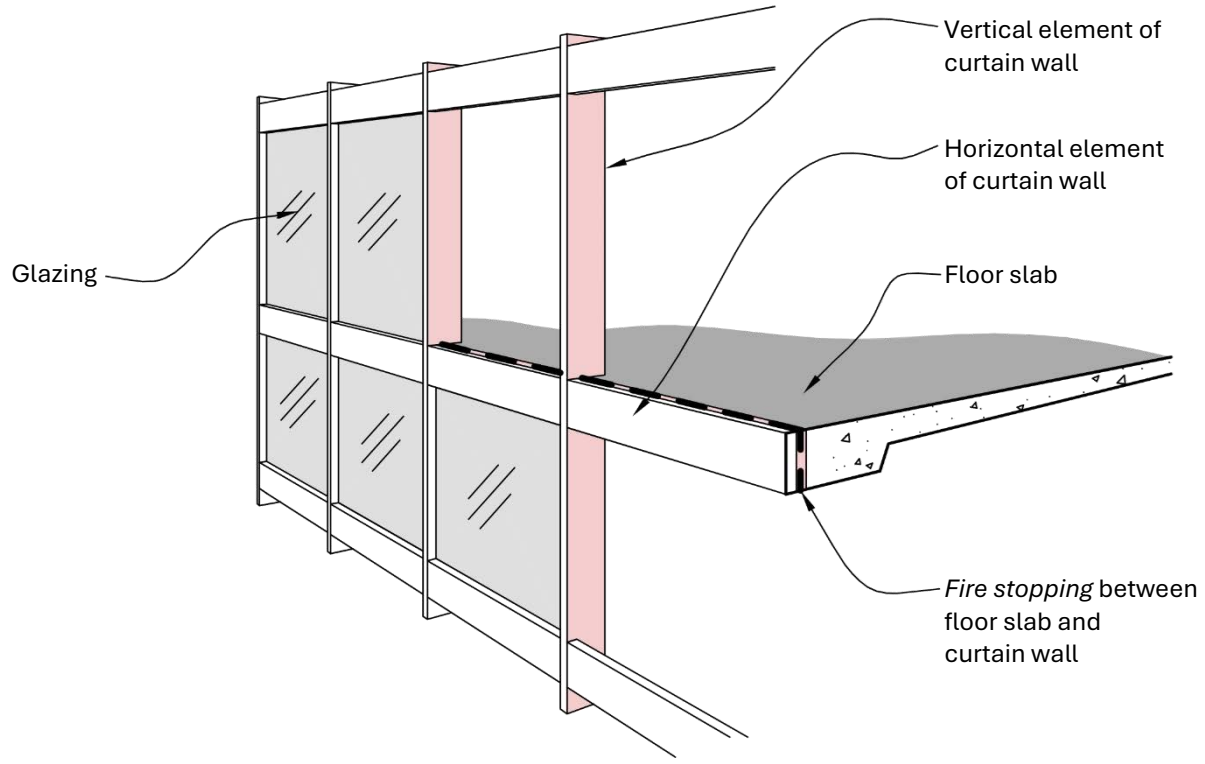


Figure 4.3.3.1C: Junctions of curtain walls

Paragraph 4.3.3.1 and 4.11.2.1



4.3.5 Ceiling spacing firecells

4.3.5.1 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.

4.3.6 Sealing of gaps

4.3.6.1 To avoid the passage of smoke through *fire separations* and *smoke separations*, gaps shall be sealed with *fire* resistant materials complying with Paragraph 8.2.1.3 of the Building Product Specifications in their intended application if they are located:

a) in *smoke separations*, and between *fire separations* and *smoke separations*; or

b) around glazing in *smoke separations*; or

c) between *fire separations* and unrated parts of *external walls*; or

d) between *smoke separations* and unrated parts of *external walls*.

4.3.6.2 Gaps around *penetrations* shall be *fire stopped* (see Subsection 4.3.2).

4.4 Closures in fire separations and smoke separations

4.4.1 Fire rating and smoke rating of closures

4.4.1.1 If activities within a *building* require openings in *fire separations* or *smoke separations* (for example, for the passage of people, goods, services or light), closures to those openings shall have the *insulation* and smoke control capability as required by Table 4.4.1.1, in addition to the *integrity* performance as required by Table 2.3.1.1.

Table 4.4.1.1: Insulation and smoke control capability of closures in fire and smoke separations

Paragraph 4.4.1.1

Risk group	Unsprinklered[1]	Sprinklered
SM	-/*/30sm	-/*/-sm
SI		-/*/-sm
CA	-/*/30sm	-/*/-sm
WB	-/*/30sm	-/*/-sm
WS		-/*/-sm
VP	-/*/30sm	-/*/-sm

Notes:

(1) Except as permitted by Paragraphs 4.4.4.2 and 4.4.5.2.

(*) *Integrity* value of the *life rating* or *property rating* as required by this acceptable solution.

4.4.2 Fire doors and smoke control doors

4.4.2.1 *Doorsets* that are required to be:

a) *fire doors* shall comply with Subsection 8.3.1 of the Building Product Specifications; and

b) *smoke control doors* shall, except as allowed by Paragraph 4.4.2.2, comply with Subsection 8.3.2 of the Building Product Specifications; and

c) *fire doors* with smoke control capability shall comply with both Paragraphs 4.4.2.1(a) and 4.4.2.1(b).

4.4.2.2 *Doorsets* installed in *fire separations* between *firecells* and *vertical safe* paths or *protected shafts* shall have smoke seals on all edges, except that smoke seals may be omitted:

a) at the sill of *doorsets*; and

b) for lifts, if either:

i) the *firecell* is sprinklered and has an automatic smoke detection system, or

ii) a *smokecell* is placed between the doors and the rest of the *firecell*, other than when the lift shaft is permitted to be in the vertical *safe path*.

4.4.2.3 *Fire doors* and *smoke control doors* shall be installed in accordance with Section 3.9.

4.4.2.4 *Doorsets* shall be provided with signage in accordance with Paragraph 3.1.1.7.

4.4.2.5 Glazing in *fire doors* and *smoke control doors* shall comply with Subsection 4.4.3.

4.4.2.6 *Fire doors* shall be provided:

a) between an *open path* and a *safe path* (see Figure 4.4.2.6A and Figure 4.4.2.6B); and

b) between a *smoke lobby* and a *safe path* (see Figure 4.4.2.6A); and

c) where the *escape route* passes through a *fire separation* (see Figure 4.4.2.6B) or into an adjoining *building* (see Figure 3.3.6.1); and

d) where the *escape route* passes through a *fire separation* which isolates the *safe path* from levels below the *final exit* (see Figure 4.4.2.6C); and

e) in *fire separations* between vertical and horizontal portions of internal *safe paths*.

4.4.2.7 *Smoke control doors* shall be provided:

a) at *smoke separations* in *vertical safe paths*; and

b) where a corridor or an *escape route* passes through a *smoke separation* (see Figure 4.7.3.1); and

c) between an *open path* and a *smoke lobby* (see Figure 4.4.2.6A).

Figure 4.4.2.6A: Fire doors and smoke control doors for smoke lobbies and safe paths

Paragraphs 4.4.2.6 and 4.4.2.7

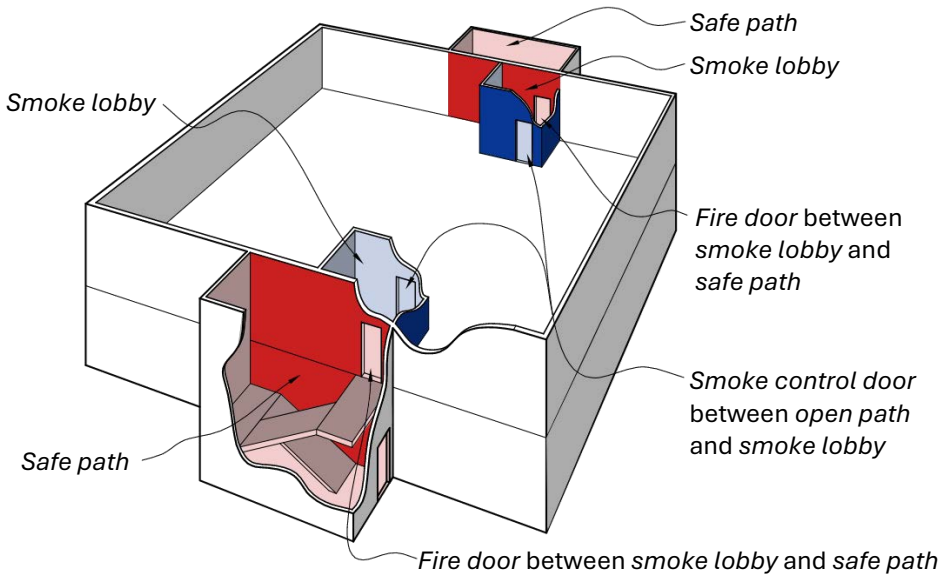


Figure 4.4.2.6B: Fire doors between open paths and safe paths

Paragraph 4.4.2.6

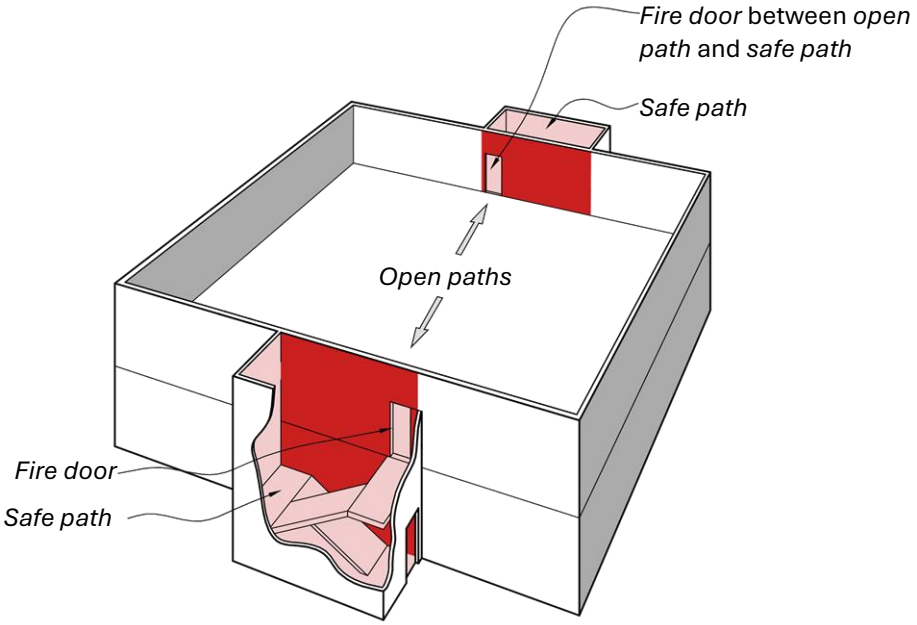
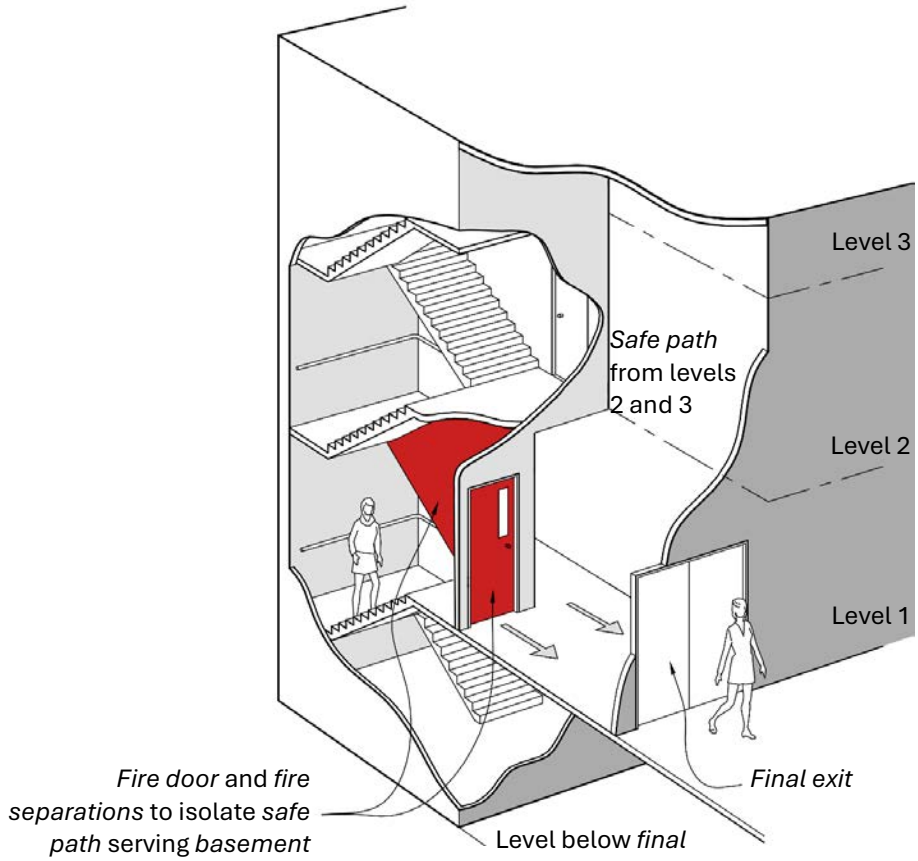


Figure 4.4.2.6C: Fire doors to separate floors above and below final exit level

Paragraph 4.4.2.6



4.4.2.8 The forces required to open any *fire door* or *smoke control door* on an *escape route* shall not exceed:

a) 67 N to release the latch; and

b) 133 N to set the door in motion; and

c) 67 N to open the door to the minimum required width.

4.4.2.9 These forces shall be applied at the latch stile.

SI 4.4.2.10 Paragraphs 4.4.2.8 and 4.4.2.9 do not apply to horizontal sliding doors in ***risk group* SI** or to power-operated doors.

4.4.2.11 All *fire door* and *smoke control door* leaves shall be self-closing except as permitted in Subsection 4.5.1. The self-closing device must be adjustable to satisfy the requirements of Paragraph 4.4.2.8 after installation.

4.4.2.12 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 that activates in the event of *fire* but does not operate at other times.

4.4.3 Glazing

4.4.3.1 Glazing in *fire separations* shall be fixed *fire resisting glazing* having the same *FRR* values for *integrity* and *insulation* as the *fire separation*, except where uninsulated glazing is permitted within vision panels or for sprinklered *buildings* (refer to Paragraph 2.3.3.2).

4.4.3.2 Uninsulated *fire resisting glazing* having the same *integrity* value as the *fire separation* is permitted in all sprinklered *buildings*.

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

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

4.4.4 Access to protected shafts and lift doors

4.4.4.1 Access panels to *protected shafts* shall have the *fire* resistance performance as required by Paragraph 4.4.1.1 and shall be capable of being opened only with a special tool.

4.4.4.2 Other than where Subsection 3.5.5 applies for a passenger lift within a vertical *safe path*, *doorsets* for lift landing doors opening into lift shafts that are *protected shafts* shall be *fire doors* complying with Paragraphs 4.4.1.1, 4.4.2.1, and 4.4.2.2 except that an *insulation* rating is not required. Lift landing doors need not be *fire* rated from the shaft side.

4.4.5 Fire dampers and smoke dampers

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

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

a) comply with Subsection 8.3.4 of the Building Product Specifications; 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; and

c) be readily accessible for servicing.

4.4.5.3 Where evacuation is delayed, ventilation ducts that pass through a *fire separation* to a *place of safety* within the *building* must be provided with a *smoke damper*.

4.4.5.4 Where a *smoke damper* is used to maintain the *smoke separating* function, it shall comply with Subsection 8.3.4 of the Building Product Specifications and be actuated on alarm activation.

4.4.6 Fire shutters

4.4.6.1 A service opening in a *fire separation* (for stairs, conveyor, forklift access or similar installation) which is not used as part of an *escape route* may be fitted with a *fire shutter*.

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

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

4.5 Sleeping areas

4.5.1 Group sleeping areas

SM SI 4.5.1.1 *Group sleeping areas* in ***risk groups*** **SM** or **SI** shall be *fire separated* from each other and from other sleeping and nonsleeping areas with a *FRR* in accordance with Section 2.3.

SM 4.5.1.2 In ***risk group*** **SM**, a *group sleeping area* shall contain no more than:

a) 40 beds if unsprinklered; or

b) 160 beds if sprinklered.

4.5.1.3 In ***risk group*** **SM**, a *group sleeping area* may contain non-*fire* rated partitions if:

a) the *group sleeping area* contains no more than 40 beds, whether or not sprinklers are installed; and

b) the partitions do not fully enclose any *occupied space* in the *group sleeping area*, and have at least one side open; and

c) all *occupied spaces* within the *group sleeping area* are available to all occupants at any time; and

d) the openings between the partitions as well as any other part of the *open path* must be unobstructed; and

e) WCs, urinals, baths, showers or bidets may be fully enclosed (see Figure 4.5.1.3(a)).

SI 4.5.1.4 For ***risk group*** **SI**, if there is only one *group sleeping area*, or the *group sleeping areas* are not adjacent to one another, the *group sleeping area* shall contain no more than 12 beds.

4.5.1.5 Where there are two or more *group sleeping areas* and these are adjacent to one another, each *group sleeping area* shall

a) contain no more than 20 beds; and

b) have sufficient space to accommodate the beds from an adjacent *group sleeping area* in an emergency.

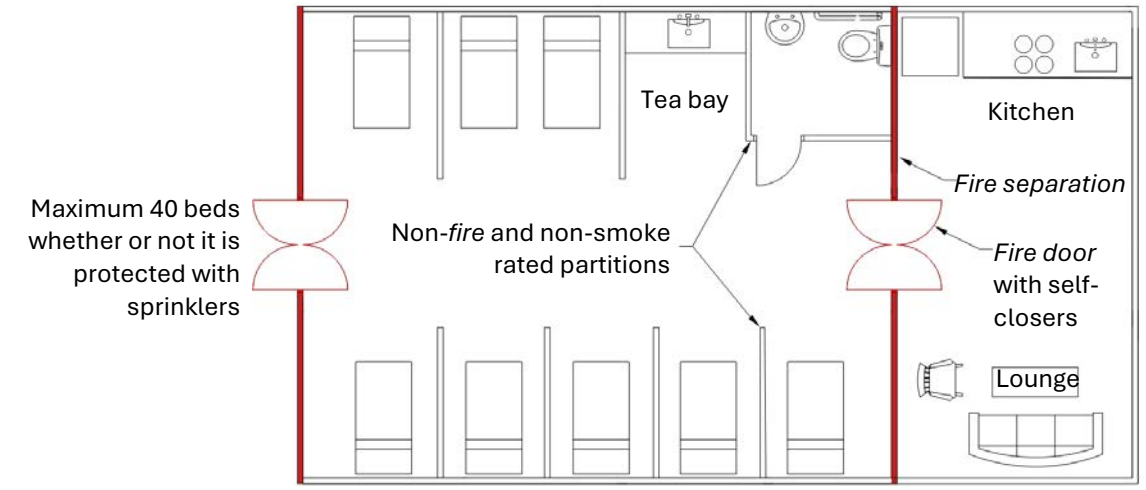
SI 4.5.1.6 In ***risk group*** **SI**, a *group sleeping area* may be subdivided with full height *smoke separations* including *smoke control doors* that need not be fitted with self- closers (see Figure 4.5.1.3(b)).

SI 4.5.1.7 In ***risk group*** **SI**, a *group sleeping area* may be subdivided with non-rated partitions if it contains no more than 6 beds (see Figure 4.5.1.3(c)).

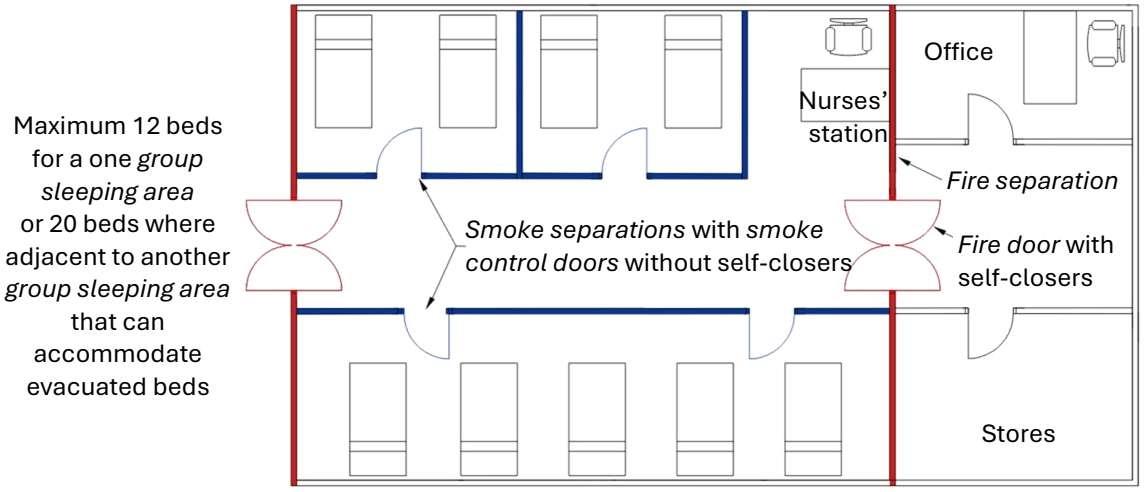
4.5.1.8 *Direct support functions* may be included in a *group sleeping area* without *fire separations* or *smoke separations*. Direct support functions may include sanitary facilities and tea making activities for use by the occupants, but may not include cooking facilities.

4.5.1.9 *Communal service functions* shall be separated from *group sleeping areas* or *suites* with *fire separations* having an *FRR* in accordance with Section 2.3.

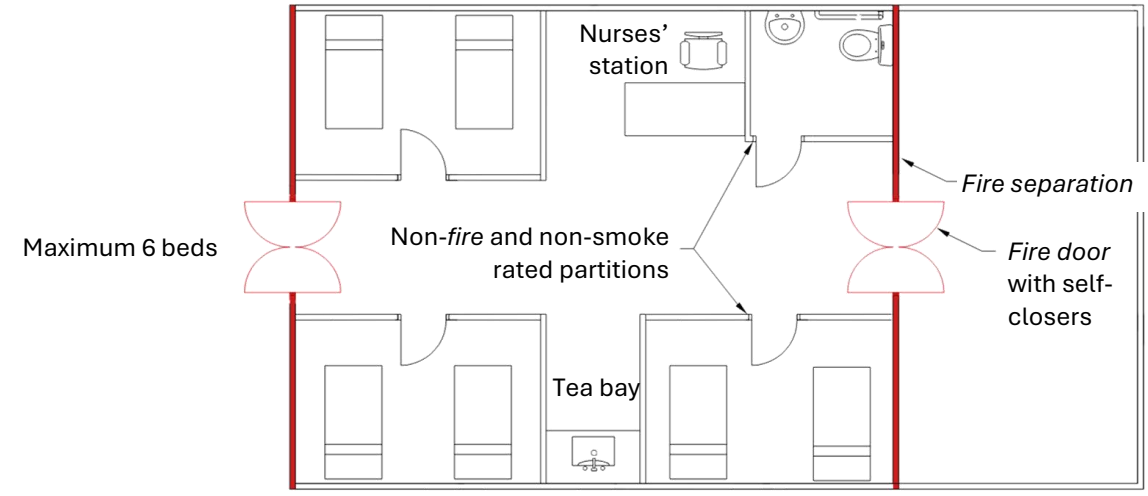
Figure 4.5.1.3: Group sleeping areas
Paragraphs 4.5.1.3, 4.5.1.6, and 4.5.1.7



(a) *Group sleeping area* for ***risk group* SM**



(b) *Group sleeping area* for ***risk group* SI** subdivided with *smoke separations*



(c) *Group sleeping area* for ***risk group* SI** subdivided with non-*fire* rated and non-smoke rated partitions

4.5.2 Suites

4.5.2.1 A *suite* shall be a separate *firecell* with *fire separations* with an *FRR* in accordance with Section 2.3.

4.5.2.2 A *group sleeping area* may be subdivided to form *suites*.

4.5.2.3 A *suite* shall contain no more than 12 beds.

4.5.2.4 A *suite* may be subdivided with non-*fire* rated *construction* to provide separate spaces for sleeping, cooking, or sanitary facilities.

4.5.3 Household units

4.5.3.1 A *household unit* shall be a single *firecell* separated from every other *firecell* by *fire separations* having an *FRR* in accordance with Section 2.3.

4.5.3.2 A *household unit* may contain one or more floors provided that the *open path l*ength provisions of Table 3.3.1.1 are satisfied.

VP

4.5.4 Vehicle parking

4.5.4.1 Service vehicle and unloading areas within a *building* with ***risk group* SM** or **SI** shall be a separate *firecell* complying with the requirements of ***risk group* VP**.

4.5.4.2 Where a vehicle parking garage associated with ***risk group* SM** is provided solely for the use of the occupants of an individual *household unit*, the garage may be included within the *household unit firecell*.

4.5.4.3 Where parking is provided for vehicles of occupants of more than one *household unit*, the parking area shall be a separate *firecell* complying with the requirements of ***risk group* VP**.

4.5.5 Special care facilities

4.5.5.1 Spaces where procedures using sedation (including dentistry and dialysis) are carried out require longer evacuation times. Such spaces shall be either:

a) contained in separate *firecells* having *fire separations* with an *FRR* of no less than 60 minutes; or

b) grouped together within a *firecell* that is separated from other activities by *fire separations* with an *FRR* of no less than 60 minutes. Within that *firecell*, each space shall be separated from adjacent spaces by *smoke separations*.

4.6 Theatres, exhibition areas and retail spaces, and tiered seating

4.6.1 Theatres

4.6.1.1 In every unsprinklered *theatre* where the *occupant load* in the auditorium is greater than 500, the stage area (including workshops, storerooms, scenery docks, property, wardrobe or painting rooms used in connection with the *theatre*) shall be separated from the auditorium by a proscenium wall meeting the requirements of a *fire separation* having an *FRR* of no less than 30/30/30.

4.6.1.2 Where the stage and supporting areas are sprinklered, the proscenium wall and curtain may be a *smoke separation*.

4.6.1.3 The opening in the proscenium wall shall be provided with a smoke curtain, *fire* curtain, or *fire shutter* (as required by Paragraph 4.6.1.1) that, when released, shall lower under gravity in a fail safe manner (see Figure 4.6.1.3). An emergency release device shall be located in the stage area on both sides of the opening.

4.6.1.4 If a sprinkler system is not installed, uninsulated glazing is not permitted in *fire* rated proscenium walls.

4.6.1.5 *Theatres* with an *occupant load* of greater than 1000 shall satisfy the following requirements:

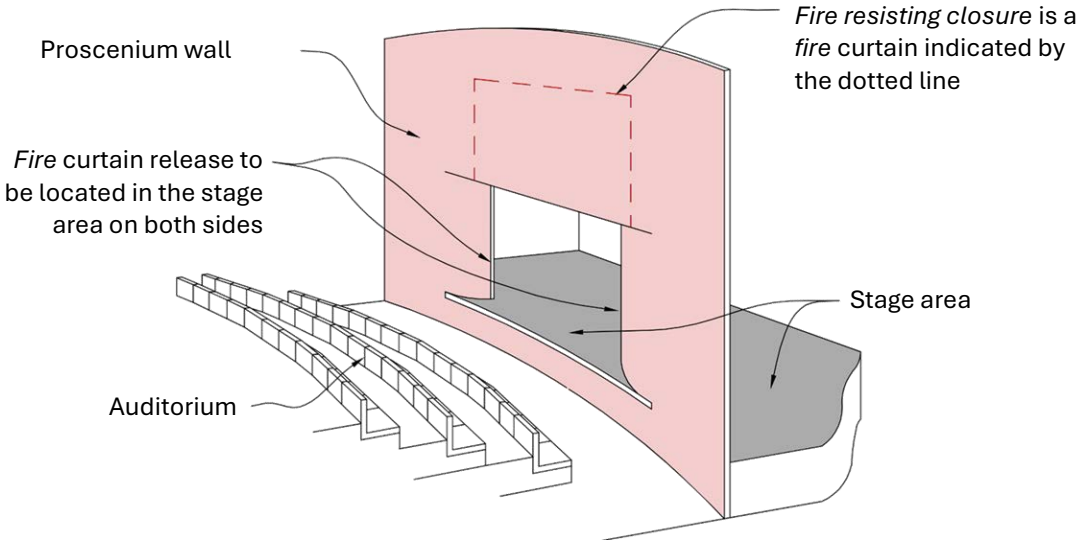
a) the stage area shall have roof vents of no less than 5% of the stage floor area, located at the highest point above centre stage. These vents shall have a positive device to keep them closed, and may be of the counterbalanced shutter type, inclined falling type, centre pivot sash type or counterbalanced skylight type, and they shall be held normally in a closed position by a heat sensing device installed below the vent opening and its controls, but above the discharge of any sprinkler head in the vicinity; and

b) vents shall be capable of being operated by a manual control located near the stage safety curtain release; and

c) the heat sensing device required by Paragraph 4.6.1.5(a) shall be interlocked with any heating or ventilating system, so that when activated, it closes all *fire dampers* in all ducts passing through the proscenium wall.

Figure 4.6.1.3: Theatre proscenium

Paragraph 4.6.1.3



Note: (1) Any glazing in an unsprinklered proscenium wall shall have an *insulation rating*.

4.6.2 Exhibition and retail areas

4.6.2.1 If the *occupant load* for a sales, exhibition, or trade fair space is greater than 500 then *smokecells* separated from the display and sales areas are required for:

a) any adjacent storage areas where goods are received, unpacked, stored or packed for dispatch; and

b) any areas used for workshops; and

c) any areas used for the storage of display material or similar items.

4.6.3 Tiered seating

4.6.3.1 If any enclosed, useable space beneath permanent, tiered seating is not sprinklered it shall be a *firecell* with an *FRR* in accordance with Section 2.3.

4.6.3.2 If any enclosed usable space beneath permanent tiered seating is sprinklered, it will not need to be a separate *firecell*. However, the supporting structure for the permanent tiered seating shall have an *FRR* in accordance with Section 2.3.

4.6.3.3 Temporary and retractable tiered seating shall not require an *FRR* provided the space beneath the seating is not used for storage.

4.7 Escape route separations

4.7.1 Exitways

4.7.1.1 *Exitways*, unless external and separated by distance, shall comprise of *smoke lobbies* sized in accordance with Paragraph 3.5.2.1 and/or *safe paths* that are *firecells*.

4.7.1.2 *Safe paths* shall be separated from all adjoining *firecells* by *fire separations* with an *FRR* in accordance with Section 2.3 throughout its length.

CA WB WS VP

4.7.1.3 For non-sleeping ***risk groups*** **CA**, **WB**, **WS** and **VP** with *escape heights* exceeding 10 m the *exitways* shall have *fire separations* with an *FRR* meeting the *property rating*.

4.7.1.4 *Safe paths* that are stairs leading from lower floors or *basements*, and that continue to floors above the level of the *final exit* shall:

a) have the lower levels *fire separated* from the *final exit* level; and

b) have an *FRR* in accordance with Section 2.3 or that required for the lower level, whichever is the greater.

4.7.1.5 *Safe paths* which are long corridors shall be subdivided by *smoke separations* in accordance with Subsection 4.7.3.

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

4.7.2 Vertical safe path smoke separation

4.7.2.1 Vertical *safe paths* which exceed a height of 25 m shall be divided by *smoke separations* and *smoke control doors* at the landing nearest mid-height. This requirement does not apply if the *building* is sprinklered.

4.7.3 Long corridor subdivision

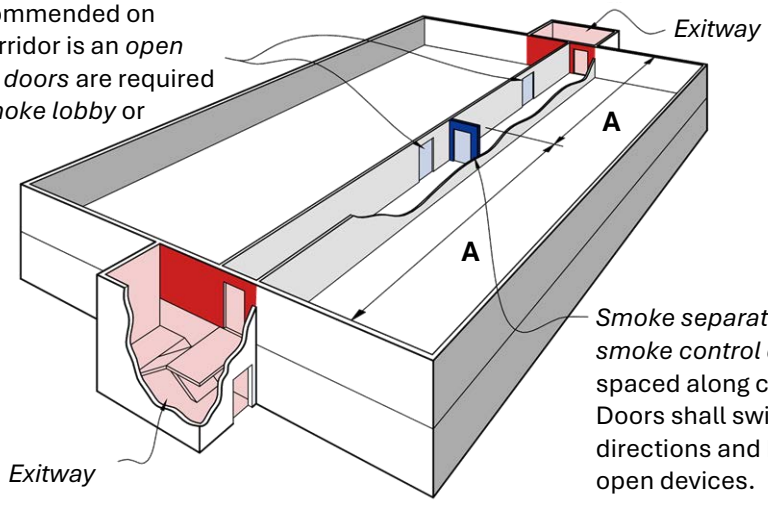
4.7.3.1 Long corridors shall be subdivided by *smoke separations* and *smoke control doors* (see Figure 4.7.3.1).

4.7.3.2 The subdivisions shall be evenly spaced along these corridors and no further apart than the distance specified in Table 4.7.3.2 for each *risk group*.

Figure 4.7.3.1: Long corridor subdivision

Paragraphs 4.4.2.7 and 4.7.3.1

Self-closers are recommended on these doors if the corridor is an *open path*. *Smoke control doors* are required if the corridor is a *smoke lobby* or *fire doors* if it is a *safe path*.



Smoke separations and *smoke control doors* evenly spaced along corridor. Doors shall swing in both directions and have hold-open devices.

Note: (1) Distance A must not exceed the maximum distances in Table 4.7.3.2.

Table 4.7.3.2: Long corridor subdivision lengths

Paragraph 4.7.3.2

Risk group	Open path length (metres)	Safe path length (metres)
SM	40(1)	80(1)
SI	60	120
CA	40(1)	80(1)
WB	40(1)	80(1)
WS	60	120
VP	40(1)	80(1)

Note: (1) These lengths may be increased by 50% if the *building* is sprinklered.

4.8 Intermittent activities

4.8.1 Support activities

4.8.1.1 Intermittent activities providing direct support to a primary activity of another *risk group* may be included with the other *risk group* and do not require *fire separations* or *smoke separations*, unless these activities are provided for enclosed waste storage or vehicle parking.

4.8.1.2 The *fire safety systems* required for each *risk group* shall also apply throughout these spaces.

4.8.1.3 If these spaces are required to be separate *firecells*, they shall have *fire separations* with *FRRs* in accordance with Section 2.3.

SI 4.8.1.4 For intermittent activities that provide *direct support functions* within ***risk group* SI** refer to Paragraph 4.5.1.8.

4.8.2 Solid waste storage

4.8.2.1 Solid waste storage areas shall be enclosed when located adjacent to *occupied spaces* except within ***risk group* VP** where these areas may be unenclosed.

4.8.2.2 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:

a) the *life rating*; or

b) if located on a *relevant boundary*, the *property rating*.

4.8.2.3 Refer to Subsection 4.9.3 for waste chutes.

4.8.3 Plant, boiler, and incinerator rooms

4.8.3.1 Any space within a *building* containing an incinerator plant, boiler, or machinery that uses solid fuel, gas, or petroleum products as the energy source (but excluding space and local water heating appliances) shall:

a) be a separate firecell (see Figure 4.8.3.1); and

b) be fire separated with an FRR of no less than 45 minutes where the building is sprinklered or no less than 90 minutes for all other cases.

4.8.3.2 Plant, boiler, and incinerator rooms in all *risk groups* shall have:

a) at least one *external wall*; and

b) either:

i) external access that may be at any floor level including the roof, or

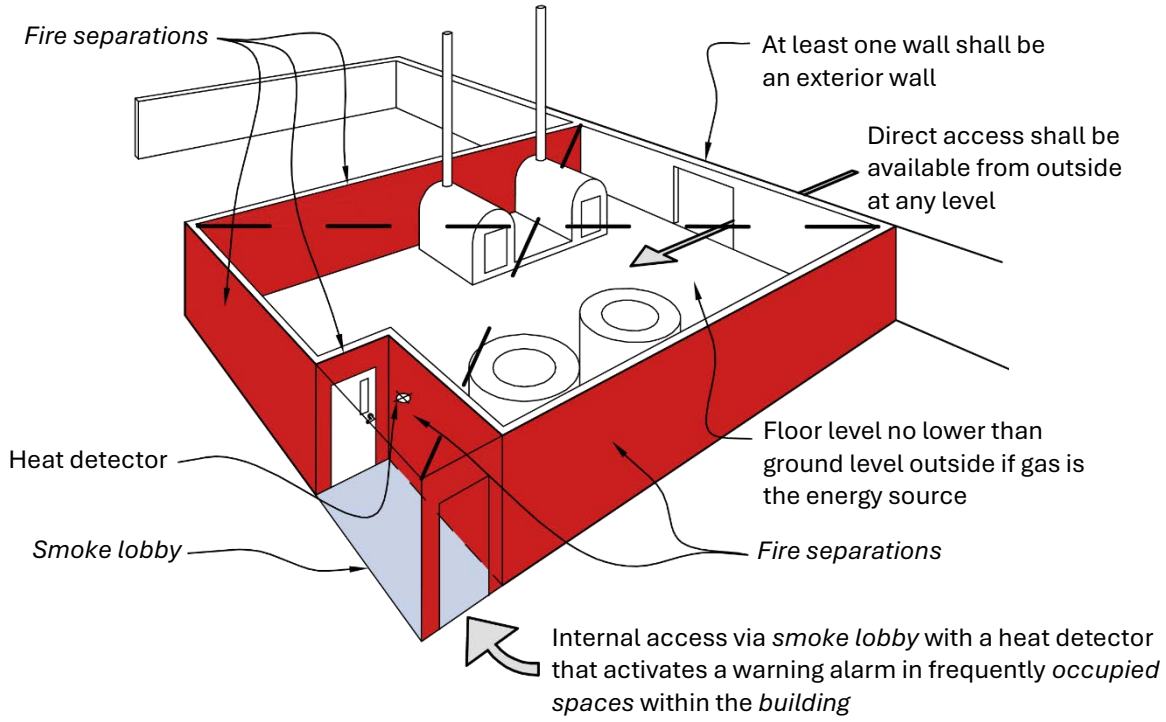
ii) alternative internal access that shall be via a *smoke lobby* that is protected with a heat detector connected to a *fire* alarm system; and

c) floor levels no lower than the ground level outside the external walls if gas is the energy source.

4.8.3.3 If a *building* services plant is contained in a *building* which is solely for the purposes of containing such plant, and that *building* is separated by 3.0 m or more from any adjacent *building*, only Paragraph 4.8.3.2(c) shall apply.

Figure 4.8.3.1: Plant, boiler, and incinerator rooms

Paragraph 4.8.3.1



Note: A separate *firecell* (indicated by the dashed diagonal lines) is required for any space within a *building* containing an incinerator, plant, boilers, or machinery that uses solid fuel, gas, or petroleum products as the energy source.

4.9 Protected shafts

4.9.1 Protected shaft firecells

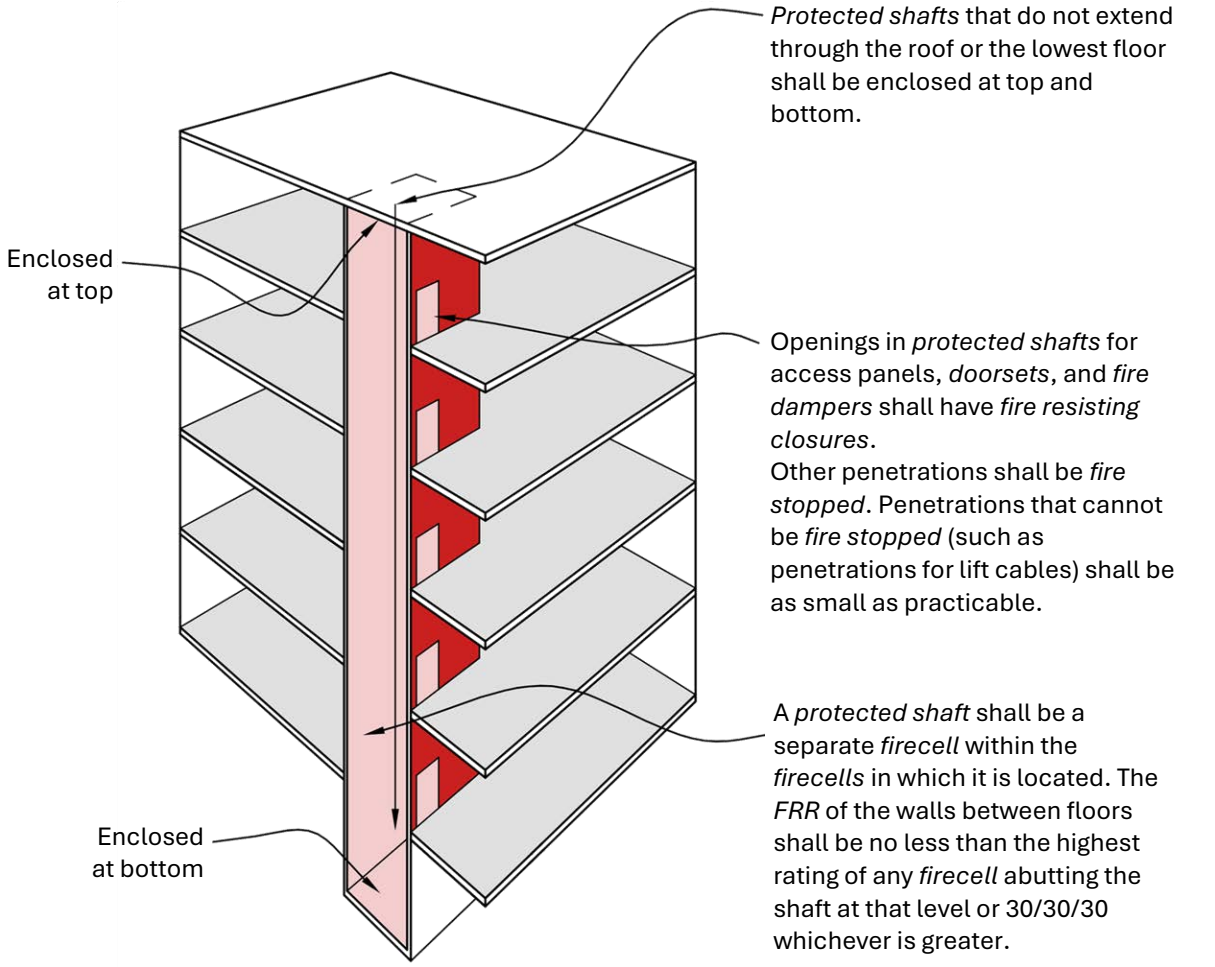
4.9.1.1 Every *protected shaft* shall be a separate *firecell* within the *firecell* or *firecells* in which it is located (see Figure 4.9.1.1). The shaft walls between each floor shall have an *FRR* of no less than that required for that level. The *FRR* of the shaft wall shall apply to both sides equally, except in the case of lift landing doors (refer to Paragraph 4.4.4.2).

4.9.1.2 Lifts, conveyors, and services that pass from one *firecell* to another *firecell* shall be enclosed within *protected shafts*.

4.9.1.3 *Protected shafts* that do not extend through the roof or lowest floor shall be enclosed at their top and bottom by *construction* which satisfies the relevant requirements of Subsection 4.3.2 for *fire stopping* (see Figure 4.9.1.1).

Figure 4.9.1.1: Protected shafts

Paragraphs 4.9.1.1, 4.9.1.3, and 4.10.1.1



4.9.2 Openings in protected shafts

4.9.2.1 There shall be no openings in *protected shafts* except for:

a) access panels having an *FRR* of no less than that required for the shaft; or

b) *doorsets* providing access to lifts and complying with smoke control requirements; or

c) openings for lift ropes passing into a lift motor room, which shall be as small as practicable; or

d) *fire dampers* serving a ventilation duct and complying with requirements for *fire resisting closures*; or

e) *penetrations* that satisfy Subsection 4.3.2 for *fire stopping*; or

f) fittings with an *FRR* of no less than that required for the shaft.

4.9.3 Solid waste and linen chutes

4.9.3.1 Solid waste and linen chutes that pass from one *firecell* to another shall be *protected shafts* or contained within a *protected shaft*.

4.9.3.2 In unsprinklered *buildings*, each chute shall be equipped with automatic sprinkler heads connected to any water supply pipe capable of meeting the minimum design criteria for the selected sprinkler head. These sprinklers shall be installed at the top of each chute and in the

space into which the chute discharges. The minimum residual pressure in the water supply pipe shall be 50 kPa with two sprinkler heads operating.

4.9.3.3 Solid waste and linen chutes shall have no inlet or discharge openings within an *exitway*.

4.10 Floors

4.10.1 Fire resistance rating of floors

4.10.1.1 Floors in *buildings* shall be *fire separations* (see Figure 4.9.1.1) except if any of the following conditions are satisfied:

a) where the floor is an intermediate floor within a *firecell* (refer to Paragraphs 4.10.2.1 and 4.10.2.6 for *FRR* requirement); or

b) the floor is the lowest floor above an unoccupied subfloor space, and complies with Paragraph 4.10.5.1.

4.10.1.2 Floors only need to be rated from the underside. The *FRR* of a floor shall be that rating applicable to the *firecell* directly below the floor.

4.10.2 Intermediate floors

4.10.2.1 *Intermediate floors*, including their supporting *primary elements* and stairs, shall have *FRRs* of at least 30 minutes.

4.10.2.2 The maximum combined area of *intermediate floors* within a *firecell* shall be the lowest of:

a) 20% of the area of the *firecell* floor not including the area of the intermediate floors if the *intermediate floors* are enclosed or partitioned, or 40% of the area of the *firecell* floor, not including the area of the *intermediate floors* if the *intermediate floors*:

i) are completely open, or

ii) the *building* has a Type 4 or 7 system; or

b) a total floor area that accommodates no more than 100 occupants based upon the *occupant load* of the space (refer to Subsection 1.2.4).

4.10.2.3 *Firecells* containing *direct support functions* to a sleeping *firecell* shall have only one *intermediate floor*.

4.10.2.4 Where there are two or more *intermediate floors*, the height difference between *intermediate floors* shall not exceed 1.0 m.

4.10.2.5 In warehouse *firecells* that contain storage at a height of more than 3.0 m, *intermediate floors* shall be limited to a total area of 35 m^2.

SM 4.10.2.6 The requirements for *intermediate floors* within Paragraphs 4.10.2.1, 4.10.2.2, 4.10.2.3, 4.10.2.4, and 4.10.2.5 do not apply within *household units* and *suites* in ***risk group* SM**.

4.10.3 Flytowers, walkways, and similar structures serving non-sleeping area firecells

4.10.3.1 Intermittently occupied structures such as flytowers, walkways, maintenance platforms, ladders, and gantries that are not used by the public are not required to be *fire* rated provided no more than 10 persons have access concurrently.

4.10.4 Basement floors

4.10.4.1 Basement *firecells* shall be separated from one another and from the lowest *firecell* above ground level by *fire separations* having *FRRs* in accordance with Section 2.3.

4.10.5 Subfloor spaces

4.10.5.1 In *buildings* with an unoccupied subfloor space between the ground and lowest floor (see Figure 4.10.5.1), the floor shall have an *FRR* in accordance with Section 2.3 except that no *FRR* is required if the following conditions are satisfied:

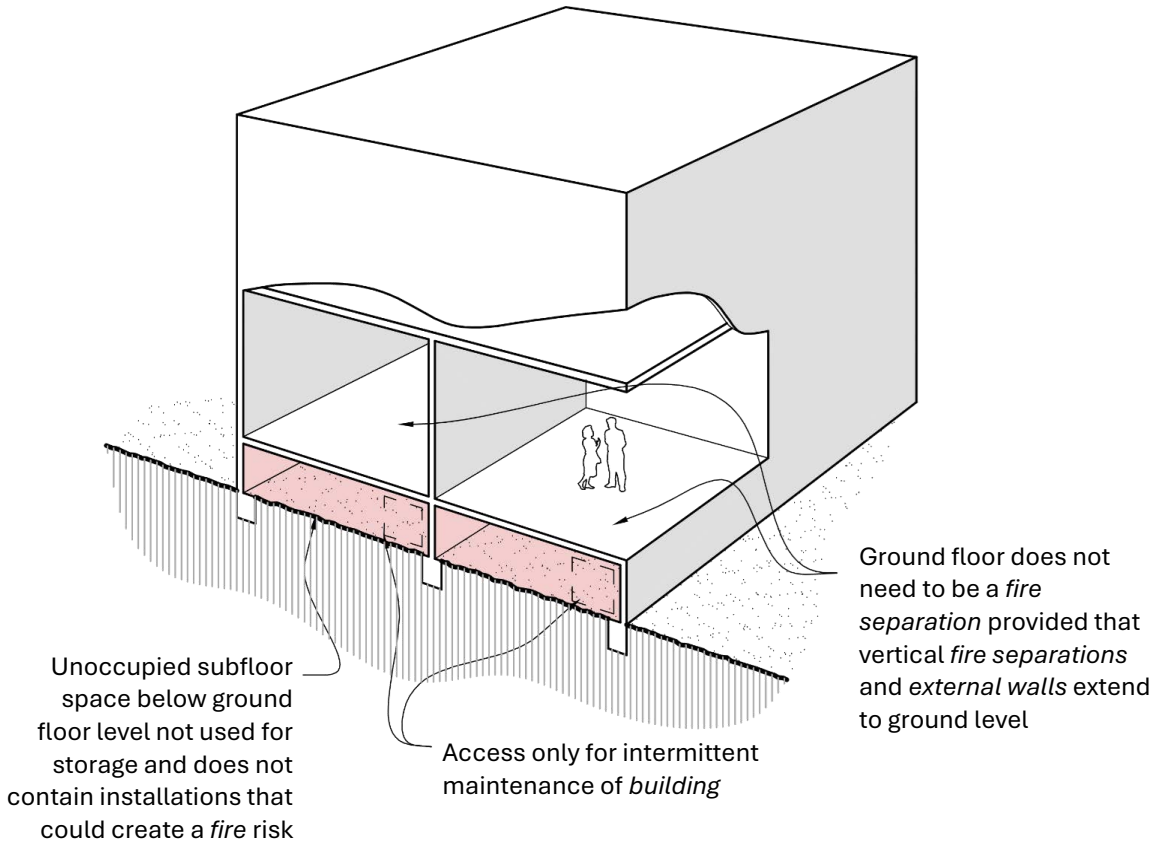
a) vertical *fire separations* and *external walls* extend down to ground level and enclose the space; and

b) access is available only for intermittent servicing of plumbing, drainage, or other static services; and

c) the space is not used for storage and does not contain any installation such as machinery or heating appliances that could create a *fire hazard*, except when *fire separated* from the rest of the subfloor space and the floor level above.

Figure 4.10.5.1: Subfloor spaces

Paragraph 4.10.5.1



4.11 Concealed spaces

4.11.1 Spread of fire in concealed spaces

4.11.1.1 The spread of *fire* in *concealed spaces* and cavities shall be avoided by

a) ensuring that voids do not pass from one *firecell* to another; and

b) by blocking off smaller voids with *cavity barriers* or, where appropriate, by using *fire stops* (see Subsection 4.3.2).

4.11.1.2 An upper concealed space may be used as an air handling plenum (see Figure 4.11.1.2) if the following requirements are satisfied:

a) the upper *concealed space* does not extend into another *firecell*; and

b) the ceiling and its supports and surfaces within the *concealed space* are *non-combustible*; and

c) electrical wiring is supported clear of the ceiling members and other equipment; and

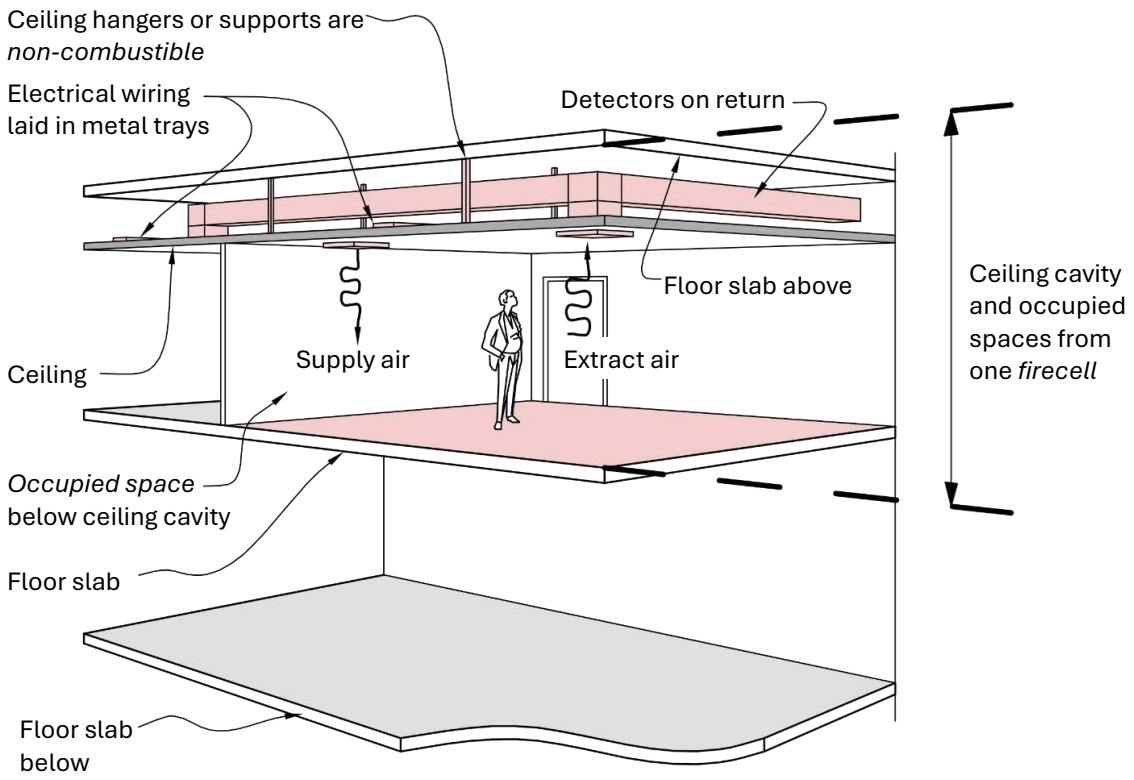
d) any material used such as pipe insulation or acoustic insulation complies with the requirements of Table 4.12.6.2; and

e) where the air handling plenum is used as an air supply path, a Type 4 alarm system is installed with detectors in all return air ducts; and

f) where the air handling plenum is used as an air supply path, detector activation causes the ventilation system to shut down as required by Paragraph 4.13.1.1.

Figure 4.11.1.2: Concealed spaces within firecells

Paragraph 4.11.1.2



Notes:
(1) A Type 4 system is required.
(2) If the plenum is used as an air supply path, refer to Paragraphs 4.11.1.2(e) and 4.11.1.2(f) for automatic *fire* detection and alarm requirements.
(3) If the *firecell* is required to have smoke control in the air handling system (a Type 9 System), refer to Appendix C.2.8 for necessary *fire* detection and alarm systems.

4.11.2 Cavity barriers

4.11.2.1 Any *concealed space* that may be a path for *fire* spread within internal walls or floors that are *fire separations*, or within *external walls*; shall have *cavity barriers* or be *fire stopped* (see Subsection 4.3.2) at all common junctions (see Figure 4.3.3.1Aand Figure 4.3.3.1C).

4.11.2.2 *Cavity barriers* are not required below a floor next to the ground if the *concealed space* is:

a) less than 1.0 m in height; or

b) not normally accessed and has no openings through which litter can accumulate.

4.11.2.3 *Cavity barriers* shall:

a) not reduce the *FRR* required for the element within which they are installed; and

b) where practical, be tightly fitted and mechanically fixed to rigid *construction*, but if this is not possible gaps shall be *fire stopped*; and

c) be fixed in a way that avoids impairment of their *fire separation* function as a result of:

i) *building* movement due to subsidence, shrinkage or thermal change, or

ii) collapse or failure of their components or fixings, or of abutting materials and any *penetrations* during a *fire*.

4.11.3 Restriction of roof and ceiling space areas in unsprinklered firecells

SM CA 4.11.3.1 For ***risk groups* SM** and **CA**, unsprinklered *firecells*, roof space, and ceiling space areas shall be subdivided by *fire separations* to prevent the hidden spread of *fire*. Any space between ceilings and roofs or floors above shall not exceed:

a) 400 m^2 in area, measured at ceiling level; or

b) 30 m in either length or width.

4.11.3.2 Paragraph 4.11.3.2 does not apply where the ceiling space is a separate *firecell*. In

CA ***risk group* CA** only, subdivision may be substituted for detection in accordance with NZS 4512.

4.11.3.3 The *fire separations* used for subdivision shall have an *FRR* in accordance with Section 2.3 and shall extend from the ceiling to the underside of the external roof cladding or floor above. Any gaps shall be *fire stopped* as specified in Subsection 4.3.2.

4.11.3.4 If openings in the *fire separations* are required for service access or any other reason, they shall be fitted with *fire resisting closures*. Gaps around service penetrations shall be *fire stopped*.

4.12 Internal surface finishes, floor coverings, and suspended flexible fabrics

4.12.1 Surface finish requirements for walls and ceilings

4.12.1.1 *Surface finish* requirements shall be as specified in Table 4.12.1.1 for walls and ceilings.

Table 4.12.1.1: Maximum permitted Group Number for internal surface finishes

Paragraph 4.12.1.1

Location in the building	Maximum permitted Group Number for spaces not protected with an automatic fire sprinkler system	Maximum permitted Group Number for spaces protected with an automatic fire sprinkler system
Exitways and Importance Level 4 *buildings*: walls and ceilings	1-S	2
Sleeping spaces where care or detention is provided: walls and ceilings	1-S	2
Other sleeping spaces (excluding within *household units*) and crowd spaces: ceiling surfaces	2-S	2
Other sleeping spaces (excluding within *household units*) and crowd spaces: wall surfaces	2-S	3
All other occupied spaces: walls and ceilings	3	3

4.12.2 Foamed plastics and combustible insulating materials

4.12.2.1 If *foamed plastics building* materials or *combustible* insulating materials form part of a wall or ceiling system, the completed system shall achieve a *Group Number* as specified in Table 4.12.1.1 and the foamed plastics shall comply with the flame propagation criteria as specified in Subsection 8.5.7 of the Building Product Specifications. This requirement does not apply to *building elements* listed in Paragraph 4.12.4.1.

4.12.3 Flooring

4.12.3.1 Flooring shall either:

a) be *non-combustible*; or

b) have a critical radiant flux no less than that specified in Table 4.12.3.1 as determined in accordance with Subsection 8.1.2 of the Building Product Specifications.

4.12.3.2 Paragraph 4.12.3.1 shall apply to flexible finishes such as carpets, vinyl sheet or tiles, and to finished or unfinished floor surfaces.

4.12.3.3 In addition to the requirements of Paragraph 4.12.3.1, where floors in multistorey *buildings* are *fire separations* and where the flooring material is made of wood products (that include boards manufactured from wood fibres or chips bound by an adhesive), the flooring material shall have either a thickness of no less than nominally 20 mm, or the floor assembly shall have an *FRR* of -/30/30 when exposed to *fire* from the flooring side.

Table 4.12.3.1: Critical radiant flux requirements for flooring (kW/m^2)

Paragraph 4.12.3.1

Risk group	Exitways in all buildings and sleeping areas and treatment rooms in risk group SM, SI	Non-sleeping firecells with more than 50 people	All other occupied spaces, other than household units
SM	2.2	Sprinklered: 1.2 Unsprinklered: 2.2	1.2
SI	Sprinklered: 2.2 Unsprinklered: 4.5	1.2	1.2
CA	2.2	Sprinklered: 1.2 Unsprinklered: 2.2	1.2
WB	2.2	Sprinklered: 1.2 Unsprinklered: 2.2	1.2
WS	2.2	1.2	1.2
VP	2.2	Sprinklered: 1.2 Unsprinklered: 2.2	1.2

4.12.4 Exceptions to surface finish requirements

4.12.4.1 *Surface finish* requirements do not apply to:

a) small areas of non-conforming product within a *firecell* with a total aggregate surface area not more than 5.0 m^2;

b) electrical switches, outlets, cover plates and similar small discontinuous areas; or

c) pipes and cables used to distribute power or services; or

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; or

e) *damp-proof courses*, seals, caulking, flashings, thermal breaks, and ground moisture barriers; or

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; or

g) individual *doorsets*; or

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; or

i) marae *buildings* using traditional Māori construction materials (eg, tukutuku and toetoe panels); or

CA

j) in ***risk group* CA** only, uniformly distributed roof lights where:

i) the total area does not exceed 15% of the ceiling area (in plan), and

ii) the minimum floor to ceiling height is not less than 6.0 m, and

iii) the roof lights achieve a *Group Number* not greater than 3.

4.12.4.2 Unsprinklered *firecells* containing classrooms, passageways and corridors of educational *buildings* need not comply with Table 4.12.1.1 provided all the following conditions are satisfied:

a) the *occupant load* is less than 250; and

b) the *firecells* are at ground floor level and are served by at least two *exitways* or *final exits*; and

c) the material *Group Number* is no more than 2–S for surfaces 1.2 m or more above floor level; and

d) the material *Group Number* is no more than 3 for surfaces less than 1.2 m above floor level.

4.12.5 Suspended flexible fabrics and membranes

4.12.5.1 The *flammability index* of suspended flexible fabrics and membrane structures shall be determined in accordance with Subsection 8.1.3 of the Building Production Specifications.

4.12.5.2 Within all *occupied spaces* including *exitways*, suspended flexible fabrics shall:

a) have a *flammability index* of no greater than 12; and

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

4.12.5.3 The fabric of structures such as tents, marquees, or canopies shall achieve a *flammability index* of no greater than 12. This does not apply to structures with small *occupant loads* such as camping tents and horticultural applications.

4.12.6 Building services

4.12.6.1 The *Group Number* for the surfaces of *building* services shall:

a) be determined in accordance with Subsection 8.5.6 of the Building Product Specifications; and

b) comply with the maximum permitted values in Table 4.12.6.2.

4.12.6.2 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 4.12.6.2.

Table 4.12.6.2: Maximum permitted Group Number for the surfaces of building services

Paragraphs 4.12.6.2 and 4.12.6.1

Building services	Maximum permitted Group Number for spaces not protected with an automatic fire sprinkler system	Maximum permitted Group Number for spaces protected with an automatic fire sprinkler system
Internal surfaces of ducts for HVAC systems and kitchen exhaust ducts	1-S	2
External surfaces of ducts, acoustic treatment and pipe insulation within *exitways*	1-S	2
Acoustic treatment and pipe insulation within sleeping uses	3	3
External surfaces of ducts for *HVAC* systems	3	3

4.12.7 Trampers' huts

4.12.7.1 In trampers' huts (that are not *backcountry huts* as defined in Acceptable Solution BCH/AS1) used for overnight accommodation in remote locations, wall and ceiling linings with a maximum *Group Number* of 3 are acceptable provided that:

a) the *occupant load* is no greater than 20; and

b) all sleeping spaces have no fewer than two *escape routes*.

4.13 Building services plant

4.13.1 Smoke control in air handling systems

4.13.1.1 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 C.2.8.

Part 5. Control of external fire spread

5.1 Buildings with more than one title

5.1.1 Fire separations

5.1.1.1 Where a *building* is subdivided so that it straddles more than one title, it 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 Section 2.3; and

b) any external area in common, unless Paragraph 5.1.1.2 applies, by *external walls* complying with Subsection 5.2.2 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 Section 2.3.

5.1.1.2 Where a *building* is subdivided (as in Paragraph 5.1.1.1(a)), and all the titles and any areas in common are sprinklered, the requirements for *fire separations* of Paragraph 5.1.1.1(b) need not apply. However, the requirements for separation of *exitways* in Paragraphs 4.7.1.1, 4.7.1.2, and 4.7.1.3, and sleeping areas in Section 4.5 shall still apply.

VP 5.1.1.3 Refer to Subsection 4.1.2 for allowances in vehicle parking areas of *buildings* separated into multiple titles.

5.2 Horizontal fire spread from external walls

5.2.1 Unprotected areas

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

a) if, due to the configuration of a single *building* or the siting of other *buildings* on the same property, *external walls* of adjacent *firecells* are exposed to each other at an angle of less than 90°, and one or both *firecells* contain sleeping *risk groups* or *exitways*; or

b) if there are *unprotected areas* in *external walls* facing a *relevant boundary* to *other property* at an angle of less than 90°.

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

a) provide a sprinkler system complying with NZS 4541 with a Class A or Class B2 water supply. This dispensation does not apply to parts of the *external wall* within 1.0 m of the *relevant boundary*, or where the *external wall* is of a *firecell* used for storage with a storage height greater than 3.0 m; or

b) limiting small openings or using *fire resisting glazing* (refer to Subsection 5.2.3).

c) limiting *unprotected areas* in *external walls* or separating by distance (refer to Subsection 5.2.4); or

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

5.2.1.4 If a wall or part of a wall is less than 1.0 m from the *relevant boundary*, a combination of small *unprotected areas* and *fire resisting glazing* is permitted as detailed in Subsection 5.2.3.

5.2.1.5 The tables in Appendix E.1 apply only to the permitted *unprotected area* in *external walls* 1.0 m or more from the *relevant boundary*. This can be combined with the areas of *fire resisting glazing* and small *unprotected areas* in Subsection 5.2.3.

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

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

5.2.1.8 For specific separation requirements for *unprotected areas* in *external walls* of *firecells* in the same *building*, or in separate *buildings* on the same property, a *notional boundary* shall be used instead of the *relevant boundary*. In such cases, when applying the tables in Appendix E.1 and Appendix E.2, the words *relevant boundary* shall be interpreted as *notional boundary*.

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

5.2.2 Fire rating of external walls

5.2.2.1 *Building elements* that are part of an *external wall* that is required to be *fire* rated shall be *fire* rated as required by Section 2.3.

5.2.2.2 If a *safe path* has an *external wall*, that wall may be 100% unprotected provided any walls between the *safe path* and adjacent *firecells* have an *FRR* determined using the *property rating*.

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

5.2.2.4 When the *unprotected area* of an *external wall* is permitted to be 100%, but the *primary elements* in the line of that wall are required to be *fire* rated, the rating of those *primary elements* shall be no less than the *life rating* in accordance with Section 2.3.

5.2.3 Small unprotected areas and fire resisting glazing

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

a) small *unprotected areas* no greater than 0.1 m^2 and areas of *fire resisting glazing* shall be located to comply with Figure 5.2.3.1; and

b) the remainder of the wall shall be *fire* rated in accordance with Subsection 5.2.4.

5.2.3.2 The *fire resisting glazing* shall be rated for integrity, and the *FRR* of both the glazing and the *external wall* shall be in accordance with Section 2.3.

5.2.3.3 Areas of *fire resisting glazing* shall be no greater than permitted by Appendix E.1 according to the distance from the *relevant boundary*.

5.2.3.4 There is no limitation on the spacing between adjacent small *unprotected areas* and areas of *fire resisting glazing* that occur in different *firecells*. Within a *firecell* the following requirements shall apply (refer to Figure 5.2.3.1):

a) small *unprotected areas* shall be no closer, both vertically and horizontally, than 1.5 m to another small *unprotected area or* areas of *fire resisting glazing*; and

b) areas of *fire resisting glazing* shall be no closer to one another, vertically or horizontally, than the dimensions X or Y shown on Figure 5.2.3.1; and

c) where areas of *fire resisting glazing* are staggered, rather than being aligned vertically or horizontally, the shortest distance, in any direction, between adjacent areas shall be no less than the greater of the X and Y measurements.

5.2.4 Unprotected areas and separation distance

5.2.4.1 The maximum *unprotected area* for *external walls* shall be no greater than permitted by Appendix E.2.

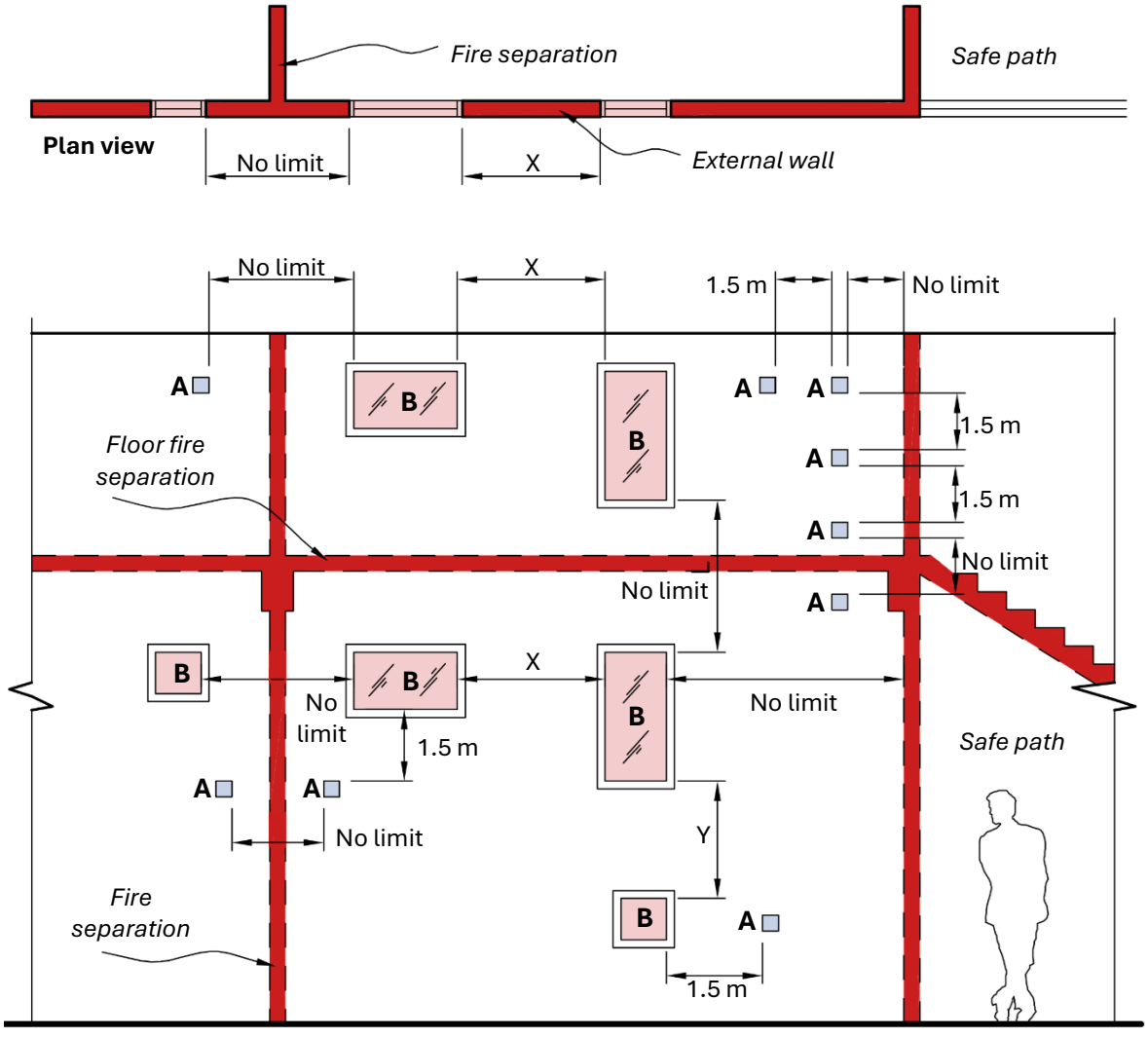
5.2.4.2 Appendix E.2 can also be used to determine the minimum required separation distance from the *relevant boundary* to the closest *unprotected area*.

5.2.4.3 As an alternative to Paragraphs 5.2.4.1 and 5.2.4.2, Verification Method C/VM2 Appendix C Design scenario HS horizontal fire spread tables can be used to determine the maximum *unprotected area* or the minimum required separation distance. The *unprotected area* tables

and the wing wall and return wall tables must be used together in the Verification Method C/VM2 Appendix C method.

Figure 5.2.3.1: Permitted small unprotected areas and fire resisting glazing

Paragraphs 5.2.3.1 and 5.2.3.4



Notes:

(1) A is a small *unprotected area* no greater than 0.1 m^2.

(2) B is an area of *fire resisting glazing* that must comply with Appendix E.1.1.

(3) Dimensions shown are the minimum distances between A and B. No limit means there is no limitation on spacing between the areas.

(4) Dimension X must be no less than the greater of the widths of the two areas of *fire resisting glazing* being considered.

(5) Dimension Y must be no less than the greater of the heights of the two areas of *fire resisting glazing* being considered.

5.3 Horizontal fire spread from roofs and open sided buildings

5.3.1 Roofs

WB VP 5.3.1.1 For ***risk groups*** **WB** and **VP**, in *buildings* other than offices and laboratories where the roof of an unsprinklered *firecell* is within 1.0 m of a *relevant boundary*, horizontal *fire* spread shall be resisted by either:

a) *fire* rating (for *fire* exposure from below) that part of the roof within 1.0 m of the *relevant boundary*. The *FRR* shall be based on the *property rating* for the *firecell*, except that insulation is not required; or

b) extending the wall, being a *fire separation* along or adjacent to the relevant boundary, no less than 450 mm above the roof to form a parapet.

5.3.2 Parapets for unsprinklered firecells

5.3.2.1 Where sprinklers are not provided and an area of roof within 1.5 m of the *relevant boundary* is used for storage of *combustible* materials or vehicle parking, a parapet shall be provided that:

a) extends no less than 1.5 m above the roof level; and

b) has an *FRR* meeting the *property rating* in accordance with Section 2.3.

VP 5.3.2.2 For ***risk group*** **VP**, this parapet shall have an *FRR* of no less than 30 minutes.

5.3.3 Roof projections

5.3.3.1 If the *external wall* is required to have an *FRR*:

a) the eaves projection shall be *constructed* with the same *FRR* as the *external wall*; or

b) the *external wall* shall be extended to the underside of the roof and the eaves need not be *fire* rated (see Figure 5.3.3.1).

5.3.3.2 If the *external wall* is not required to have an *FRR*, roof eaves projecting from that wall need not be *fire* rated provided that no part of the eaves *construction* is closer than 650 mm to the *relevant boundary*.

5.3.3.3 If the *external wall*, on its own, is not required to have an *FRR*, but roof eaves extend to within 650 mm of the *relevant boundary*, the total eaves *construction* and the *external wall* from which they project shall have *FRRs* in accordance with Section 2.3 (see Figure 5.3.3.1).

5.3.3.4 Eaves *construction* includes the guttering or spouting and any other projections from the eaves, although guttering or spouting need not be *fire* rated.

5.3.4 Open sided buildings

5.3.4.1 An open sided *building* may be either a detached *building* or connected to another *building* (see Figure 5.3.4.1). For the open sided *building* to be deemed 'detached', the horizontal distance between the other building and the roof of the open sided *building* shall be no less than:

a) 1.0 m for a roof area exceeding 40 m^2; or

b) 0.3 m for a roof no greater than 40 m^2.

5.3.4.2 Open sided *buildings* (see Figure 5.3.4.1) having only a single floor level may be *constructed* with *external walls* having 100% *unprotected area* provided that they:

a) have no less than two sides completely open to the environment; and

b) where attached to another *building*, both *buildings* are under the control of the same occupancy; and

SM SI CA WS WB VP c) for roof areas > 40 m^2, open sided buildings shall be no closer to a *relevant boundary* than:

i) 1.0 m if in ***risk groups*** **SM**, **SI**, **CA**, or **WS**, or

ii) 3.0 m if in ***risk groups*** **WB** or **VP**; and

d) for roof areas ≤ 40 m^2, open sided *buildings* shall be no closer than 0.3 m to the *relevant boundary*.

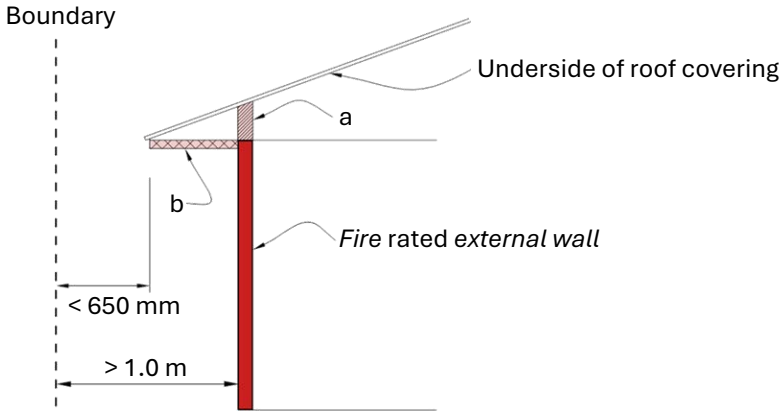
5.3.4.3 Where the requirements of Paragraph 5.3.4.2 cannot be achieved, the applicable *external wall/s* shall comply with all the requirements for the horizontal *fire* spread from *external walls* in accordance with Section 5.2.

5.3.5 Floor projections

5.3.5.1 If a floor projects beyond the face of any part of an *external wall* which requires a *property rating*, or any part of the projection is closer than 1.0 m to the *relevant boundary*, the floor projection shall have the same *FRR* as the floor inside the *external wall*, and exposed exterior faces of the projection shall comply with Section 5.5.

Figure 5.3.3.1: Eaves projection

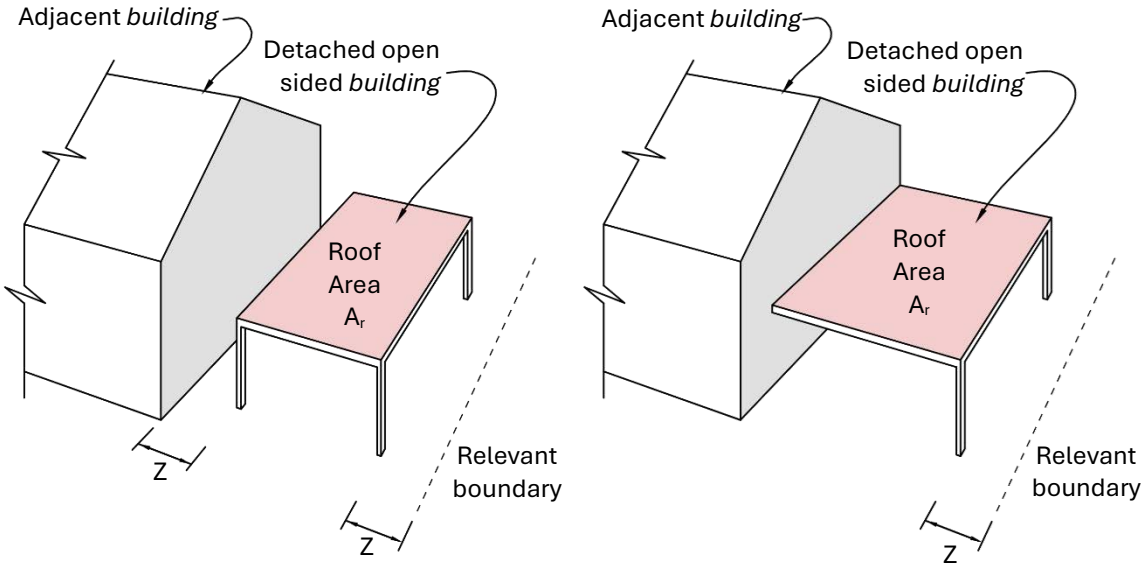
Paragraphs 5.3.3.1 and 5.3.3.3



Note: (1) Either a or b must be *fire* rated.

Figure 5.3.4.1: Single story open sided buildings with non-fire rated construction

Paragraphs 5.3.4.1 and 5.3.4.2



Note: (1) When A_r is less than or equal to 40 m^2, Z must not be less than 0.3 m. When A_r exceeds 40 m^2, Z must not be less than 1.0 m if in ***risk groups*** **SM**, **SI**, **CA**, or **WS** or 3.0 m if in ***risk groups*** **WB** or **VP**. In all cases, at least two sides of the perimeter wall shall be completely open to the environment.

5.4 Vertical fire spread

5.4.1 Roofs

SM SI

5.4.1.1 Sleeping ***risk groups*** **SM** and **SI**, *other property*, and external *exitways* shall be protected against vertical *fire* spread from roofs.

5.4.1.2 Protection against *fire* spread shall be achieved using one or more of the following methods:

a) separation by distance; and/or

b) *fire* rating the adjoining *external wall*; and/or

c) *fire* rating all or part of the roof, including its supporting structure, against the threat of *fire* from the underside; and/or

d) installing sprinklers in the *firecell* below the roof.

5.4.2 External exitways over roofs

5.4.2.1 Subject to Section 3.6, when an external *exitway* crosses a roof or is above or adjacent to a roof on the same or another *building*, the roof within 3.0 m of any part of the *exitway* and all supporting elements shall have an *FRR* in accordance with Section 2.3.

5.4.3 Primary elements

5.4.3.1 *Primary elements* providing support to an area of *fire* rated roof shall have an *FRR* of no less than that of the roof.

5.4.3.2 When supporting an unrated roof:

a) *primary elements* such as columns or walls which are required to be *fire* rated shall be rated from floor level to the underside of the roof framing members; and

b) any roof framing members connected to these *fire* rated columns or walls shall also be rated if their collapse in *fire* would cause the consequential collapse of the rated columns or walls.

5.4.4 Fire spread from an adjacent lower roof

5.4.4.1 *Fire* spread from a roof close to and lower than an *external wall* in the same *building* (as the lower roof), or in an adjacent *building* on the same title shall be avoided by compliance with Paragraph 5.4.4.2 where *firecells* behind the wall contain:

a) *other property*; or

SM SI

b) either ***risk group*** **SI** or **SM**;

c) *exitways*.

5.4.4.2 Where the distance between any part of an *external wall* and a lower roof is less than 9.0 m vertically or 5.0 m horizontally (see Figure 5.4.4.4), protective measures shall be applied either to the roof as specified in Paragraph 5.4.4.3 or to the wall as specified in Paragraph 5.4.4.4.

5.4.4.3 Roof protection shall be achieved by:

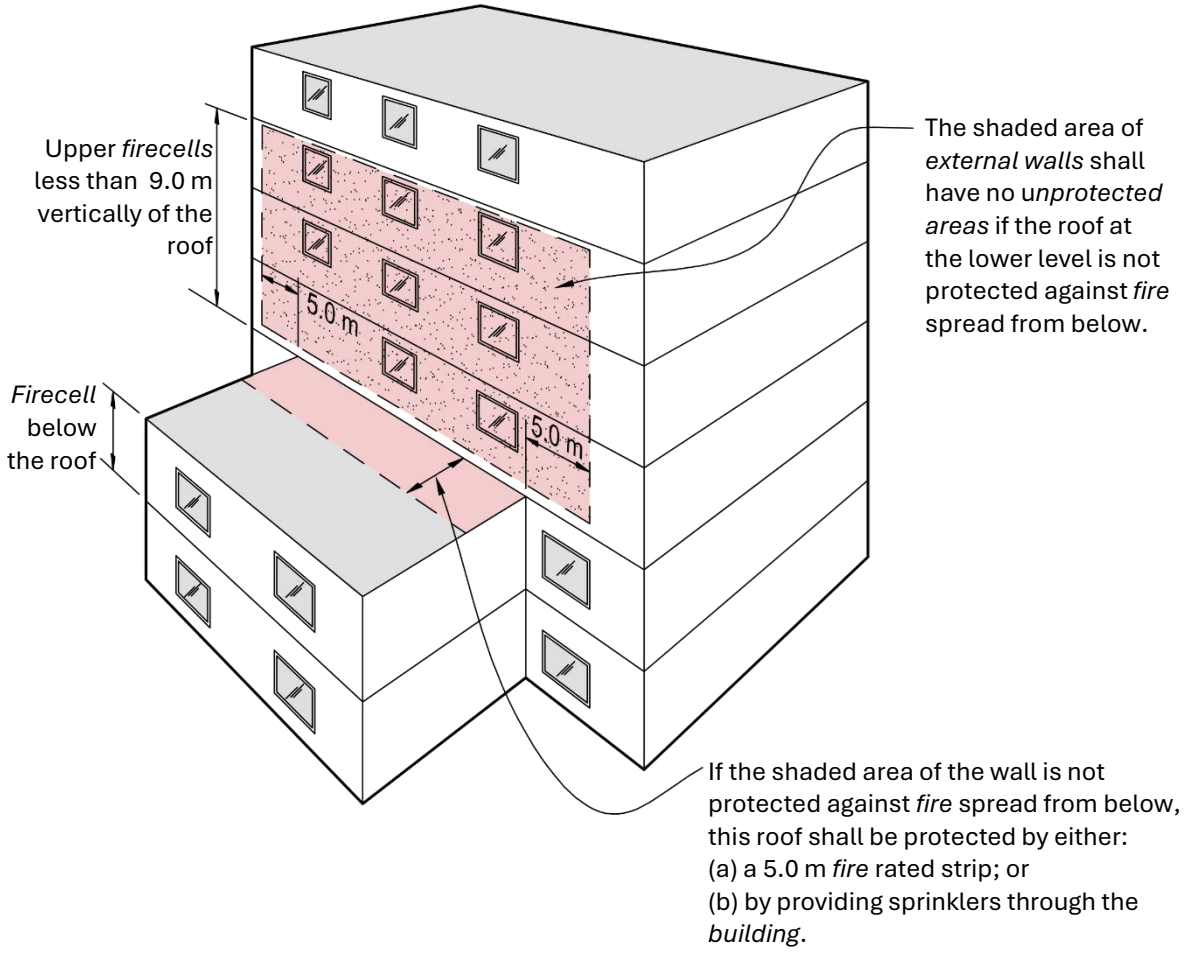
a) providing sprinklers throughout the *building*; or

b) constructing that part of the roof within 5.0 m horizontally of the wall, with an *FRR* in accordance with Section 2.3 of the *firecell* below the roof.

5.4.4.4 *External wall* protection above an adjacent lower roof shall be provided by *constructing* the critical part of the wall (closer to the roof than 9.0 m vertically or 5.0 m horizontally) with an *FRR* in accordance with Section 2.3 (see Figure 5.4.4.4)).

Figure 5.4.4.4: Vertical fire spread for external walls and roofs

Paragraphs 5.4.4.2 and 5.4.4.4



5.4.5 External fire spread between different levels of the same building

5.4.5.1 Except where *firecells* are sprinklered, *unprotected areas* in *external walls* shall be protected against vertical *fire* spread if any of the following conditions occur:

SM a) an *escape height* of 4.0 m or more in ***risk group* SM**; or

b) *exitways* with an *escape height* of:

CA i) 4.0 m or more in ***risk group* CA**, or

WB VP ii) 10 m or more in **risk groups WB** and **VP**; or

c) *firecells* containing retail areas having an *escape height* of 7.0 m or more; or

d) *firecells* containing *other property* located one above the other.

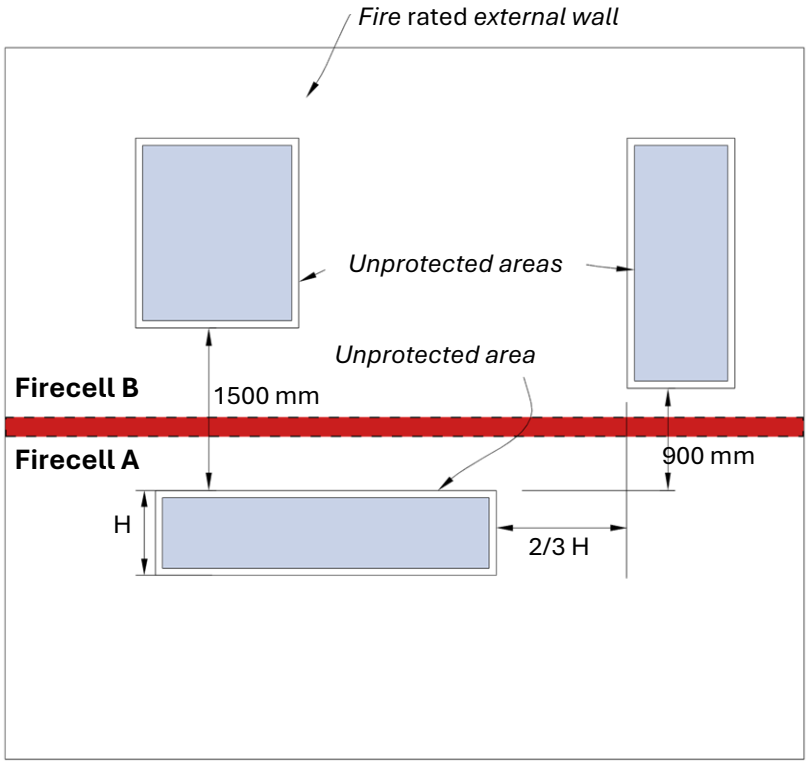
5.4.5.2 If the conditions described in Paragraph 5.4.5.1 occur, *unprotected areas* (see Figure 5.4.5.2) in the *external walls* of the *firecells* shall be separated by no less than:

a) 1500 mm where any parts of the *unprotected areas* are vertically aligned above one another; or

b) 900 mm where the *unprotected areas* on one level are horizontally offset from those on the other level.

Figure 5.4.5.2: Separation of unprotected areas

Paragraph 5.4.5.2



Note: (1) Dimension H is the height of the window.

5.4.6 Spandrels and apron projections

5.4.6.1 Table 5.4.6.1 specifies the acceptable combinations of apron projection and spandrel height. Spandrels may be omitted where an apron projecting no less than 600 mm is constructed.

5.4.6.2 Aprons shall extend horizontally beyond the outer corners of the *unprotected area* by no less than the apron projection distance.

5.4.6.3 Aprons and spandrels shall have *FRRs* of no less than that of the floor separating the upper and lower *firecells*. Spandrels shall be rated from both sides. Aprons need only be rated from the underside.

Table 5.4.6.1: Combination of aprons and spandrels

Paragraph 5.4.6.1

Apron projections (mm)	Spandrel height (mm)
0	1500
300	1000
450	500
600	0

5.4.7 Roof storage

5.4.7.1 Storage of *combustible* materials on a roof is not permitted within 1.5 m of a higher *external wall* if the adjacent *building* above contains sleeping *risk groups*.

5.4.8 Roof vehicle parking

VP 5.4.8.1 Where a roof used for vehicle parking is within 1.5 m of a higher *external wall* and the adjacent *building* above contains sleeping occupancies, *external wall* protection above the adjacent lower roof shall be provided by *constructing* the part of the wall (that is closer to the roof than 3.0 m vertically or 1.5 m horizontally) with an *FRR* of no less than that required from Table 2.3.1.1.

VP 5.4.8.2 Vertical distances shall be measured for vehicle parking from the *building* roof level. (Refer to Paragraph 5.3.2.1 for parapet protection against horizontal *fire* spread.)

5.5 External cladding systems

5.5.1 External wall cladding materials

5.5.1.1 Cladding materials shall be specified in accordance with Subsection 8.4.1 of the Building Product Specifications.

5.5.1.2 Where *external walls* are located less than 1.0 m from a *relevant boundary*, cladding materials shall be *non-combustible*, *limited combustible*, or Type A materials.

SI 5.5.1.3 For *buildings* containing ***risk group* SI**, where *external walls* are located more than 1.0 m from a *relevant boundary*, cladding materials shall be *non-combustible, limited combustible*, Type A, or Type B materials.

5.5.1.4 In addition to the requirements in Paragraphs 5.5.1.1 and 5.5.1.2, where multi-level *buildings* have a *building height* of 10 m or more, cladding materials shall:

a) be *non-combustible*, *limited combustible*, or Type A materials; or

b) be part of an entire *external wall* cladding system that complies with Subsection 5.5.2.

5.5.2 External wall cladding systems for multi-level buildings with a building height ≥ 25 m

5.5.2.1 Where multi-level *buildings* have a *building height* of 25 m or more, the entire *external wall* cladding system shall:

a) be *comprised of non-combustible* or *limited combustible* materials; or

b) meet the acceptance criteria in Subsection 8.4.2 of the Building Product Specifications for one or more of the testing or classification methods stated.

5.5.3 Cavity barriers

5.5.3.1 The spread of *fire* through cavities in an *external wall* shall be avoided by providing *cavity barriers* at each floor level. *Cavity barriers* shall comply with the requirements in Subsection 4.11.2.

Part 6. Firefighting

6.1 Fire and Emergency New Zealand vehicular access

6.1.1 Access to buildings

6.1.1.1 If *buildings* are located remotely from the street boundaries of a property, pavements situated on the property and likely to be used by Fire and Emergency New Zealand vehicles to reach a hard-standing shall:

a) be able to withstand a laden weight of up to 25 tonnes with an axle load of 8 tonnes or have a load-bearing capacity of no less than the public roadway serving the property, whichever is the lower; and

b) be trafficable in all weathers; and

c) have a minimum width of 4.0 m; and

d) provide a clear passageway of no less than 3.5 m in width and 4.0 m in height at site entrances, internal entrances and between *buildings*; and

e) provide access to a hard-standing from which there is an unobstructed path to the *building* within 20 m of:

i) the firefighter access into the *building*, and

ii) the inlets to *fire* sprinkler systems or *building* fire hydrant systems, where these are installed.

SI 6.1.1.2 For ***risk group* SI** only, the following requirements shall be met in addition to those in Paragraph 6.1.1.1:

a) roadway pavements shall withstand a vehicle of multiple axles spaced at no less than 2.5 m centres, and each carrying 8.2 tonnes; and

b) where a property includes two or more *buildings*, any one of which has a *building height* greater than 7.0 m, roadway widths shall be no less than 6.5 m, corners and bends shall have a minimum radius of 12.5 m and turning areas shall be a minimum of 25 m from wall-to-wall; and

c) hard-standings shall be provided adjacent to any *building* having a *building height* greater than 7.0 m.

SI 6.1.1.3 For ***risk group* SI** only, the location and extent of hard-standings shall be determined in consultation with Fire and Emergency New Zealand.

6.2 Information for firefighters

6.2.1 Control panel location

6.2.1.1 If *fire* alarm or sprinkler systems are installed, the control panel shall be located in a position close to the Fire and Emergency New Zealand attendance point and in accordance with NZS 4512, NZS 4515 and NZS 4541 as appropriate.

6.2.2 Hazardous substances

6.2.2.1 If *hazardous substances* are present in the *building*, warning signage in accordance with Acceptable Solution F8/AS1 shall be displayed.

6.3 Firefighting facilities

6.3.1 Protection of control features

6.3.1.1 The control features of *fire safety systems* shall be located at a position with ready access from street level and protected from the effects of *fire* including debris falling from upper floors.

6.3.2 Fire hydrant system

6.3.2.1 *Building fire* hydrant systems shall be installed as specified in Section 2.2 and shall meet the requirements of NZS 4510.

6.3.3 Fire and Emergency New Zealand lift control

6.3.3.1 Fire and Emergency New Zealand lift control is required if the *escape height* exceeds 10 m. The control of lifts under *fire* conditions shall comply with NZS 4332.

Part 7. Prevention of fire occurring

7.1 Heating appliances

7.1.1 Solid fuel appliances

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

a) domestic solid fuel burning appliances, installed in either domestic or commercial situations; and

b) *flue systems*.

7.1.2 Gas burning appliances

7.1.2.1 Gas-burning appliances shall be installed in accordance with clause G11 of the Building Code.

7.1.3 Oil-fired appliances

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

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

7.2 Electrical fire safety

7.2.1 Electrical installations

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

7.3 Open fires

7.3.1 Chimneys

7.3.1.1 *Chimneys* shall be *constructed* in accordance with Table 7.3.1.1 and Figure 7.3.1.1. They shall have:

a) *fireplaces* lined with fire bricks having a thickness of no less than 50 mm; and

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

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

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

Table 7.3.1.1: Minimum acceptable dimensions of chimneys

Paragraph 7.3.1.1

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

7.3.1.2 Cross-sectional areas of *flues* shall be no less than 0.03 m^2 for an open fireplace (see Figure 7.3.1.2).

7.3.1.3 *Flue* linings shall be one of the following types:

a) clay *flue* liners with rebated or socketed joints; or

b) imperforate clay pipes with socketed joints; or

c) high alumina cement and kiln-burnt aggregate pipes, with rebated or socketed joints, or steel collars around joints.

7.3.1.4 The *flue liners* shall be fitted with the sockets or rebates uppermost to prevent condensate running out, and to prevent any caulking material from being adversely affected. Joints between the *flue liners*, and any space between *flue liners* and the masonry, shall be filled with weak mortar or insulating concrete (see Figure 7.3.1.2(a)).

7.3.1.5 *Flue liners* are not required for:

a) brick *chimneys* if constructed of two 90 mm skins of brickwork with a 65 mm grout-filled gap between (see Figure 7.3.1.2(b)); or

b) ordinary concrete *chimneys*; or

c) pre-cast pumice concrete *chimneys*.

7.3.1.6 Clearance above roofs shall be in accordance with Figure 4.9 of AS/NZS 2918.

7.3.1.7 Every *fireplace* shall have a separate *flue*.

7.3.1.8 *Flue* joints shall be of *non-combustible* material and sealed against air leakage.

7.3.1.9 *Hearths* for *fireplaces* shall:

a) be *constructed* of fully grouted stones, bricks or concrete of no less than 50 mm total thickness; and

b) extend no less than 230 mm on each side of the *fireplace* opening, and no less than 380 mm forward of the *fireplace* opening; and

c) have no *combustible* material closer than the clearances given in Paragraph 7.3.1.9b) from the upper and lower surfaces of the *hearth*.

7.3.1.10 Clearances between a *chimney* and any *combustible* material (see Figure 7.3.1.10) shall be no less than:

a) 200 mm at any opening in the *flue*, or at the *fireplace* opening; and

b) 200 mm above or below the upper surface of the *hearth*, and 75 mm from the lower surface of the *hearth*.

7.3.1.11 *Hearth* edges are to be separated from *combustible* material with *insulating material* having a minimum service operating temperature of 150°C.

7.3.1.12 A ventilated space of no less than 50 mm shall be provided between the outer face of a *fireplace*, *chimney* or *flue* and any *combustible* material.

7.3.1.13 AS/NZS 2918 Sections 2 and 4 shall also be used for the installation of *flues* from open *fires*.

Figure 7.3.1.1: Chimney terms and dimensions

Paragraph 7.3.1.1

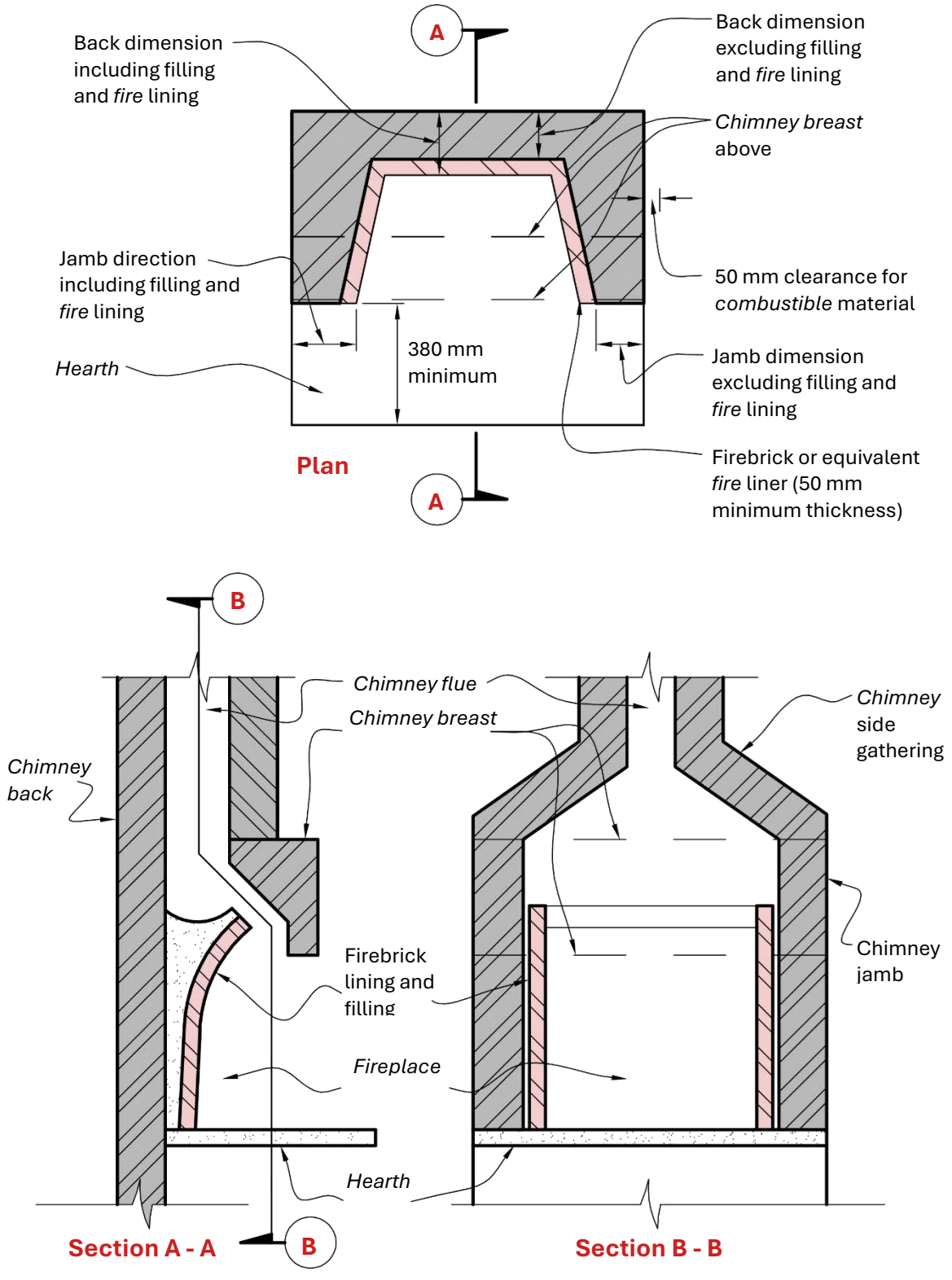
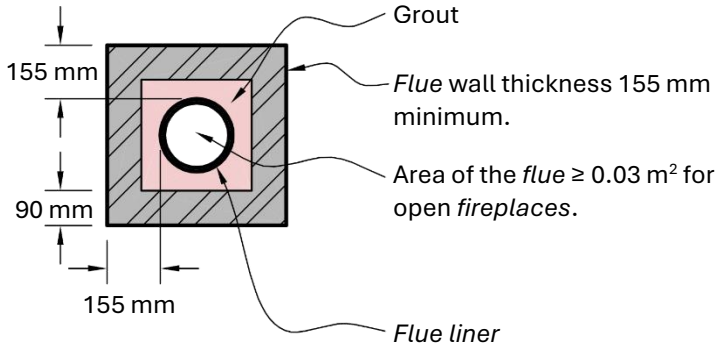
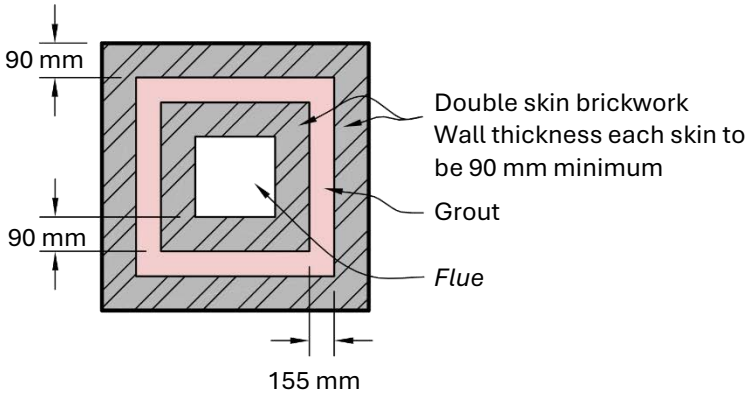


Figure 7.3.1.2: Brick chimney flues – sections

Paragraphs 7.3.1.2, 7.3.1.4, and 7.3.1.5



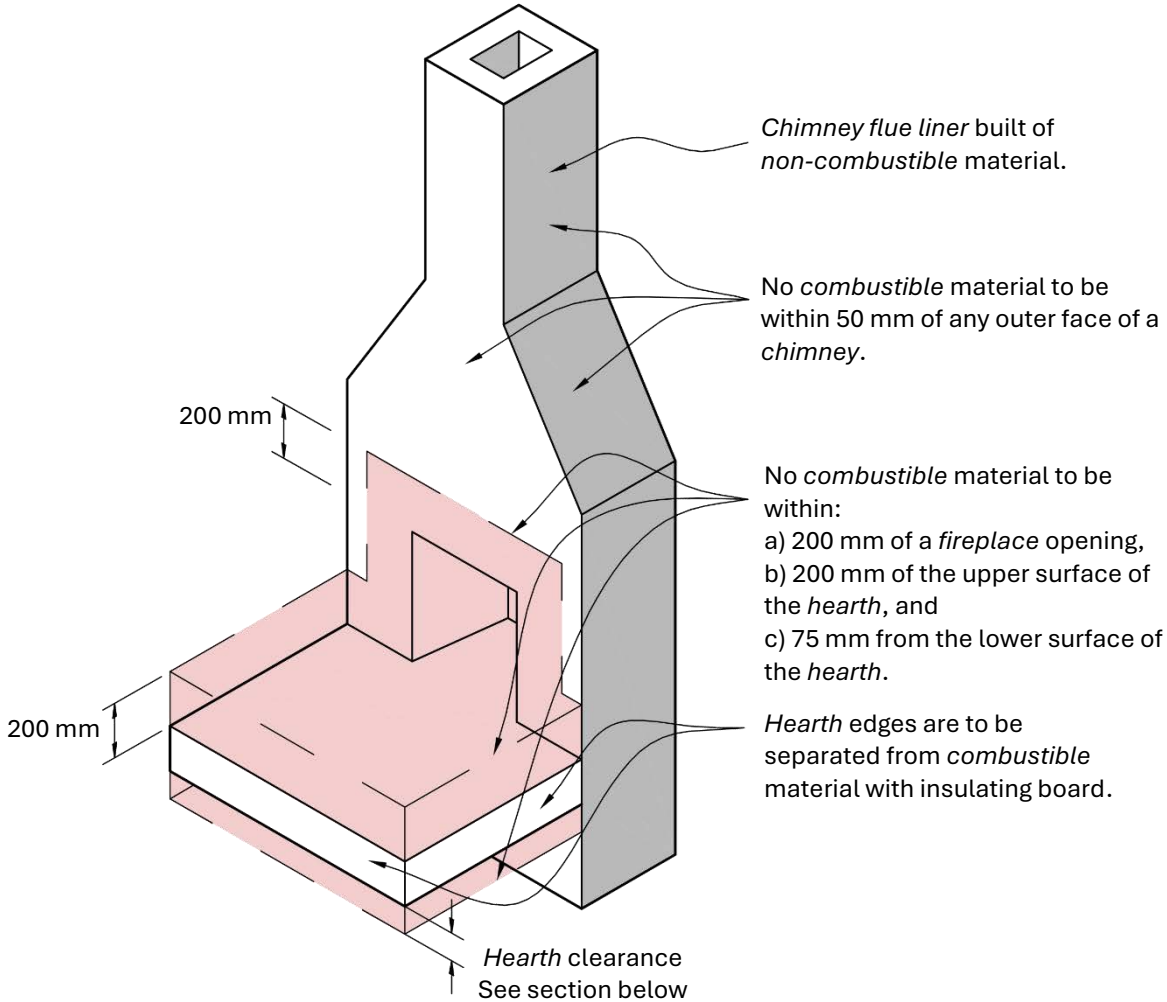
(a) With *flue liner*

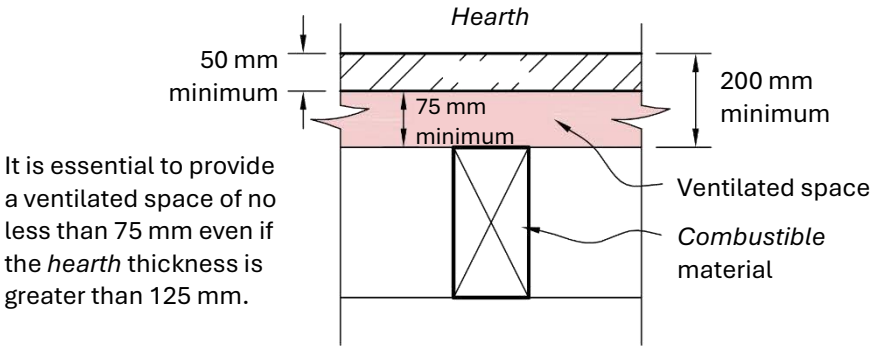


(b) Without *flue liner*

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

Paragraph 7.3.1.10





Note: Refer to Paragraph 7.3.1.11 for *insulating materials* for *hearth* edges.

Appendix A. References

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

Standards New Zealand		Where quoted
AS/NZS 2918:2001	Domestic solid fuel burning appliances	7.1.1.1, 7.1.3.2, 7.3.1.6, 7.3.1.13, D.2.1.1
AS/NZS 3000:2018	Electrical installations – Known as the Australian/ New Zealand Wiring Rules	D.1.3.2
NZS 4510:2008	Fire hydrant systems for buildings Amendment 1	C.2.10.1
NZS 4512:2021	Fire detection and alarm systems in buildings	C.1.1.2, C.2.1.1, C.2.3.1, C.2.4.1, C.2.4.3, C.2.5.3, C.2.5.4, C.2.8.1, D.1.1.2, D.1.3.2, D.1.3.3
NZS 4514:2021	Interconnected smoke alarms for houses	2.2.3.1, C.1.1.4, C.2.1.1, D.1.1.1
NZS 4515:2009	Fire sprinkler systems for life safety in sleeping occupancies (up to 2000 m^2)	2.2.3.1, 2.3.3.2, 6.2.1.1, C.1.1.3, D.1.2.3, Definitions
NZS 4517:2010	Fire sprinkler systems for houses	C.1.1.3
NZS 4541:2020	Automatic fire sprinkler systems	2.3.3.2, 5.2.1.2, 6.2.1.1, C.1.1.3, C.2.5.3, C.2.6.1, D.1.2.2, Definitions,

These standards can be accessed from www.standards.govt.nz.

Standards Australia		Where quoted
AS 1668.1:2015	The use of ventilation and/or air conditioning in buildings – Part 1: Fire and smoke control in multi-compartment buildings Amendment 1	3.5.5.2, C.2.8.1, D.1.3.1, D.1.3.2
AS 1691:1985	Domestic oil-fired appliances – installation	7.1.3.1, 7.1.3.2, D.2.2.1

These standards can be accessed from www.standards.org.au.

New Zealand Legislation	Where quoted
Conservation Act 1987	Definitions
Education (Early Childhood Services) Regulations 2008	Table 1.2.4.2
Hazardous Substances and New Organisms Act 1996	1.1.2.5, Definitions
Health and Safety at Work (Hazardous Substances) Regulations 2017	1.1.2.5
Local Government Act 1974	Definitions
National Parks Act 1980	Definitions
Railways Act 2005	Definitions
Reserves Act 1977	Definitions

These documents can be accessed from www.legislation.govt.nz.

Appendix B. Definitions

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

Term	Definition
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*.
Allotment	Has the meaning given to it by section 10 of the Building Act 2004.
Backcountry hut	A building that— a) is located on land that is administered by the Department of Conservation for conservation, recreational, scientific, or other related purposes, including any land administered under any of the following: 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 certified 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.
Basement	Any *firecell* or part of a *firecell* below the level of the lowest *final exit*.

Definitions

Term	Definition
Boundary	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. For the purposes of this acceptable solution and notwithstanding the definition of *building*, a number of separated *buildings* cannot be taken as a single *firecell*.
Building consent	Means a 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	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	Material that is neither *non-combustible* nor *limited combustible*.
Communal service functions	Spaces that provide day to day service function to support the sleeping areas and are higher *fire* risk than *direct support functions*. These are generally enclosed spaces which include but are not limited to offices, waiting rooms, lounges, stores, dining rooms, laundries, and kitchens.
Concealed space	Any part of the space within a *building*, excluding *protected shafts*, that cannot be seen from an *occupied space*.
Construct	In relation to a *building*, includes to design, build, erect, prefabricate, and relocate the *building*; and construction has a corresponding meaning.
Damp-proof course	A strip of durable vapour barrier placed between *building elements* to prevent the passage of moisture from one element to another.
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.
Direct support function	Activities that provide support to the primary use of a space that are open areas of low risk and *fire* load which may include but are not limited to reception desks, nurses' stations, kiosks, tea bays, sanitary facilities which may be enclosed to provide appropriate privacy, and mailboxes.

Definitions

Term	Definition
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)	Premises used regularly for the education or care of three or more children (not being children of the persons providing the education or care, or children enrolled at a school being provided with education or care before or after school) under the age of six years old: a) by the day or part of a day; but b) not for any continuous period of more than seven days. This 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*. 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*. Note that doors in an escape route are not considered to be obstructions provided they comply with this Acceptable Solution and D1/AS2.
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* (including a roof) 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*.
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. Floors, in this context, include ground floors and those in which the underside is exposed to the external environment (eg when cantilevered). Note that internal floors between *firecells* are *fire separations*.
Fire damper	A device with a specified *FRR* complete with fixings and operating mechanism for automatically closing off an airway where it passes through a *fire separation*. An airway may be a duct, plenum, ceiling space, roof space or similar *construction* used for the passage of ventilating air.
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.

Definitions

Term	Definition
Fire hazard	The danger of potential harm and degree of exposure arising from – a) the start and spread of *fire*; and b) the smoke and gases that are generated by the start and spread of *fire*.
Fire load	The sum of the net calorific values of the *combustible* contents which can reasonably be expected to burn within a *firecell*, including furnishings, built-in and removable materials, and *building elements*. The calorific values shall be determined at the ambient moisture content or humidity.
Fireplace	A space formed by the *chimney 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. There are two types of *FRR: life rating* and *property rating*.
Fire resisting closure	A *fire* rated device or assembly for closing an opening through a fire separation. This includes *fire doors*, *fire* windows or access panels. The opening may be used to permit passage of people or goods, or to transmit light, but does not include an opening to permit the passage of *building* services.
Fire resisting glazing	Fixed or openable glazing completed with frame and fixings, mullions, transoms, and glazing beads, with a specified *FRR* and complying with Subsection 8.3.3 of the Building Product Specifications.
Fire retardant	A substance or a treatment, incorporated in or applied to a material, that suppresses or delays the combustion of that material under specified conditions.
Fire safety systems	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* that separates *firecells* or *firecells* and *safe paths*, and provides a specific *fire resistance rating*.
Fire shutter	A *fire* rated device, complete with fixings and operating mechanism, for automatically closing off an opening in a *fire separation* or *protected shaft*.
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*. *Fire stops* are mainly used to seal around *penetrations*, but can also be used to seal narrow gaps between *building elements*.
Fixture	An article intended to remain permanently attached to and form part of a *building*.

Definitions

Term	Definition
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 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.
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. The methods for determining a Group Number are provided in Section 8.5 of the Building Product Specifications.
Group sleeping area	A *firecell* containing communal sleeping accommodation for a specified number of people who may or may not be known to one another.
Handrail	A rail to provide support to, or assist with the movement of a person.
Hazardous	Creating an unreasonable risk to people of bodily injury or deterioration of health.
Hazardous substance	has the meaning ascribed to it by section 2 of the Hazardous Substances and New Organisms Act 1996.
Hearth	The insulating floor under the *fire* and in front and at the sides of the *fireplace*.
Hold-open device	A device that holds a *smoke control door* or *fire door* open during normal use, but is released by deactivating the device by an automatic *fire* detection system, allowing the door to close automatically under the action of a self-closing device.
Household unit	a) means a *building* or group of *buildings*, or part of a *building* or group of *buildings*, that is— i) used, or intended to be used, only or mainly for residential purposes; and ii) occupied, or intended to be occupied, exclusively as the home or residence of not more than 1 household; but b) does not include a hostel, boarding house, or other specialised accommodation.
HVAC	An abbreviation for heating, ventilating and air-conditioning.
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.

Definitions

Term	Definition
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. The precise meaning of *integrity* depends on the type of *building elements* being treated and how it is defined in the *standard test* being used.
Intended use	In relation to a *building* – a) includes any or all of the following: i) any reasonably foreseeable occasional use that is not incompatible with the intended use; ii) normal maintenance; ii) activities undertaken in response to *fire* or any other reasonably foreseeable emergency; but b) does not include any other maintenance and repairs or rebuilding.
Intermediate floor	Any upper floor within a *firecell* which because of its configuration provides an opening allowing smoke or *fire* to spread from a lower to an upper level within the *firecell*.
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*.
Limited combustible	Material that meets the criteria for a limited combustible material in Section 8.1 of the Building Product Specifications.
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*.
Multi-unit dwelling	Applies to a *building* or use which contains more than one separate household or family.
Non-combustible	Material that meets the criteria for a non-combustible material in Section 8.1 of the Building Product Specifications.
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. The *notional boundary* is not permitted to be located any closer than 1.0 metre to any unprotected areas within the external wall of the *buildings* that is receiving the radiation where orientated at less than 90°.
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 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.
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*.

Definitions

Term	Definition
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	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 any *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 would be so entitled if the land were let to a tenant at a rack rent; and b) includes— i) the *owner* of the fee simple of the land; and ii) for the purposes of Building Act 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*. 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	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.
Property rating	The *fire resistance rating* to be applied to elements of *construction* that allows for protection of *other property*.

Definitions

Term	Definition
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	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 licencee 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*. Refer also to *notional boundary* for *buildings* on the same property under a single land title.
Remote receiving centre	A *fire* alarm monitoring centre service provider that transmits *fire* alarm signals to summon Fire and Emergency New Zealand in case of *fire* and complies with NZS 4512.
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	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.
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.
Safety glass	Means glass so treated or combined with other materials as to reduce the likelihood of injury to persons when it is cracked or broken.
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* that is enclosed by an envelope of *smoke separations*, or *external walls*, roofs, and floors.
Smoke control door	A *doorset*, single or multi-leaf, having smoke control capability and forming part of a *smoke separation*.
Smoke damper	A *fire damper* whose closing action is initiated by the detection of smoke.

Definitions

Term	Definition
Smoke lobby	That portion of an *escape route* within a *firecell* that precedes a *safe path* or an *escape route* through an adjoining *building* that is protected from the effects of smoke by *smoke separations*.
Smoke separation	Any *building element* able to prevent the passage of smoke between two spaces.
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*.
Stairway	A series of steps or stairs with or without landings, including all necessary *handrails* and giving access between two different levels.
Standard test	A test method that is recognised as being appropriate for the *fire* protection properties being assessed.
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. The *fire* design load should be as specified in B1/VM1.
Suite	A *firecell* providing residential accommodation for the exclusive use of one person or of several people known to one another. It comprises one or more rooms for sleeping and may include spaces used for associated domestic activities such as hygiene and cooking. A *suite* may include transient or educational accommodation.
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*.
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.
Travel distance	The length of the *escape route* as a whole or the individual lengths of its parts, namely: a) *open paths*, and b) *safe paths*.
Unprotected area	In relation to an *external wall* of a *building*, 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. *Unprotected areas* include 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.

Appendix C. Fire safety systems

C.1 Fire alarm and sprinkler systems

C.1.1 Design and installation

C.1.1.1 Part 2. Firecells, fire safety systems, and fire resistance ratings specifies which type of *fire safety system* shall be installed in each *risk group*.

C.1.1.2 *Fire* alarm systems shall be designed and installed in accordance with NZS 4512 where appropriate and the specific requirements of this acceptable solution.

C.1.1.3 Sprinkler systems shall be designed and installed in accordance with NZS 4541, NZS 4515, or NZS 4517 where appropriate and the specific requirements of this acceptable solution.

C.1.1.4 Smoke alarms shall be manufactured and installed in accordance with NZS 4514 where appropriate and the specific requirements of this acceptable solution.

C.2 Fire safety system descriptions

C.2.1 Type 1 – Domestic smoke alarm system

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

C.2.2 Type 2 – Manual fire alarm system

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

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

C.2.3.1 A Type 3 is an automatic *fire* alarm system compliant with NZS 4512 with full *building* coverage of heat detectors and manual call points.

C.2.3.2 If the *building* area to be protected is not fully covered with heat detectors but is adequately provided with manual call points, it is deemed a Type 2 with supplementary detectors.

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

C.2.4.1 A Type 4 is an automatic *fire* alarm system compliant with NZS 4512 with full *building* coverage of smoke detectors and manual call points.

C.2.4.2 If the *building* area to be protected is not fully covered with smoke detectors but is adequately provided with manual call points, it is deemed a Type 2 with supplementary smoke detectors.

C.2.4.3 In limited circumstances as described in NZS 4512, where the ambient conditions of a space are not suitable for smoke detectors, heat detectors are allowed to be substituted.

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

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

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

a) shall be restricted to single *firecells* containing sleeping accommodation, being *household units* or individual *suites* in ***risk group* SM** and **SI**. The local alarm system shall not be extended to other areas such as *exitways* or common spaces, or other *firecells* in the same *building*. These shall retain a Type 4 smoke detection system; and

b) shall have the facility to be silenced (muted) by a 'hush' facility located at a level readily able to be reached in accordance with clause D1 of the Building Code.

c) shall be permitted only where an automatic *fire* alarm system activated by heat detectors (part of the main alarm system) is also installed in *household unit* or *suite* which do not already have an automatic *fire* sprinkler system.

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

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

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

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

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

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

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

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

a) AS 1668.1 for *HVAC* system shutdown and interface with any Type 4 or 7 system; or

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

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

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

C.2.10 Type 18 – Fire hydrant systems for buildings

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

Appendix D. Modifications to standards

D.1 Fire safety systems

D.1.1 Fire detection and alarm systems in buildings

D.1.1.1 Where domestic smoke alarm systems are required by this acceptable solution, they shall comply with NZS 4514 without further modification to the standard.

D.1.1.2 Wherever *fire* alarms are required by this acceptable solution, they shall comply with NZS 4512 without further modification to the standard.

D.1.2 Automatic fire sprinkler systems

D.1.2.1 Wherever sprinklers are required by this acceptable solution, they shall comply with the relevant New Zealand Standard as modified by Paragraphs D.1.2.2 and D.1.2.3.

D.1.2.2 NZS 4541 is modified as follows:

a) Clause 1.3 Definitions

Sprinkler system - a system including:

(a) to (i) no change.

(j) remove.

(k) no change; and

b) Clause 2.5 remove entire clause; and

c) Clause 2.6 remove entire clause; and

d) Clause 12.3 Routine inspections; and

e) Clause 12.3.1 remove the first two paragraphs and replace with:

i) "It is important that a sprinkler system at all times complies with this Standard as modified by Paragraph D.1.2 of Appendix D to C/AS2 in all respects. To ensure that building alterations, changes in process or storage patterns or progressive deterioration of system components do not prejudice system compliance, a comprehensive survey shall be carried out biennially at intervals not exceeding 28 months. Such surveys shall be carried out by an independent qualified person."

D.1.2.3 NZS 4515 is modified as follows:

a) Clause 1.5 Definitions

Sprinkler system A system including:

(a) to (g) no change.

(h) remove; and

b) Clause 1.11 remove the entire clause; and

c) Clause 2.1.2 remove; and

d) Clause 2.1.3 remove; and

D.1.3 Smoke control in air-handling systems

D.1.3.1 Where AS 1668.1 is used as a means to comply with Appendix C.2.8.1(a), AS 1668.1 is modified as follows:

a) Clause 7.2.1(b) Delete clause; and

b) Clause 7.2.3 Delete clause.

D.1.3.2 Where AS 1668.1 is used as a means to comply with Appendix C.2.8.1(a), AS 1670.1 as referenced in AS 1668.1 is modified as follows:

a) Clause 7.1

i) remove the first sentence, and

ii) replace the last sentence with: “Detection and control shall also be in accordance with NZS 4512 except where varied by this clause.”; and

b) Clause 7.4.1 replace “this Standard” with “NZS 4512”; and

c) Clause 7.5.1 (c) replace with: “Detectors shall be spaced in accordance with the requirements of NZS 4512”; and

d) Clause 7.5.1 (d) replace with: “Optical beam smoke detectors shall be spaced in accordance with the requirements of NZS 4512”; and

e) Clause 7.5.1 Note remove; and

f) Clause 7.5.2.1 replace “this Standard” with “NZS 4512”; and

g) Clause 7.2.5.1(i) replace the first sentence with: “Rooms that have a dimension of 10 m or more in any direction on the horizontal plane shall have detection provided in the room in accordance with NZS 4512”; and

h) Figure 7.5.2.2(B) replace “15 m” with “10 m”; and

i) Clause 7.15.1 Location replace with “The FFCP shall be incorporated into or located adjacent to the main indicating unit and constructed in accordance with the requirements in NZS 4512. Note: an example is shown in Figure 7.15.1”; and

j) Clause 7.17.2 (iii) replace “AS/CA S009” with “AS/NZS 3000”; and

k) Clause 7.18 Transmission paths replace the first paragraph with:

“Transmission paths to equipment serving more than one smoke control zone shall have a redundant transmission path. Transmission paths to the following equipment forming part of the smoke control system shall meet the requirements of Clause 2.6, Clause 3.13, Clause 3.25, Clause 3.26 and NZS 4512.”; and

l) Clause 7.19.1 replace “Clause 1.7.2” with “NZS 4512”.

D.1.3.3 In addition to meeting the requirements in AS 1670.1 as modified to comply with the requirements for smoke detectors that are part of the smoke control in air-handling systems, further requirements in NZS 4512 will need to be met where a *fire* alarm system is required to be installed.

D.2 Heating appliances

D.2.1 Domestic solid fuel burning appliances

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

a) replace Paragraph 3.8 with the following:

i) “3.8 Seismic restraint

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

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

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

b) replace Section 7 with the following:

i) “7.1 Ventilation

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

7.2 Water heating equipment

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

D.2.2 Domestic oil-fired appliances

D.2.2.1 AS 1691 is modified as follows:

a) replace Paragraph 2.2.3 with the following:
   i) "2.2.3 Electrical equipment

      Electrical equipment shall comply with Acceptable Solution G9/AS1 or Verification Method G9/VM1."; and
b) replace "CSIRO durability Class 2 or better" from Paragraph 3.1.2 (b) with "H5 treatment"; and
c) remove the Note to Paragraph 3.1.2 (d); and
d) replace Paragraph 3.1.4 with the following:
   i) "3.1.4 Stability

      The appliance shall be mechanically fixed to the building.

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

      The appliance and the fuel tank shall resist their respective seismic forces with no significant movement."; and
e) remove the words "without specific approval" from Paragraph 3.2.8 (b); and
f) remove Paragraph 5.1.1; and
g) add the following note to 5.2.2: "Note: Refer to Acceptable Solution G4/AS1 for ventilation requirements."

Appendix E. Horizontal fire spread tables

E.1 Fire resisting glazing

E.1.1 Maximum permitted areas of fire resisting glazing

E.1.1.1 This appendix contains tables to satisfy the requirements in Subsection 5.2.3. The area of *fire resisting glazing* shall be no greater than the values in:

a) Table E.1.1.1A for unsprinklered *firecells*; or

b) Table E.1.1.1B for sprinklered *firecells*.

E.2 Minimum distances and maximum unprotected areas

E.2.1 Overview

E.2.1.1 This appendix contains tables to satisfy the requirements in Subsection 5.2.4. The tables in Appendix E.2.2 and Appendix E.2.3 can be used to determine:

a) the maximum percentage of *unprotected area* in the *external wall* of each *firecell* depending on the distance to the *relevant boundary* from the closest *unprotected area*; or

b) the minimum required distance from the *relevant boundary* to the closest *unprotected area* where the *unprotected area* has previously been determined.

E.2.1.2 These tables are split into three parts according to the angle between the *external wall* and the *relevant boundary*. The minimum distance and the angle between the *external wall* and relevant boundary are shown in Figure E.2.1.2A and Figure E.2.1.2B.

E.2.1.3 Where these tables do 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.

E.2.2 Maximum percentage of unprotected area for external walls

E.2.2.1 The maximum percentage of *unprotected area* for *external walls* shall comply with:

SI SM a) for ***risk group* SM**, Table E.2.2.1A; and

b) for ***risk group* SI**, Table E.2.2.1B; and

CA c) for ***risk group* CA**, Table E.2.2.1C; and

WB d) for ***risk group* WB** professional activities, industrial activities, and intermittently occupied *buildings*, Table E.2.2.1D; and

e) for ***risk group* WB** storage activities, Table E.2.2.1E; and

WS f) for ***risk group* WS**, Table E.2.2.1F; and

VP g) for ***risk group* VP**, Table E.2.2.1D.

E.2.3 Largest individual unprotected areas

E.2.3.1 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 E.2.3.1 for the applicable *risk group*.

CA WB WS VP E.2.3.2 In ***risk groups* CA**, **WB**, **WS**, and **VP** where the *firecell* is wider than 30 m; the *external wall* shall be divided into a number of 30 m widths and each of these can be assessed separately when considering the size of the largest individual *unprotected area* specified in Table E.2.3.1.

Horizontal fire spread tables

Table E.1.1.1A: Maximum permitted areas of fire resisting glazing for unsprinklered firecells (m^2)

Paragraphs 5.2.1.5, 5.2.1.8, and E.1.1.1

Minimum distance to relevant boundary (m)	Risk group SM[1] Unsprinklered (m^2)	Risk groups CA, WB[2], and VP Unsprinklered (m^2)	Risk group WB with storage activities Unsprinklered (m^2)
0.0	1.0	1.0	1.0
0.1	1.0	1.0	1.0
0.2	1.0	1.0	1.0
0.3	1.0	1.0	1.0
0.4	1.0	1.0	1.0
0.5	1.5	1.0	1.0
0.6	2.0	1.0	1.0
0.7	3.0	1.5	1.0
0.8	3.5	2.0	1.0
0.9	5.0	2.5	1.5
1.0	6.0	3.5	1.5
1.1	7.5	4.0	2.0
1.2	8.5	5.5	2.5
1.3	10.0	7.0	3.0
1.4	12.0	8.0	3.5
1.5	13.0	8.5	4.0
1.6	14.0	9.5	5.0
1.7	15.0[4]	10.0	5.5
1.8	Unlimited[4]	10.0	6.0
1.9	Unlimited[4]	11.0	6.5
2.0	Unlimited[4]	12.0	7.0
2.1	Unlimited[4]	13.0	7.5
2.2	Unlimited[4]	14.0	8.0
2.3	Unlimited[4]	15.0[3]	8.5
2.4	Unlimited[4]	15.0[3]	9.0
2.5	Unlimited[4]	15.0[3]	9.5
2.6	Unlimited[4]	15.0[3]	10.0
2.7	Unlimited[4]	15.0[3]	11.0
2.8	Unlimited[4]	15.0[3]	11.0
2.9	Unlimited[4]	15.0[3]	12.0
3.0	Unlimited[4]	15.0[3]	12.0
3.1	Unlimited[4]	15.0[3]	13.0
3.2	Unlimited[4]	15.0[3]	14.0
3.4	Unlimited[4]	15.0[3]	15.0[3]

Notes:

(1) For sprinklered *firecells* in ***risk groups*** **SM** and **SI** there is no limit on the permitted area of *fire resisting glazing*.

(2) For ***risk group*** **WB**, this is limited to professional activities, industrial activities, and intermittently occupied *buildings*.

(3) For all **risk groups other than SM** and **SI**, the maximum permitted area of *fire resisting glazing* is 15 m^2.

(4) For unsprinklered *firecells* in ***risk group*** **SM**, there is no limit on the permitted area of *fire resisting glazing* at distances greater than 1.7 m from the *relevant boundary*.

Horizontal fire spread tables

Table E.1.1.1B: Maximum permitted areas of fire resisting glazing for sprinklered firecells (m^2)

Paragraphs 5.2.1.5, 5.2.1.8, and E.1.1.1

Minimum distance to relevant boundary (m)	Risk groups CA, WB(2), and VP Sprinklered (m^2)	Risk group WB with storage activities Sprinklered (m^2)	Risk group WS Sprinklered (m^2)
0.0	5.0	1.0	1.0
0.1	6.5	1.0	1.0
0.2	7.5	1.0	1.0
0.3	9.0	1.0	1.0
0.4	10.0	1.5	1.5
0.5	11.0	2.5	2.5
0.6	13.0	3.5	3.5
0.7	14.0	5.0	5.0
0.8	15.0(3)	6.5	6.5
0.9	15.0(3)	7.5	7.5
1.0	15.0(3)	8.5	8.5
1.1	15.0(3)	9.5	9.5
1.2	15.0(3)	10.0	10.0
1.3	15.0(3)	11.0	11.0
1.4	15.0(3)	12.0	12.0
1.5	15.0(3)	13.0	13.0
1.6	15.0(3)	14.0	14.0
1.7	15.0(3)	15.0(3)	15.0(3)

Notes:

(1) For sprinklered *firecells* in ***risk groups*** **SM** and **SI** there is no limit on the permitted area of *fire resisting glazing*.

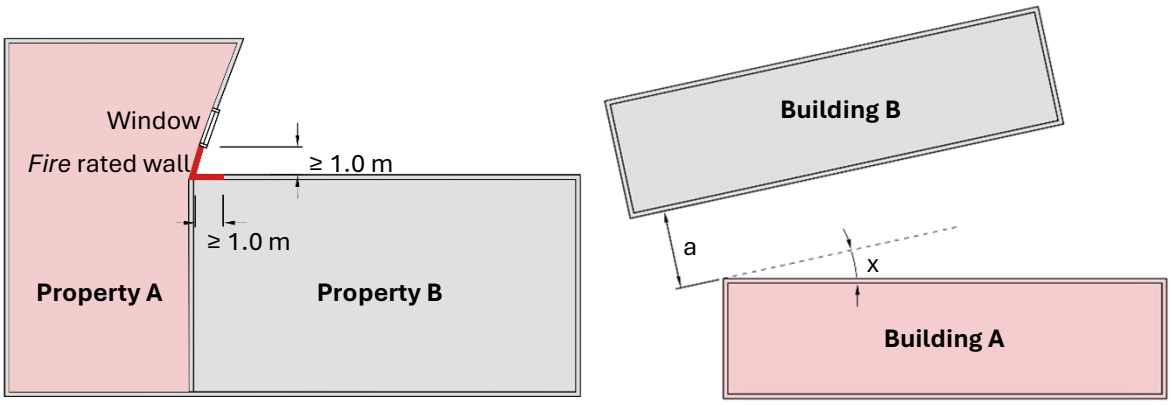
(2) For ***risk group*** **WB**, this only includes professional activities, industrial activities, and intermittently occupied *buildings*.

(3) For all **risk groups other than SM** and **SI**, the maximum permitted area of *fire resisting glazing* is 15 m^2.

Horizontal fire spread tables

Figure E.2.1.2A: Measuring distances from separate firecells to a relevant boundary

Paragraph E.2.1.2, Table E.2.2.1A, Table E.2.2.1B, Table E.2.2.1C, Table E.2.2.1D, Table E.2.2.1E, Table E.2.2.1F, and Table E.2.3.1



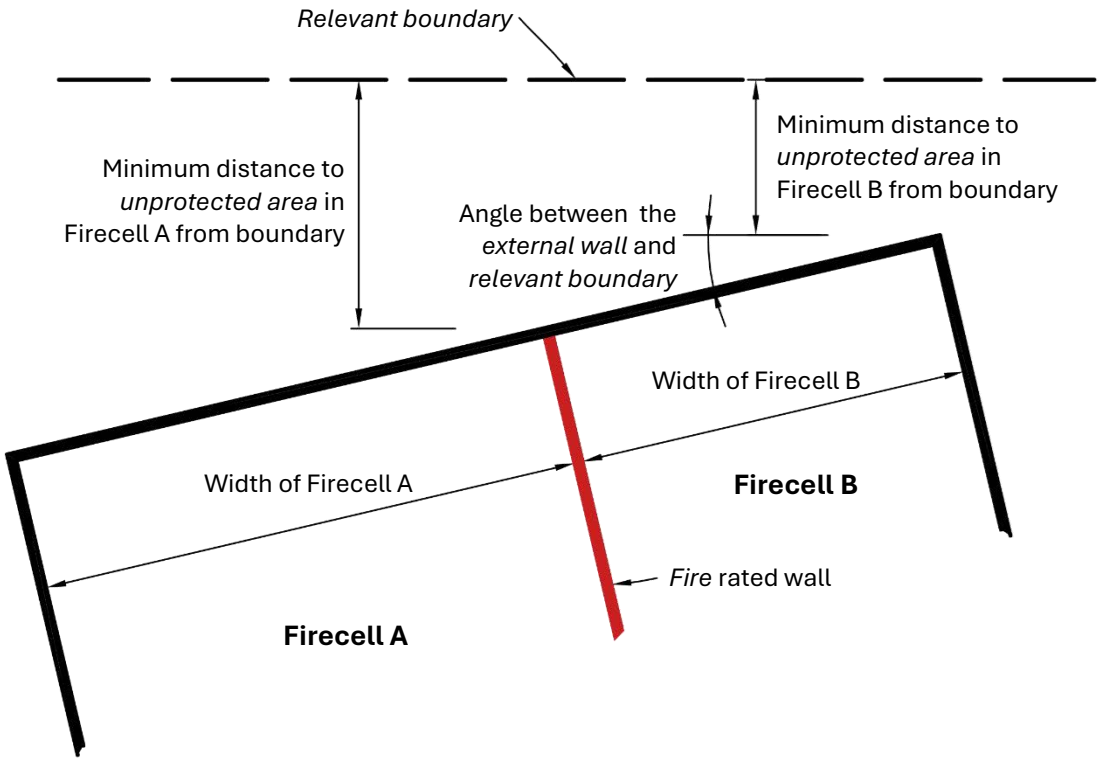
(a) Adjoining firecells

(b) Separate buildings

Notes:
(1) Distance a is measured between the two *buildings*.
(2) Angle x is measured between the *external wall* and the *relevant boundary*.

Figure E.2.1.2B: Measuring distances and angles from an external wall to a relevant boundary

Paragraph E.2.1.2, Table E.2.2.1A, Table E.2.2.1B, Table E.2.2.1C, Table E.2.2.1D, Table E.2.2.1E, Table E.2.2.1F, and Table E.2.3.1



Horizontal fire spread tables

SM **Table E.2.2.1A: Maximum percentage of unprotected area for external walls for risk group SM**

Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for unsprinklered firecell widths ≤ 5 m (%)	Maximum unprotected area for unsprinklered firecell widths > 5 m (%)	Maximum unprotected area for sprinklered firecell widths ≤ 5 m (%)	Maximum unprotected area for sprinklered firecell widths > 5 m (%)
≤ 45°	< 1	0	0	0	0
	1	35	30	70	60
	2	55	40	100	80
	3	80	55	100	100
	4	100	70	100	100
	5	100	90	100	100
	6	100	100	100	100
> 45° to 60°	< 1	0	0	0	0
	1	45	33	90	66
	2	70	45	100	90
	3	95	65	100	100
	4	100	90	100	100
	5	100	100	100	100
> 60° to < 90	< 1	0	0	0	0
	1	55	35	100	70
	2	85	55	100	100
	3	100	80	100	100
	4	100	100	100	100

Note: (1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B

SI **Table E.2.2.1B: Maximum percentage of unprotected area for external walls for risk group SI**

Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for sprinklered firecell widths ≤ 5 m (%)	Maximum unprotected area for sprinklered firecell widths > 5 m (%)
≤ 45°	< 1	0	0
	1	70	60
	2	100	80
	3	100	100
> 45° to 60°	< 1	0	0
	1	90	66
	2	100	90
	3	100	100
> 60° to < 90°	< 1	0	0
	1	100	70
	2	100	100

Note: (1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

Horizontal fire spread tables

CA **Table E.2.2.1C: Maximum percentage of unprotected area for external walls for risk group CA (continued on next page)**

Paragraphs 5.2.1.8 and E.2.2.1

Angle[(1)]	Minimum distance (m)[(1)]	Maximum unprotected area for unsprinklered firecell widths ≤ 10 m (%)	Maximum unprotected area for unsprinklered firecell widths > 10 m (%)	Maximum unprotected area for sprinklered firecell widths ≤ 10 m (%)	Maximum unprotected area for sprinklered firecell widths > 10 m (%)
≤ 45°	< 1	0	0	0	0
	1	20	20	40	40
	2	22	20	44	40
	3	25	25	50	50
	4	30	30	60	60
	5	40	30	80	60
	6	45	35	90	70
	7	55	40	100	80
	8	65	45	100	90
	9	75	50	100	100
	10	90	55	100	100
	11	100	65	100	100
	12	100	70	100	100
	13	100	80	100	100
	14	100	90	100	100
	15	100	95	100	100
	16	100	100	100	100
> 45° to 60°	< 1	0	0	0	0
	1	20	20	40	40
	2	25	20	50	40
	3	30	25	60	60
	4	40	30	80	60
	5	50	30	100	60
	6	60	40	100	70
	7	70	45	100	80
	8	85	50	100	90
	9	95	55	100	10 0
	10	100	65	100	100
	11	100	75	100	100
	12	100	85	100	100
	13	100	95	100	100
	14	100	100	100	100

Note: (1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

Horizontal fire spread tables

CA

Table E.2.2.1C: Maximum percentage of unprotected area for external walls for risk group CA (continued from previous page)

Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for unsprinklered firecell widths ≤ 10 m (%)	Maximum unprotected area for unsprinklered firecell widths > 10 m (%)	Maximum unprotected area for sprinklered firecell widths ≤ 10 m (%)	Maximum unprotected area for sprinklered firecell widths > 10 m (%)
> 60° to < 90°	< 1	0	0	0	0
	1	23	20	46	40
	2	30	22	60	44
	3	39	25	78	50
	4	50	30	100	60
	5	64	40	100	80
	6	79	45	100	90
	7	90	55	100	100
	8	100	65	100	100
	9	100	75	100	100
	10	100	90	100	100
	11	100	100	100	100

Note: (1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

Horizontal fire spread tables

WB VP

Table E.2.2.1D: Maximum percentage of unprotected area for external walls for risk group WB professional activities, industrial activities, and intermittently occupied buildings and risk group VP

Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for unsprinklered firecell widths ≤ 10 m (%)[2]	Maximum unprotected area for unsprinklered firecell widths > 10 m (%)[2]	Maximum unprotected area for sprinklered firecell widths ≤ 10 m (%)[2]	Maximum unprotected area for sprinklered firecell widths > 10 m (%)[2]
≤ 45°	< 1	0	0	0	0
	1	20	20	40	40
	2	25	25	50	50
	3	30	30	60	60
	4	40	35	80	70
	5	50	40	100	80
	6	60	50	100	100
	7	75	55	100	100
	8	90	60	100	100
	9	100	70	100	100
	10	100	80	100	100
	11	100	90	100	100
	12	100	100	100	100
> 45° to 60°	< 1	0	0	0	0
	1	20	20	40	40
	2	30	25	60	50
	3	40	30	80	60
	4	50	35	100	70
	5	65	40	100	80
	6	80	50	100	100
	7	90	60	100	100
	8	100	70	100	100
	9	100	80	100	100
	10	100	90	100	100
	11	100	100	100	100
> 60° to < 90°	< 1	0	0	0	0
	1	25	20	50	40
	2	35	25	70	50
	3	40	30	80	60
	4	50	40	100	80
	5	60	50	100	100
	6	75	60	100	100
	7	90	75	100	100
	8	100	90	100	100
	9	100	100	100	100

Notes: (1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

(2) For ***risk group* WB**, this table only applies to professional activities, industrial activities, and intermittently occupied *buildings*. For storage activities, refer to Table E.2.2.1E

Horizontal fire spread tables

WB **Table E.2.2.1E: Maximum percentage of unprotected area for external walls for risk group WB storage activities (continued on next page)**

Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for unsprinklered firecells of any width (%)[2]	Maximum unprotected area for sprinklered firecells of any width (%)[2]
≤ 45°	< 1	0	0
	1	10	20
	2	15	30
	3	20	40
	4	20	45
	5	25	50
	6	30	60
	7	35	70
	8	40	80
	9	40	85
	10	45	90
	11	50	100
	12	60	100
	13	65	100
	14	70	100
	15	100	100
> 45° to 60°	< 1	0	0
	1	15	30
	2	15	35
	3	20	40
	4	25	50
	5	25	55
	6	30	60
	7	35	70
	8	45	90
	9	50	100
	10	55	100
	11	60	100
	12	70	100
	13	80	100
	14	85	100
	15	100	100

Notes:

(1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

(2) For ***risk group* WB**, this table applies to storage activities. For professional activities, industrial activities, and intermittently occupied *buildings*, refer to Table E.2.2.1D.

Horizontal fire spread tables

WB

Table E.2.2.1E: Maximum percentage of unprotected area for external walls for risk group WB storage activities (continued from previous page)

Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for unsprinklered firecellsof any width (%)	Maximum unprotected area for sprinklered firecells of any width (%)
> 60° to 90°	< 1	0	0
	1	15	30
	2	15	35
	3	20	40
	4	25	50
	5	30	60
	6	35	70
	7	40	80
	8	50	100
	9	55	100
	10	65	100
	11	70	100
	12	80	100
	13	90	100
	14	100	100

Notes:

(1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

(2) For ***risk group* WB**, this table applies to storage activities. For professional activities, industrial activities, and intermittently occupied *buildings*, refer to Table E.2.2.1D.

Horizontal fire spread tables

WS **Table E.2.2.1F: Maximum percentage of unprotected area for external walls for risk group WS**
Paragraphs 5.2.1.8 and E.2.2.1

Angle[1]	Minimum distance (m)[1]	Maximum unprotected area for sprinklered firecell widths ≤ 20 m (%)	Maximum unprotected area for sprinklered firecell widths > 20 m (%)
≤ 45°	< 1	0	0
	1	20	20
	2	30	25
	3	30	30
	4	35	35
	5	40	40
	6	45	40
	7	50	50
	8	60	55
	9	65	60
	10	70	65
	11	80	70
	12	90	80
	13	100	85
	14	100	95
	15	100	100
> 45° to 60°	< 1	0	0
	1	25	20
	2	30	30
	3	35	30
	4	40	35
	5	45	40
	6	50	45
	7	60	50
	8	65	60
	9	80	65
	10	90	75
	11	100	80
	12	100	90
	13	100	100
> 60° to 90°	< 1	0	0
	1	25	20
	2	30	25
	3	35	30
	4	40	35
	5	50	40
	6	60	50
	7	70	60
	8	85	65
	9	100	75
	10	100	90
	11	100	100

Notes: (1) The minimum distance to the *relevant boundary* and the angle between the *external wall* and *relevant boundary* are shown in Figure E.2.1.2A and Figure E.2.1.2B.

Horizontal fire spread tables

Table E.2.3.1: Maximum size of largest permitted single unprotected area in external walls

Paragraphs 5.2.1.8, E.2.3.1, and E.2.3.2

Risk group	Minimum distance (m)(1)	Maximum largest single unprotected area (m^2) Unsprinklered	Minimum distance to adjacent unprotected areas (m) Unsprinklered	Maximum largest single unprotected area (m^2) Sprinklered	Minimum distance to adjacent unprotected areas (m) Sprinklered
SM	1	1.0	1.0	15	1.5
	2	6.0	1.5	25	2.5
	3	13	4.5	60	3.5
	4	20	5.5	96	4.0
	5	29	6.5	139	4.5
	6	40	7.5	No restriction	No restriction
SI	1			15	1.5
	2			35	2.5
	3			60	3.5
CA WB VP	1	1.0	0.5	15	1.5
	2	4.0	1.0	35	2.5
	3	10	5.0	60	3.5
	4	16	7.0	96	4.0
	5	23	8.0	139	4.5
	6	31	8.5	No restriction	No restriction
	7	40	9.5	No restriction	No restriction
	8	51	11	No restriction	No restriction
	9	64	13	No restriction	No restriction
	10	77	13.5	No restriction	No restriction
WS	1			15	1.5
	2			35	2.5
	3			60	3.5
	4			96	4.0
	5			139	4.5
	6			No restriction	No restriction

Note: (1) The minimum distance to the *relevant boundary* is shown in Figure E.2.1.2A and Figure E.2.1.2B.

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