

Compliance Document for New Zealand Building Code Clauses C1, C2, C3, C4 Fire Safety

Prepared by the Department of Building and Housing

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Defined words (italicised in the text) and classified uses are explained in Clause A1 of the Building Code and in the Definitions at the start of this Compliance Document.

C1, C2, C3 and C4: Document History				
	Date	Alterations		
First published December 2000	Effective from 1 June 2001	This document replaces all previous editions of the individual documents C1, C2, C3 and C4.		
Errata	1 July 2001	p. 2 Document History, Status p. 29 Definitions	p. 43 Table 2.1	
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Amendment 2	24 April 2003	p. 201 A1.3, A2.1.1 Type 1	p. 219 Index	
Amendment 3	25 February 2004	pp. 16-17 Contents pp. 19-22 References p. 27 Definitions p. 33 VM1	pp. 193-199 Part 9 pp. 213-214, 221-223, 226-228 Index	
Amendment 4 4 July 2005	Effective 1 October 2005	p. 2 Document History, Status p.13 Contents pp. 19-20 References pp. 23-29, 31-32 Definitions p. 43 Table 2.1 p. 58 3.5.4 p. 73 3.15.3 p. 89 3.18.1 p. 98 4.5.8 p. 99 4.5.19-4.5.22	pp. 101-106 Table 4.1 p. 108 5.3.1, 5.3.2 pp. 109-11 5.6.2-5.6.13 p. 116 5.9.4 p. 119 6.2.1 p. 120 6.5-6.6.2 p. 121 6.6.4, 6.6.7, 6.7.2 p. 122 6.7.5, 6.7.6, 6.7.9 p. 123 6.9.2 p. 125 6.10.2	p. 127 6.11.1 p. 131 6.14.3 pp. 133-5 6.16.2-6.16.7 p. 142 6.19.13 p. 145 6.20.16 p. 175 7.9.3 p. 176 7.9.8 pp. 179-180 7.10.2-7.10.8 pp. 210-212 Appendix D pp. 213-215, 217-221, 224, 225, 227, 228, Index
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Document Status

The most recent version of this document, as detailed in the Document History, is approved by the Chief Executive of the Department of Building and Housing. It is effective from 1 October 2005 and supersedes all previous versions of this document.

People using this Compliance Document should check for amendments on a regular basis. The Department of Building and Housing may amend any part of any Compliance Document at any time. Up-to-date versions of Compliance Documents are available from www.building.dbh.govt.nz

References

For the purposes of New Zealand Building Code compliance, acceptable reference documents include only the quoted edition and specific amendments listed below.

		Where quoted	
		(Unless otherwise stated all references apply to C/AS1)	
Standards New Zealand			
	NZS 4203: 1992	General structural design and design loadings for buildings <i>Corrigendum: 1</i>	5.9.5 c) Comment 2
	NZS 4232:- Part 2: 1988	Performance criteria for fire resisting closures Fire resisting glazing systems	5.8.3 a), 5.8.4, Figure 5.1
	NZS 4503: 1993	The distribution, installation and maintenance of hand operated fire fighting equipment for use in buildings	A2.1 (Type 14)
	NZS 4510: 1998	Fire hydrant systems for buildings	A2.1 (Type 18)
	NZS 4512: 2003	Fire detection and alarm systems in buildings	6.22.14 b) i), A2.1 (Type 9), C8.1.6
	NZS 4515: 2003	Fire sprinkler systems for residential occupancies	6.16.7, 6.18.10, D3.1.1, Table 7.5
Amend 4 Oct 2005	NZS 4541: 2003	Automatic fire sprinkler systems	6.16.7, 6.18.10, 6.19.9, 6.22.6, D2.1.1, Table 7.5
Amend 3 Feb 2004	NZS 5261: 2003	Gas installation	9.2.1, 9.2.2
	NZS 6104: 1981	Specification for emergency electricity supply in buildings	6.23.3
Amend 3 Feb 2004	NZS/BS 476:- Part 20: 1987	Fire tests on building materials and structures Method for determination of the fire resistance of elements of construction (general principles) <i>Amend: 6587</i>	C7.1.1
	Part 21: 1987	Methods for determination of the fire resistance of loadbearing elements of construction	C7.1.1
	Part 22: 1987	Methods for determination of the fire resistance of non-loadbearing elements of construction	C7.1.1
Standards Australia			
	AS 1366:- Part 1: 1992	Rigid cellular plastics sheets for thermal insulation Rigid cellular polyurethane (RC/PUR) <i>Amend: 1</i>	Table 6.3

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Step 4 Check whether *external walls* are required to be *fire rated*. A *FRR* of 30/30/30 is necessary where the *external wall* is within 1.0 m of the *relevant boundary* (see Paragraph 7.10.6), or roof eaves project within 650 mm of the *boundary* (see Paragraph 7.8.5).

Step 5 Where an open sided carport is part of the *construction*, check specific provisions (see Paragraphs 7.8.8 to 7.8.10).

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Step 6 Where the *escape height* exceeds 10 m, apply an *FRR* based on the *S rating* to parts of the *external wall* not permitted to be *unprotected areas* (see Paragraph 7.10.8). If the *building height* exceeds 10 m apply the requirements for *external wall surface finishes* (see Paragraphs 7.11.2 and 7.11.4).

Multi-unit dwellings

1.3.5 *Multi-unit dwellings* are *purpose group SR*. For low-rise *buildings*, having no more than two levels (one *household unit* above another) and containing only *SR purpose group*, the *fire safety* requirements are similar to those for *purpose group SH* (see Paragraphs 1.3.3 and 1.3.4) provided that each *household unit*:

- a) Has a separate *escape route*, and
- b) Is *fire separated* from other *household units* with *fire separations* having a *FRR* of no less than 30/30/30.

1.3.6 For other *multi-unit dwellings* the *fire safety* requirements depend on such things as:

- a) The *escape height*,
- b) The number of *household units*,
- c) Whether the *household units* are under single *ownership* or have unit titles,
- d) Whether *escape routes* are shared,
- e) Whether enclosed car parking spaces are shared by different *household units*, and
- f) Whether the *building* contains other *purpose groups*.

COMMENT:

1. The definitions of *intermediate floor* and *relevant boundary* have specific relevance for *SR purpose group*.
2. The following is an abbreviated list of some key references relating to *SR accommodation*. Users should always refer to the relevant quoted paragraph or table before applying the information to a specific project.

	Reference Paragraph or Table
Description of types of <i>construction</i> classified as <i>purpose group SR</i>	Table 2.1
Number of <i>escape routes</i>	Table 3.1
Conditions permitting single <i>escape routes</i>	3.15
Width of <i>escape routes</i>	Table 3.2
<i>Open path</i> lengths and increases for <i>FSPs</i>	3.5 and Table 3.3
Exit doors from <i>household units</i> to open directly onto a <i>safe path</i> or <i>final exit</i>	3.11.6
<i>Safe path</i> termination	3.16.8
<i>Safe path</i> combined with other <i>purpose groups</i>	3.16.9
Requirement for <i>hold-open devices</i>	3.17.9
<i>FSP</i> requirements	Table 4.1/5
<i>FSP</i> requirements on floors below <i>SR</i>	4.5.11
<i>Fire separation</i> of <i>household units</i>	6.8.1
Enclosed car parking	6.8.4
<i>Household unit</i> with upper floors treated as single floor when determining <i>FSPs</i>	6.8.6
<i>Exitway</i> ventilation	6.9.6 to 6.9.10
<i>Protected shafts</i> (lifts, solid waste and linen chutes)	3.12.3, 6.16
Restriction of roof and ceiling space areas	6.18.7 to 6.18.10
No restriction on interior <i>surface finishes</i> within <i>household units</i> except for <i>foamed plastics</i>	6.20.1
Separation of legal titles	7.2
Preventing horizontal <i>fire spread</i>	7.3.1
Enclosing rectangle relaxation for <i>SR</i>	7.5.7
<i>External wall</i> rating if eaves within 650 mm of <i>relevant boundary</i>	7.8.5
Rating of floor projections within 1.0 m of <i>relevant boundary</i>	7.8.6
Protection against <i>fire spread</i> from a lower roof	7.9.6, 7.9.9
<i>Fire spread</i> from lower <i>firecells</i>	7.9.10
<i>FRRs</i> for <i>external wall</i>	7.10.6 to 7.10.8

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Primary purpose group for multiple activities

2.2.2 Where a *building* contains a number of different activities which individually may be categorised in different *purpose groups*, the *purpose group* designated for a particular *firecell* of a *building* shall be that of the primary *purpose group*. The primary *purpose group* shall be that one, within the *firecell*, requiring the most severe *fire safety precautions* (see exception in Paragraph 5.6.7).

2.2.3 For example, a floor of a hotel containing a dining room, kitchen, conference room and administration offices, in addition to the sleeping areas, will be categorised in *purpose group SA* (sleeping accommodation). In comparison, a tavern with similar facilities but no accommodation, would be in *purpose group CS* or *CL* (crowd activities).

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

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

Basement carparks	IA
Shopping floors	CM
Office floors	WL
Domestic accommodation	SR

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

Offices	WL
Shops	CM
Cafeteria	CS or CL depending on occupant load

Purpose groups CS and CL

2.2.6 A *building*, such as a school, may have a number of separate spaces containing fewer than 100 occupants. Each space therefore satisfies the description of *purpose group CS*. However, if those spaces are contained in a single *firecell* and the total occupancy exceeds 100, that *firecell* must be classified as *purpose group CL*.

2.2.7 Where a *CS purpose group* is a support activity, such as a conference room used occasionally by people in an office complex, the space may be included under the primary *purpose group WL*.

Purpose group SH

2.2.8 The only *fire* safety requirements for *purpose group SH* (detached dwellings) are restrictions on *open path* lengths and the *fire* rating of *external walls* and eaves close to the *relevant boundary*. Those requirements are summarised in Paragraphs 1.3.3 and 1.3.4.

Purpose group SA treated as SR or SH

2.2.9 Where any part of an *SA purpose group* consists of self contained *suites*, each with no more than 12 beds then:

- a) Where the *suites* are attached, have an *escape height* of no more than 34 m and are used as *household units*, the requirements of *purpose group SR* may be applied.

COMMENT:

Treatment as an *SR purpose group* is permitted only where an *SA suite* is used as a residential dwelling. For example, where occupied by the *owner* or manager of the *building*. Treatment as *SR* does not apply to transient occupancy.

- b) Where the *suites* are detached, the requirements of *purpose group SH* may be applied.

COMMENT:

Under Clause A1 2.0.2 of the NZBC, a boarding house accommodating fewer than six people, may be treated as a detached dwelling.

Fire hazard category 4

2.2.10 *Fire hazard category 4* includes materials with a *fire load energy density (FLED)* of greater than 1500 MJ/m², and materials which have a *fire* growth rate of 1 MW or more in less than 75 seconds. Any *firecell* with a *fire hazard category* of 4 (*FHC 4*) shall have the *S rating* determined by *fire* engineering design (see Paragraph 5.6.11). Table 2.1 provides an indication of where *fire hazard category 4* is likely to apply, but the examples given are not

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exhaustive. Paragraph 5.6.12 describes the circumstances in which the *fire hazard category* may be reduced if the *FHC 4 purpose group* comprises only a small proportion of the *firecell*.

2.3 Occupant Load

2.3.1 The size and location of *escape routes* and the *fire safety precautions* applied to them in a *building* are related to the *occupant load*.

2.3.2 The *occupant load* is determined from the *purpose group* and number of people in each space of the *building*, and may need to be evaluated not only for each *purpose group*, but also for:

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

2.3.3 *Occupant loads* may be calculated from the occupant densities given in Table 2.2 based on the floor area of the part of the *building* housing the activity. Where a *building* space has alternative activity uses, the activity having the greatest occupant density shall be used. For an activity not specifically described in Table 2.2, the nearest reasonable description should be used.

COMMENT:

When using Table 2.2 to calculate the *occupant load* note that:

- a) The floor area to be used is the total *firecell* floor area (except where Paragraph 2.3.4 applies) including that occupied by internal partitions and permanent *fixtures*.
- b) Table 2.2 occupant densities already allow for a proportion of the floor area, appropriate to the activity, being occupied by furniture, partitions, *fixtures* and associated equipment.

2.3.4 Duplication should 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 *exitways*, lift lobbies, sanitary facilities etc, used intermittently by people already counted elsewhere in the *building*.

Fixed seating

2.3.5 *Occupant load* assessment shall take account of the actual arrangement and number of seats for fixed seating (see Paragraph 3.9.3). Where additional floor area abuts the fixed seating, additional occupants may be allowed for based on standing space density, provided the *escape route* is not obstructed.

Where occupancy is based on number of beds

2.3.6 In *purpose groups* SC, SD and SA, the actual number of beds shall be used for determining the number of occupants.

COMMENT:

1. In this acceptable solution the term "beds" is used to denote the number of people expected to be sleeping in the *firecell*. Therefore, a double bed counts as two beds, and a tier of three single bunks (one above another) counts as three beds.
2. The number of beds depends on the individual layout in every case. Clearly dormitories will have a far greater number of beds within any given area than single bedrooms in a hospital or an old people's home, which may have individual lounge areas, toilets and kitchenettes attached. During use, the number of bed spaces must not be increased beyond that initially provided for unless a new *building consent* is obtained.

Justification for exceptions

2.3.7 Where, for a particular situation, the *occupant load* derived from Table 2.2 is clearly more than that which will occur, the basis of any proposal for a lesser *occupant load*, shall be substantiated to the *territorial authority*.

COMMENT:

Designing a *building* for a reduced *occupant load* can severely restrict future occupancy options, and may involve significant expense in meeting the means of escape provisions for increased numbers.

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Table 2.1: Purpose Groups Paragraphs 1.3.4, 2.1.3, 2.2.1, 2.2.10, 5.6.11 and 5.6.13			
Purpose group	Description of intended use of the building space	Some examples	Fire hazard category
CROWD ACTIVITIES			
CS or CL	For <i>occupied spaces</i> . CS applies to <i>occupant loads</i> up to 100 and CL to <i>occupant loads</i> exceeding 100.	Cinemas when classed as CS, art galleries, auditoria, bowling alleys, churches, clubs (non-residential), community halls, court rooms, dance halls, day care centres, gymnasias, lecture halls, museums, eating places (excluding kitchens), taverns, enclosed grandstands, indoor swimming pools.	1
		Cinemas when classed as CL, schools, colleges and tertiary institutions, libraries (up to 2.4 m high book storage), nightclubs, restaurants and eating places with cooking facilities, <i>early childhood centres</i> , <i>theatre</i> stages, opera houses, television studios (with audience).	2
		Libraries (over 2.4 m high book storage).	3
CO	Spaces for viewing open air activities (does not include spaces below a grandstand).	Open grandstands, roofed but unenclosed grandstand, uncovered fixed seating.	1
CM	Spaces for displaying, or selling retail goods, wares or merchandise.	Exhibition halls, retail shops.	2
		Supermarkets or other stores with bulk storage/display over 3.0 m high.	4
SLEEPING ACTIVITIES			
SC	Spaces in which <i>principal users</i> because of age, mental or physical limitations require special care or treatment.	Hospitals. Care institutions for the aged, children, <i>people with disabilities</i> .	1
SD	Spaces in which <i>principal users</i> are restrained or liberties are restricted.	Care institutions, for the aged or children, with physical restraint or detention.	1
		Hospital with physical restraint, detention quarters in a police station, prison.	
SA	Spaces providing transient accommodation, or where limited assistance or care is provided for <i>principal users</i> .	Motels, hotels, hostels, boarding houses, clubs (residential), boarding schools, dormitories, halls, <i>wharehenui</i> , community care institutions.	1
SR	Attached and multi-unit residential dwellings.	<i>Multi-unit dwellings</i> or flats, apartments, and includes <i>household units</i> attached to the same or other <i>purpose groups</i> , such as caretakers' flats, and residential accommodation above a shop.	1
		<i>Household unit firecells</i> may contain garages which are used exclusively by the occupants of that <i>household unit</i> .	
SH	Detached dwellings where people live as a single household or family.	Dwellings, houses, being <i>household units</i> , or <i>suites</i> in <i>purpose group SA</i> , separated from each other by distance. Detached dwellings may include attached self-contained <i>suites</i> such as granny flats when occupied by a member of the same family, and garages whether detached or part of the same <i>building</i> and are primarily for storage of the occupants' vehicles, tools and garden implements.	1

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Errata
Jul 2001

Firecell floor area limits

4.2.3 Except as permitted by Paragraph 4.2.4, the floor area of an unsprinklered *firecell* to which an *S rating* applies, shall not exceed the maximum *firecell* floor area given in the following table.

Fire hazard category (from Table 2.1)	Maximum firecell floor area (m ²)
1	5000
2	2500
3	1500
4	Specific fire engineering design required

COMMENT:

Firecell floor area limits assist *fire-fighting* operations, and are set to limit total *fire load* to approximately 2,000,000 MJ in unsprinklered *firecells*.

4.2.4 In an unsprinklered single floor *building* where the *building elements* supporting the roof are not *fire* rated, the *firecell* floor area may be unlimited provided that no less than 15% of the roof area (distributed evenly throughout the *firecell*) is designed for effective *fire venting*.

4.2.5 Where a *firecell* is sprinklered, except when *purpose groups* require subdivision or other area limitations are imposed by this Approved Document, the *firecell* floor area may be unlimited.

Fire safety precautions for firecells

4.2.6 *Fire safety precautions (FSPs)* within *firecells* shall ensure that:

- a) Occupants, in the event of *fire*, have reasonable warning and protection while making their escape to a *safe place*,
- b) The spread of *fire* is restricted, and
- c) Fire Service personnel have sufficient time to undertake rescue operations.

Assessing FSP requirements

4.2.7 In this acceptable solution:

- a) *Fire safety precautions* are determined for individual *firecells* and vary according to the *purpose group* contained and the *escape height*.
- b) *Fire safety precautions* increase with increases in *occupant load* and *escape height*.
- c) Where a *firecell* contains more than one *purpose group*, the *fire safety precautions* to be applied are those of the primary *purpose group*, as described in Paragraphs 2.2.2 to 2.2.5.

4.3 Table 4.1

Limitations of table

4.3.1 Table 4.1 lists the *fire safety precautions* for individual *firecells* in a *building* but, on its own, does not provide all the information necessary to satisfy the *fire safety precautions* for the whole *building*. Users of the table must be familiar with the definitions and the contents of all Parts of this acceptable solution.

4.3.2 *Fire resistance ratings* for floors are determined from the required *F rating* for the *firecell* below, except where specific requirements apply to floors separating *other property* or *basement* levels, and to *intermediate floors* (see Paragraphs 5.3.2 d), 6.14.3 and 6.14.4).

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Purpose groups SH, CO, IE, IA, ID

4.3.3 These *purpose groups* are not included in Table 4.1. Specific requirements for *purpose groups* SH, CO, IE, IA and ID are given in Paragraphs 1.3.4, 6.5, 6.9, 6.10 and 6.11 respectively.

4.5.5 Where *fire separations* are not needed between different *purpose groups* on the same floor level, the *FSPs* adopted for the whole floor level shall be those of the primary *purpose group*, except when a concession is permitted by satisfying Paragraph 5.6.7.

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4.5.6 The alarm systems required by Paragraphs 4.5.3 and 4.5.4 shall be interconnected to alert all occupants of that floor level in the event of *fire* (see Paragraphs 4.5.8 to 4.5.18 for other floor levels in the *building*).

F ratings

4.5.7 Where, on one floor in the *building*, *firecells* have different *F ratings* in accordance with Table 4.1, the greatest *firecell F rating* shall be applied to common spaces and shared *escape routes* for that floor level.

COMMENT:

Within each *firecell* the *FRR* for both *primary* and *secondary elements* is based on the *F rating* for that *firecell* (see Paragraph 5.3.1).

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Other floors in a building

4.5.8 In a *building* with two or more floor levels:

- a) Selection of appropriate *fire safety precautions* shall take account of the specific requirements of each *purpose group* and its location within the *building*, and
- b) No *firecell*, other than the top floor *firecell* (see Paragraph 4.5.14), shall have a *firecell rating* of less than column 2 from Table 4.1 for that *purpose group* and *FHC*.

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4.5.9 Where by Table 4.1 any *firecell* in a *building* requires a Type 2 alarm, all other *firecells* on all floor levels in that *building* shall have no less than a Type 2 alarm.

4.5.10 Where by Table 4.1 any *firecell* in a *building* requires a Type 3, Type 4, Type 6 or Type 7 alarm:

- a) All other *firecells* on all floors in that *building* shall have no less than a Type 3 alarm, except that

- b) Where any *firecell* having an *escape height* greater than 25 m requires a Type 6 or 7 alarm, all lower floor levels in the *building* shall have no less than a Type 6 alarm. In such situations the Type 6 alarm shall replace any Type 2, 3 or 4 alarm otherwise required for lower *firecells*.

4.5.11 Where any upper floor contains a sleeping *purpose group*, all floors below shall have an appropriate alarm system which shall activate alerting devices in all sleeping areas within the *building*. For SC or SD all lower floors shall, regardless of *purpose group* contained, have sprinklers (Type 6 or 7). For SA *purpose group* all lower floors shall, regardless of the *purpose group* contained, have heat or smoke detectors or sprinklers (Types 3, 4 or 6). For SR *purpose group* where any lower floor contains a *purpose group* other than SR, all lower floors shall have heat or smoke detectors or sprinklers (Types 3, 4 or 6).

4.5.12 The alarm systems required in a *building* shall be interconnected to alert all *building* occupants in the event of *fire*.

COMMENT:

Safe evacuation of a *building* in the event of *fire*, particularly for sleeping *purpose groups*, depends largely on providing early warning to the occupants. For the purpose of early warning:

- smoke detectors provide the fastest response
- heat detectors and sprinklers are next
- manual call point systems are considered to have the slowest response, being dependent on human activation.

Same purpose group on different floors

4.5.13 Where *firecells* containing the same *purpose group* occur at different levels in the same *building*, the *FSPs* required by Table 4.1 for the *firecell* (containing that *purpose group*) having the greatest *escape height*, shall be applied to all *firecells* in that *purpose group*.

Top floor firecells

4.5.14 A top floor *firecell* may have a *F rating* of F0, but all other *FSPs* required by Table 4.1 for that *purpose group* and *escape height* shall be applied.

Part 3

- 3.3.2 c) Reduced *escape route* width if *firecell* sprinklered.
- 3.5.2 Increased *open path* lengths if *firecell* sprinklered.
- 3.9.12 f) Lower floors must be sprinklered where escape is via an adjacent *firecell* for sleeping *purpose groups*.
- 3.9.13 d) Smoke control required for *intermediate floor*.
- 3.12.2 b) Sprinklers or smoke detectors required in *exitways* containing activities.
- 3.14.3 Sprinklers reduce separation distance for external *escape routes*.

Part 4

- 4.2.5 Unlimited *firecell* floor area with sprinklers.
- 4.5.10 b) Sprinklers required on lower floors where *escape height* greater than 25 m.
- 4.5.11 Heat detectors, smoke detectors or sprinklers required on all floors below SC, SD, SA or SR *purpose groups*.

Part 5

- 5.6.6 Reduced *FRR* requirement for sprinklers where sprinklers not required by Table 4.1.
- 5.6.10 Sprinklers required in *FHC 4 firecells*.

Part 6

- 6.3.2 Sprinkler and venting requirements for *theatre stages*.
- 6.16.6 Sprinklers required in laundry and solid waste chutes.
- 6.16.8 Sprinkler requirements in *protected shafts*.
- 6.19.9 Sprinkler requirements for proscenium walls.
- 6.20.5 Concessions on *surface finish* requirements if *firecell* is sprinklered.
- 6.22.7 to 6.22.14 Smoke control for *limited area atriums*.
- 6.22.14 Smoke detector requirements in mechanical smoke extraction systems.

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Table 4.1: Fire Safety Precautions	
Key to table references	
Part 3	Paragraphs 3.1.5, 3.13.1 and 3.19.2
Part 4	Paragraphs 4.3, 4.3.1, 4.3.3, 4.4.1, 4.5.2, 4.5.3, 4.5.4, 4.5.7, 4.5.8, 4.5.9, 4.5.10, 4.5.13, 4.5.14, 4.5.15, 4.5.19
Part 5	Paragraphs 5.5.1, 5.6.6, 5.6.8, 5.9.4 c)
Part 6	Paragraphs 6.2.1, 6.4.1, 6.7.1, 6.8.1, 6.8.5, 6.8.6, 6.10.1, 6.11.1, 6.15.1, 6.19.9, 6.21.2, 6.23.1 d), 6.23.2, 6.23.3
Part 8	Paragraphs 8.2.1, 8.2.2, 8.2.3
Appendix A	Paragraphs A1.1.1 and A1.1.2

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Fire safety precautions		Special applications
Type	Description	
1	Domestic smoke alarm system.	a Not required where:
2	Manual fire alarm system.	i) the <i>escape routes</i> serve an <i>occupant load</i> of no more than 50 in <i>purpose groups</i> CS (excluding <i>early childhood centres</i>), CM, WL, WM, WH and WF, or
3	Automatic fire alarm system with heat detectors and manual call points.	ii) the <i>escape routes</i> are for <i>purpose group</i> SA and serve no more than 10 beds, (or 20 beds for trampers huts, see Paragraph 6.20.6), or
4	Automatic fire alarm system with smoke detectors and manual call points.	iii) exit doors from <i>purpose group</i> SA and SR <i>firecells</i> open directly onto a <i>safe place</i> or an external <i>safe path</i> (see paragraph 3.14).
5	Automatic fire alarm system with modified smoke/heat detection and manual call points.	b Where only a single <i>escape route</i> is available, no less than a Type 4 alarm is required. See Paragraph 3.15.3 for situations where sprinklers are required.
6	Automatic fire sprinkler system with manual call points.	c Required where Fire Service hose run distance, from the Fire Service vehicular access (see Paragraph 8.1.1) to any point on any floor, is greater than 75 m.
7	Automatic fire sprinkler system with smoke detectors and manual call points.	d Emergency lighting extended to <i>open paths</i> throughout the <i>firecell</i> .
8	Voice communication system.	e Type 5 is permitted as an alternative alarm system within <i>firecells</i> containing sleeping accommodation. (See Appendix A for description of Type 5.)
9	Smoke control in air handling system.	f A direct connection to the Fire Service is not required provided a telephone is installed and freely available at all times to enable 111 calls to be made.
10	Natural smoke venting.	
11	Mechanical smoke extract.	
12	No Type 12 currently specified.	
13	Pressurisation of safe paths.	
14	Fire hose reels.	
15	Fire Service lift control.	
16	Emergency lighting in exitways.	
17	Emergency electrical power supply.	
18	Fire hydrant system.	
19	Refuge areas.	
20.	Fire systems centre.	

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Note:

The numbered references are more fully explained in Appendix A.
Throughout Table 4.1 dark shading identifies where sprinklers are required.

**Table 4.1/2: Fire safety precautions for active purpose group firecells
Occupant load 101 to 500**

Purpose group	FHC	Escape height							
		0 m (or single floor)	<4 m (or two floors)	4 m to <10 m	10 m to <25 m	25 m to <34 m	34 m to <46 m	46 m to <58 m	over 58 m
CL (Notes 6,7)	1	F0	F45	F45	F45	F30	F45	F45	F60
	2	F0	F60	F60	F60	F45	F45	F60	F90
	3	F0	F60	F60	F90	F45	F60	F60	F90
			3f 16 18c	3f 16 18c	3b 9 16 18c	4 9 16 18	6 9 13 15 16 18	7 9 13 15 16 18	7 9 13 15 16 17 18 19 20
CM (Note 5)	2	F0	F60	F60	F60	F45	F45	F60	F90
	4	F0	F30	F30	F45	F45	F60	F60	F90
			3f 16 18c	3f 16 18c	6 9 16 18c	3b 9 16 18c	6 9 15 16 18	6 9 13 15 16 18 20	7 9 13 15 16 17 18 19 20
			3f 16 18c	3f 16 18c	6 9 16 18c	3b 9 16 18c	6 9 15 16 18	6 9 13 15 16 18 20	7 9 13 15 16 17 18 19 20
WL	1	F0	F45	F45	F45	F30	F45	F45	F60
WM	2	F0	F60	F60	F60	F45	F45	F60	F90
WH	3	F0	F60	F60	F90	F45	F60	F60	F90
(Note 5)	4	F0	F30	F30	F45	F45	F60	F60	F90
			3f 16 18c	3f 16 18c	6 9 16 18c	3b 9 16 18c	6 9 15 16 18	6 9 13 15 16 18	7 9 13 15 16 17 18 19 20
			3f 16 18c	3f 16 18c	6 9 16 18c	3b 9 16 18c	6 9 15 16 18	6 9 13 15 16 18	7 9 13 15 16 17 18 19 20
			3f 16 18c	3f 16 18c	6 9 16 18c	3b 9 16 18c	6 9 15 16 18	6 9 13 15 16 18	7 9 13 15 16 17 18 19 20
WF	4	F0	F30	F30	F45	F45	F60	F60	F90
		3f 16 18c	6 16 18c	6 16 18c	6 15 16 18	6 15 16 18	6 9 13 15 16 18	7 9 13 15 16 18	7 9 13 15 16 17 18 19 20
Column		1	2	3	4	5	6	7	8

- Notes:
- Use of table:** Refer to Paragraph 4.4 for instructions on using this table to determine the fire safety precautions in firecells.
 - Adjoining firecells having a F0 rating:** Paragraph 6.2.1 requires adjoining firecells to be separated by fire separations with FRR no less than 30/30/30.
 - Intermediate floors:** Where a firecell contains intermediate floors a FRR shall apply to the intermediate floors and supporting elements, and smoke control systems Type 9 and either Type 10 or Type 11, are required (see Paragraphs 4.5.16 to 4.5.18, 6.14.3 and 6.21.5 to 6.22.14).
 - Car parking:** Refer to Paragraphs 6.10.3 to 6.10.6 for car parking provisions within buildings.
 - Sprinklers:** Refer to Paragraph 5.6.11 for concessions for FHC 4.
 - CL cinemas and theatres:** Type 16d is required for all escape heights.
 - CL:** For firecells, which are not cinemas or theatres, with escape height less than 4.0 m and occupant load not greater than 250, Type 2f is a permitted alternative to Type 3f.

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Table 4.1/3: Fire safety precautions for active purpose group firecells
Occupant load 501 to 1000

Purpose group	FHC	Escape height							
		0 m (or single floor)	<4 m (or two floors)	4 m to <10 m	10 m to <25 m	25 m to <34 m	34 m to <46 m	46 m to <58 m	over 58 m
CL (Note 6)	1	F0	F45	F45	F30	F30	F45	F45	F60
	2	F0	F60	F60	F30	F45	F45	F60	F90
	3	F0	F60	F60	F45	F45	F60	F60	F90
		4	4	4	7	7	7	7	7
		16	16	9	9	9	9	9	9
		18c	18c	16	13	13	13	13	13
				18c	15	15	15	15	15
					16	16	16	16	16
					18	18	18	18	17
									18
								19	
								20	
CM (Note 5)	2	F0	F60	F60	F30	F45	F45	F60	F90
	4	F0	F30	F30	F45	F45	F60	F60	F90
		4	4	6	4	6	7	7	7
		16	16	16	9	9	9	9	9
		18c	18c	18c	16	16	15	13	13
					16	16	15	13	13
					18c	18c	16	15	15
							18	16	16
								18	17
								20	18
								19	
								20	
WL	1	F0	F45	F45	F30	F30	F45	F45	F60
WM	2	F0	F60	F60	F30	F45	F45	F60	F90
WH	3	F0	F60	F60	F45	F45	F60	F60	F90
(Note 5) WF	4	F0	F30	F30	F45	F45	F60	F60	F90
		4	4	6	4	6	7	7	7
		16	16	16	16	16	15	15	9
		18c	18c	18c	18c	18c	16	16	9
							16	16	13
							18	18	13
								15	15
								16	16
								18	18
									18
								19	
								20	
Column		1	2	3	4	5	6	7	8

Notes:

- Use of table:** Refer to Paragraph 4.4 for instructions on using this table to determine the fire safety precautions in firecells.
- Adjoining firecells having a F0 rating:** Paragraph 6.2.1 requires adjoining firecells to be separated by fire separations with FRR no less than 30/30/30.
- Intermediate floors:** Where a firecell contains intermediate floors an FRR shall apply to the intermediate floors and supporting elements, and smoke control systems Type 9 and either Type 10 or Type 11, are required (see Paragraphs 4.5.16 to 4.5.18, 6.14.3 and 6.21.5 to 6.22.14).
- Car parking:** Refer to Paragraphs 6.10.3 to 6.10.6 for car parking provisions within buildings.
- Sprinklers:** Refer to Paragraph 5.6.11 for concessions for FHC 4.
- CL cinemas and theatres:** Type 16d is required for all escape heights.

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Part 5: Fire Resistance Ratings

5.1 FRR Components

5.1.1 As described in the definitions, a *FRR* comprises three numbers indicating values for *stability*, *integrity* and *insulation*. *Primary* and *secondary elements* required to be *fire* rated will, depending on their function, need to satisfy one or more of these three criteria. The following is an indication of where they apply:

- a) **Stability:** Provided by *primary elements* within a *firecell*. These include *building elements* which are part of the structural frame, and those providing support to other *fire* rated elements within the same or adjacent *firecells*. Examples are: columns, beams, floors and walls (which may also be *fire separations*). Paragraph 5.9.4 describes special situations where *primary elements* need not be rated.
- b) **Integrity:** Provided by *secondary elements*: e.g. *fire separations* being internal walls and floors, areas of *external walls* not permitted to be an *unprotected area*, and some areas of roofs when close to another *building*, or crossed by an *exitway*. *Primary elements* integral with *secondary elements* are also rated for *integrity*.
- c) **Insulation:** Provided by either *primary* or *secondary elements*. Applies to *fire separations* and is required where the transmission of heat through the element may endanger occupants on the other side, or cause *fire* to spread to other *firecells* or *adjacent buildings*.

COMMENT:

For example, *insulation* is necessary for *fire separations* between sleeping spaces or where protecting a *safe path* or through *external walls*. Paragraph 5.6.4 establishes where *insulation* values are required.

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5.2 FRR Component Values

5.2.1 The values applied to each of the three components of the *FRR*, depend on the function and location of the *building element* to which the *FRR* applies. In some cases all three numbers (for *stability*, *integrity*, *insulation*) will be the same. In others, the numbers will differ and some may have a value of zero.

For example:

- a) When *F45* or *S45* applies to an isolated column in a *firecell*, the *FRR* is 45/-/-; but if the column is integral with a *fire separation* wall having a *FRR* of 30/30/30, the column *FRR* is 45/30/30.
- b) Where the rating requirements *F45* and *S30* both apply to a *firecell* with an *external wall*, the *S* rating becomes *S45* for *primary elements* and *S30* for *secondary elements*. The appropriate *FRRs* are thus:
 - i) for isolated *primary elements*, 45/-/-,
 - ii) for *secondary elements*, -/30/x, and
 - iii) for *primary elements* integral with *secondary elements* (being *fire separations*), 45/30/x.

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COMMENT:

x represents the *insulation* value required by Paragraph 5.6.4.

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5.2.2 In specific situations this acceptable solution prescribes minimum *FRRs*. However, in most cases it is necessary to derive the *FRR* using the *F* and *S* ratings.

5.3 Application of F and S Ratings

F ratings

5.3.1 *F ratings* apply to *primary* and *secondary elements* within a *firecell*, including walls and floors which are *fire separations*, together with their supporting elements within the same *firecell*.

S ratings

5.3.2 *S ratings* apply to:

- a) *Primary elements* which, within a *firecell*, provide *stability* to an *external wall* not permitted to have 100% *unprotected area* due to:
 - i) proximity of the *building* to a *relevant boundary*, or
 - ii) the configuration of the *building* or siting of *adjacent buildings*, where there is a threat of *fire* spread to sleeping *purpose groups*.
- b) *Secondary elements* forming parts of an *external wall* which are not permitted to be *unprotected areas*.

- c) All *primary elements*, in any *building* with an *escape height* exceeding 25 m (see also Paragraph 5.7.7).
- d) *Fire separations* between *firecells* containing *other property*.
- e) *Fire separations* in *firecells* which require subdivision due to restrictions on floor areas (see Paragraph 4.2.3).
- f) *Buildings* containing car parking (see Paragraph 6.10.3).

5.4 Essential Data for Determining F and S Ratings

5.4.1 *F* and *S ratings* may be obtained from tables once essential data on the *building* and its proposed occupancy are known. It is therefore necessary to determine:

- a) *Escape height* and number of floors.
- b) The number of *firecells* at each floor level. (In most cases each full floor level will be a separate *firecell*.)
- c) Floor area (A_f) of each *firecell*, which will be the sum of the areas of any *intermediate floors* and the lowest floor in the *firecell*.
- d) *Purpose groups* and the floor areas they occupy in each *firecell*.
- e) *Occupant load* in each *firecell*.
- f) *Fire hazard category* in each *firecell*.
- g) Distance between each *external wall* and the *relevant boundary*.
- h) Total area of vertical openings (A_v) in all *external walls* of each *firecell*.
- i) Area of horizontal openings (A_h) in the roof of each *firecell* where relevant.
- j) Whether the *firecell* floor areas comply with the maximum permitted (by Paragraph 4.2.3) for the *fire hazard category* contained.

COMMENT:

See Table 5.1 Note 4 for a description of what comprises effective openings when determining the values of A_v and A_h .

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5.5 Determining F and S Ratings

F ratings

5.5.1 *F ratings* are determined directly from Table 4.1.

S Ratings for firecells with FHC 1, 2 and 3

5.5.2 *S ratings* are determined from Table 5.1 using the following process.

5.5.3 For each *firecell* determine the ratios:

$$A_v/A_f \text{ and } A_h/A_f$$

Where:

A_f = area of floor.

A_v = total area of vertical openings in the walls.

A_h = area of horizontal openings in the roof.

The *S rating* is calculated from the formula:

$$S = kt_e$$

Where:

t_e (equivalent time of *fire* exposure in minutes) is determined from Table 5.1, and k is a variable having the following values:

k = 1.0 for unsprinklered *firecells*, or
= 0.5 for sprinklered *firecells*.

COMMENT:

1. Table 5.1 has been based on unpublished overseas information used to develop a series of Eurocodes for structural *fire* safety design.
2. In contrast to the traditional method of expressing *fire* rating requirements in 30 minute intervals, use of Table 5.1 allows the allocation of a t_e value (and consequentially an *S rating*) ranging anywhere between 30 and 240 minutes in 10 minute intervals.
3. This has the advantage of permitting *fire* resisting *building elements* to be used to their full potential as determined by *standard tests* or calculation methods based on those tests.

For example: A *primary element* tested satisfactorily to 40 minutes for *stability*, would traditionally be rated at 30 minutes, being the next lowest value in the 30 minute interval system. Using Table 5.1 it is possible to adjust the ventilation configuration, if desired, to take advantage of the full 40 minutes.

4. Standard *fire* tests give values for all three criteria of *stability*, *integrity* and *insulation*, and depending on the requirements of a particular *building element*, a low value for one criterion, for example, *insulation*, might not permit higher values for *stability* or *integrity* being utilised.
5. Specific *fire* engineering design may be used as an alternative method for determining *S ratings*, and in some cases may give less conservative results than provided by Table 5.1. A list of relevant Eurocode references is given in the reference section of this Compliance Document.

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5.6 Determining the FRR

5.6.1 Having determined the *F* and *S ratings*, choosing the appropriate numbers for the *FRR* involves:

- a) Identifying the functions of the *building element* in question (e.g. *primary* or *secondary element*, or part of an *external wall* not permitted to be *unprotected area*).
- b) Deciding whether or not *insulation* is required (see Paragraph 5.6.4).
- c) Checking whether specific requirements are imposed elsewhere in this Acceptable Solution for a particular *purpose group* or *building function* (see Paragraphs 5.6.9, 6.3 to 6.11 and Part 7).

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5.6.2 Following this analysis an appropriate *FRR* may be assigned to each *building element* (see examples given in Paragraph 5.2.1). If an *F rating* and an *S rating* apply to a *building element*, use the higher of the two.

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Applying insulation component in FRR

5.6.3 Where the *building element* is a *fire separation*, the *FRR* of that *fire separation* shall be no less than the *FRR* required by the adjacent *firecell*.

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5.6.4 *Insulation* ratings shall apply to:

- a) All *fire separations*, except as noted in Paragraph 5.6.5 c) and d).
- b) Parts of *external walls* which are not permitted to be *unprotected areas*.
- c) Parts of *external walls* which are within 2.0 m of an external *exitway*.
- d) *Intermediate floors*.

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5.6.5 Where required by Paragraph 5.6.4, the *insulation* value shall be no less than the *F rating*, or the *S rating* if under Paragraph 5.3.2 the *S rating* applies to the *building element*, except that:

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- a) For any part of an *external wall* not permitted to be an *unprotected area*, the value shall be no less than the rating based on the higher of the *F* or *S rating* applicable to the *firecells*.
- b) *Intermediate floors* shall have an *insulation* value as required by Paragraph 6.14.3.
- c) *Insulation* values for closures in *fire separations* are as specified in Table 6.1.
- d) No *insulation* value is required for glazing installed in accordance with Paragraph 5.8.2.

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Oct 2005**FRR reductions for sprinklered firecells**

5.6.6 Where sprinklers are installed in a *firecell*, but such installation is not a requirement under Table 4.1, the *FRR* of *building elements* may be reduced. Any permitted reduction shall be no greater than 50%.

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Oct 2005**COMMENT:**

1. For example: a *FRR* of 60/60/60 may be reduced to 30/30/30, a *FRR* of 60/-/- to 30/-/-.
2. The calculation for *S ratings* automatically takes account of sprinkler installation and no further reductions are permitted.

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5.6.7 When a single *firecell* contains *purpose groups* with different *FRR* requirements for *fire separations*, use either:

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- a) The highest *FRR* throughout the *firecell*, or
- b) The second highest *FRR* throughout the *firecell*, if the percentage given by:

$$\frac{\text{floor area with highest FRR} \times 100}{\text{total firecell floor area}}$$

is no more than:

- i) 20%, or
- ii) 40% if the *firecell* is sprinklered.

5.6.8 The concession permits the use of the second highest *FRR*. This rating may be applied throughout the *firecell*, except that, if not sprinklered, the rating of the floor above shall be no less than that of the *purpose group* with the highest *FRR*. The alarm type and *fire safety precautions* from Table 4.1 shall be those for the *purpose group* requiring the highest degree of protection (see Paragraph 5.6.11 for *FHC* 4 concessions).

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Oct 2005**Special requirements for buildings remaining occupied during fire**

5.6.9 Where a *building* evacuation is not possible or desirable although there is a *fire* in one of the *firecells* (e.g. in a hospital operating theatre, civil defence *building* or police station), or in any other situation where security from structural collapse is not related to distance from a *relevant boundary*, the risks shall be evaluated by a *fire* engineer who shall decide whether:

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- a) The higher of the *F* or *S ratings* and associated *fire safety precautions* and subdivision into smaller *firecells* are appropriate, or
- b) The requirements for active and passive *fire* protection are to be determined by *fire* engineering design.

5.6.10 In such situations the accommodation concerned, the services to it, and the means of escape, shall remain safe for the duration of a fully developed *fire* in an adjacent *firecell*.

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Firecells with FHC 4

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5.6.11 Where *fire hazard category 4* applies to a given *purpose group* (see Table 2.1), the *S rating* associated with the *firecell* shall be determined by *fire engineering design*, except that where there are multiple *purpose groups* on that floor, only one of which is in *fire hazard category 4*, the concession available from Paragraph 5.6.12 may apply.

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5.6.12 In a *firecell*, where an area of *FHC 4* is present not exceeding 5% or 20 m², whichever is the lesser of the *firecell* floor area, the overall *FHC* of the *firecell* will remain unchanged as if the *FHC 4* is not present.

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5.6.13 *Firecells* containing *fire hazard category 4*, in *buildings* with two or more floors shall be sprinklered where the concession permitted by Paragraph 5.6.12 does not apply.

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COMMENT:

1. A *purpose group* may be in *fire hazard category 4* for one or both of the following reasons:
 - a) The energy density of the *fire load* exceeds that associated with *fire hazard category 3* (an upper limit of around 1500 MJ/m²).
 - b) The *combustible* material in the *firecell* exhibits an overall rate of *fire growth* appreciably greater than that of predominantly cellulose-based products, in particular, materials which have a heat release rate (hrr) of 1 MW or more in less than 75 seconds. Examples of such materials and heat release rates may be obtained from NFPA 92B, Smoke-management systems in malls, atria and large areas.
2. Both reasons will apply to the uses listed under *fire hazard category 4* for *purpose groups* CM, WH and WF in Table 2.1.
3. Specific *fire engineering design* for *fire hazard category 4* will typically commence with the design of an active protection system. This system must be purpose designed to meet the design *fire hazard* for the particular application and to control a developing *fire*.

5.7 Applying FRRs to Building Elements

General requirements

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

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

5.7.3 Floors shall be rated on the underside (see Paragraph 6.14.2).

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

5.7.5 Except as required by Paragraph 5.7.6, areas of *external wall* not permitted to be *unprotected areas* need be rated only for the threat of *fire* from within a *firecell*.

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

- a) Walls are within 1.0 m of the *relevant boundary*, or
- b) *Purpose groups* SC, SD and SA are on one or more floor levels above their *final exit*, or SR is on two or more floor levels above their *final exit*, or
- c) The *building height* is more than 10 m.

COMMENT:

Refer also to Paragraphs 7.9.10 and 7.9.11 for additional *external wall* requirements for the *purpose groups* referred to in b).

5.7.7 When providing *stability* to *fire* rated elements in an adjacent (above or beside) *firecell*, *primary elements* need be rated only as required for the *firecell* in which they are located, regardless of any higher ratings which may apply to the adjacent *firecell*.

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

COMMENT:

Primary elements shall have a *FRR* of no less than that of any *building element* to which they provide support within the *firecell*.

Minimum FRRs

5.7.9 Throughout this acceptable solution minimum *FRRs* are specified for particular situations. It is therefore essential to check for specific requirements, particularly with respect to sleeping *purpose groups* and those with a high *FHC*.

COMMENT:

The following is an abbreviated list of some situations where minimum *FRRs* are specified. Users should always refer to the relevant quoted paragraph before determining *FRR* requirements for individual projects.

	Reference Paragraph
Minimum FRR 15/-/-	
<i>Primary elements</i> of detached open sided <i>building</i> close to <i>boundary</i>	7.8.10
Minimum FRR 15/15/15	
Separation of SC or SD <i>suites</i>	6.6.5
Separation of sprinklered SA <i>group sleeping areas</i>	6.7.2
<i>Intermediate floors</i>	6.14.3
Walls of attached open sided <i>buildings</i> close to <i>relevant boundary</i>	7.8.10
Minimum FRR -/30/30	
<i>Fire separations</i> subdividing ceiling spaces in <i>purpose group</i> SA or SR	6.18.8
Minimum FRR 30/30/30	
Separation of <i>firecells</i> rated F0	6.2.1
Proscenium walls in <i>theatres</i> (CL) with <i>occupant load</i> > 500	6.3.1
Supporting structure in sprinklered enclosed spaces beneath tiered seating (CS, CL, CO)	6.5.2
Separation of SC or SD from other <i>purpose groups</i>	6.6.1

Separation of SC or SD sleeping areas	6.6.2
Separation of SC operating theatres, etc. from other SC activities	6.6.6
Separation of support functions with <i>FHC</i> >1 from other SC or SD activities	6.6.7
Separation of SA from other <i>purpose groups</i> , but <i>FRR</i> based on <i>F rating</i> if that is greater	6.7.1
Separation between unsprinklered SA <i>purpose group sleeping areas</i>	6.7.2
Separation between SA <i>suites</i> located on the same floor level	6.7.6
Separation of SR <i>household units</i> , or based on <i>F rating</i> if that is greater	6.8.1
<i>Safe paths</i> (IE) with an <i>escape height</i> of no more than 10 m, but based on <i>F rating</i> if that is greater	6.9.2
Separation, at <i>final exit</i> level, between upper and lower vertical <i>safe paths</i> , but based on <i>F rating</i> if that is greater	6.9.3
Separate IA <i>firecells</i> , or based on <i>F rating</i> of adjacent space if that rating is higher	6.10.1
Separation of <i>protected shafts</i> , or based on highest <i>F rating</i> of adjacent <i>firecells</i>	6.16.2
Parapet for roof car parking or storage <i>FHC</i> < 3	7.8.2
Wall and eaves for SH or SR where eaves within 650 mm of the <i>boundary</i>	7.8.5
Roof within 3.0 m of an external <i>exitway</i> (IE) sprinklered <i>firecells</i>	7.9.3
Walls of small <i>buildings</i> (maximum 40 m ² and <i>FHC</i> 1) within 1.0 m of <i>relevant boundary</i>	7.10.5
<i>External walls</i> of SH or SR within 1.0 m of the <i>boundary</i> , limited to 10 m <i>escape height</i>	7.10.6
<i>External walls</i> of SR <i>household units</i> not permitted to be <i>unprotected area</i>	7.10.7
Minimum FRR 45/45/45	
Unsprinklered <i>firecell FHC</i> 1 tiered seating	6.5.1
Separation of other spaces from sleeping areas	6.7.5
Minimum FRR 60/60/60	
Unsprinklered <i>firecell FHC</i> 2 between tiered seating	6.5.1
Separation of solid waste storage (IA) from other <i>purpose groups</i>	6.10.2
Separation of ID <i>firecells</i> (excluding those containing solid fuel, gas or petroleum powered plant) from other <i>purpose groups</i>	6.11.1

Separation of ID <i>firecells</i> containing plant powered by solid fuel, gas or petroleum products, from <i>purpose groups</i> other than SC or SD	6.11.3
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<i>Basement</i> floors in other than <i>household units</i> in <i>purpose groups</i> SH and SR	6.14.4
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Parapets for roof car parking or storage <i>FHC</i> > 2	7.8.2
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Roof within 3.0 m of an external <i>exitway</i> (IE) unprinklered <i>firecell</i>	7.9.3
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Minimum FRR 90/90/90

Separation of ID <i>firecells</i> , containing plant powered by solid fuel, gas or petroleum products, from SC or SD <i>firecells</i>	6.11.3
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5.8 Glazing in Fire and Smoke Separations

Fire separations

5.8.1 Glazing in *fire separations* shall be fixed *fire resisting glazing* having the same *integrity* and *insulation* values as the *fire separation*, except where uninsulated glazing is permitted by Paragraph 5.8.2.

5.8.2 Uninsulated *fire resisting glazing*, having the same *integrity* value as the *fire separation*, is permitted in:

- a) *External walls* for Type B areas of *fire resisting glazing* meeting the requirements of Paragraph 7.4, and
- b) *Fire separations* for sprinklered *firecells* as described in Paragraphs 5.8.7 and 5.8.8, and
- c) *Safe paths* complying with Paragraphs 5.8.3 to 5.8.6 provided that where the *safe path* is an internal *stairway*:
 - i) that *stairway* serves no more than 4 floor levels, and
 - ii) the *building* does not contain *purpose groups* SC, SD, SA or SR, and
 - iii) two or more *escape routes* are available.

Safe paths

5.8.3 Limited areas of uninsulated *fire resisting glazing* may be used in *fire separations* between the *safe path* and adjacent *firecells*. Where only a single *safe path* is provided no glazing shall be permitted within 2.0 m of the floor level (see Figure 5.1 (b)). Where two or more *safe paths* are provided:

- a) The glazing dimensions within 2.0 m of the floor level shall be no greater than permitted by NZS 4232: Part 2 for the chosen separation and the path of travel within the *safe path*, and
- b) Glazing lengths shall be limited and, in the direction of escape, alternate with unglazed lengths of no less than twice the length of the glazed opening (see Figure 5.1 (a)).

Acceptable Solution C/AS1

Part 6: Control of Internal Fire and Smoke Spread

6.1 General

6.1.1 The extent to which internal *fire* and smoke spread shall be controlled, and the methods adopted, depend mainly on the *purpose groups* and activities within the *building*. Control is generally required only for the time required for occupants to escape to a *safe place*. However, the Act Section 4(2)(i) requires the provision of protection to limit the extent and effects of the spread of *fire* to *household units*, other residential units and *other property*.

6.1.2 Control is achieved by using one or more of the following:

- a) Subdividing *firecells* into smaller *firecells* or *smokecells*.
- b) Separating high risk activities from other activities, especially from sleeping *purpose groups*.
- c) Ensuring the *integrity* of *construction* joints and closures in *fire separations* and *smoke separations*.
- d) Preventing the movement of *fire* and smoke through *concealed spaces* and services ducts.
- e) Using appropriate materials and *surface finishes*.
- f) Installing equipment which, when *fire* occurs, activates automatically to suppress *fire* and smoke spread.

6.2 Firecells Rated F0

6.2.1 Where adjacent *firecells* on the same floor level are permitted by Table 4.1 to have a *F rating* of F0, they shall be *fire separated* from one another. The *fire separations* shall have a *FRR* of no less than that required by Part 6 or Part 7 (for a specific *purpose group* or situation), or 30/30/30, whichever is the greater.

COMMENT:

1. Although Table 4.1 provides a *firecell rating* of F0 for all single floor *firecells*, by definition *firecells* must be *fire separated* from one another. The main reason for having separate *firecells* is to provide for *purpose groups* having different *fire safety precautions*. Also, within sleeping *purpose groups*, Paragraphs 6.6 to 6.8 have requirements for certain activities to be *fire separated* and, for *fire separations* to limit the number of occupants in a *firecell*. Within active *purpose groups*, Table 4.1 has different *fire safety precautions* within a *firecell* depending on the *occupant load*.
2. In the absence of *fire separations* on a single floor, the space must be treated as a single *firecell* and the *fire safety precautions* for the primary *purpose group* (see Paragraph 2.2.2) must apply throughout the floor.

6.3 Purpose Groups CS and CL

Theatres

6.3.1 In every *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. Where the stage and supporting areas are sprinklered as required by Paragraph 6.3.2, the proscenium wall and curtain may be a *smoke separation*. The openings in *fire rated* proscenium walls shall be protected as required by Paragraph 6.19.9.

COMMENT:

In determining the number of occupants on the floor, *occupied spaces* providing support functions need not be included.

Theatre stages

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

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- a) Where the stage area is greater than 50 m², a sprinkler system shall be installed at the ceiling above the stage, and in all spaces used for support activities.
- b) Have roof vents of no less than 5% of the stage floor area, located at the highest point above centre stage.
- c) The 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.
- d) The vents 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.
- e) Vents shall be capable of being operated by a manual control located near the stage safety curtain release.
- f) The heat sensing device required by d) above, 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.

6.4 Purpose Group CM

6.4.1 When the *occupant load* on a sales, exhibition or trade fair floor is greater than 500, adjacent storage areas in which goods are received, unpacked, stored, packed for despatch, or areas used for workshops, and display material storage etc. shall be *smokecells* separated from the display and sales areas.

COMMENT:

1. This applies particularly to exhibition and trade fair halls.
2. Sprinkler requirements for *purpose group* CM are obtained from Table 4.1.

6.5 Purpose Group CO, CS and CL

6.5.1 If not sprinklered any enclosed useable space beneath tiered seating shall be a *firecell* with a rating of *F 45* for *FHC 1* and *F 60* for *FHC 2*.

6.5.2 If any enclosed useable space beneath tiered seating is sprinklered, it need not be a separate *firecell*, but supporting structure of the tiered seating shall have an *FRR* of 30/30/30.

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6.6 Purpose Groups SC and SD

6.6.1 *Firecells* containing *purpose groups* SC and SD shall be separated from *firecells* containing other *purpose groups*, by *fire separations* having a *FRR* of no less than 60/60/60 or 30/30/30 if the adjacent *firecell* is sprinklered.

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6.6.2 Sleeping areas in *purpose group* SC or SD shall be separate *firecells* but may include direct support functions (see Paragraph 6.6.7). *Fire separations* between non-sleeping areas and sleeping areas, and between adjacent sleeping areas, shall have an *FRR* of no less than 30/30/30.

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Group sleeping areas

6.6.3 Where SC or SD *purpose group* sleeping accommodation is contained within only a single *group sleeping area firecell*, the number of beds shall not exceed 12. Where the sleeping accommodation is distributed over two or more *group sleeping area firecells*, each *firecell* shall:

- a) Contain no more than 20 beds, and
- b) Have sufficient space to accommodate, in an emergency, the beds from an adjacent *firecell* of any occupants unable to walk.

Comment:

1. In this acceptable solution the term "beds" is used to denote the number of people expected to be sleeping in the *firecell*. Therefore, a double bed counts as two beds, and a tier of three single bunks (one above another) counts as three beds.
2. When it is not possible or desirable to evacuate occupants from sleeping areas and operating theatres, special considerations may be required. Refer to Paragraph 5.6.9.

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6.6.4 A *group sleeping area firecell* in *purpose group* SC or SD may be subdivided by either:

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

6.7.3 A *group sleeping area firecell* in *purpose group SA* may be subdivided provided that:

- a) The *firecell* contains no more than 40 beds, whether or not sprinklers are installed, and
- b) There is a gap of no less than 400 mm between the top of all partitions and the underside of the roof or ceiling. The partitions need not be *fire* rated.

6.7.4 Intermittently *occupied spaces*, such as tea bays and sanitary facilities, which provide direct support functions to the sleeping area, may be included in a *SA group sleeping area firecell*.

6.7.5 Spaces such as storerooms, laundry facilities, communal kitchens, dining rooms and lounges shall be separated from sleeping areas with *fire separations* having a *FRR* of no less than 45/45/45. It is acceptable for these non-sleeping activities to share a common *firecell*. (See Paragraph 5.6.6 for *FRR* reductions where sprinklers are installed.)

Suites

6.7.6 A sleeping area in *purpose group SA* may be subdivided into separate *suites* (such as a motel unit or hotel room with or without en-suite facilities). Each *suite* shall be a separate *firecell* and contain no more than 12 beds. *Fire separations* between adjacent *suites* on the same floor level shall have a *FRR* of no less than 30/30/30.

COMMENT:

1. It is implicit that within a *suite* containing *SA purpose group*, there is a substantial degree of responsible self regulation by the occupants. Where there are two or more occupants it is expected that the social cohesion of the group would result in a mutual responsibility for warning each other of a *fire* within a *suite*.
2. See Paragraph 2.2.9 for situations where *SA* may be treated as *SR* or *SH*.

6.7.7 Where *SA firecells* are located on an upper floor, *firecells* on lower floors shall have alarm systems in accordance with Paragraphs 4.5.10 to 4.5.12.

6.7.8 Service vehicle and unloading areas within the perimeter walls of a *building* containing *purpose group SA*, shall meet the requirements of Paragraphs 6.10.3 to 6.10.5.

COMMENT:

Service vehicles include commercial vehicles such as delivery vans, refuse pick-up vehicles and the like.

Halls and wharenuī

6.7.9 A hall or *wharenuī* used for sleeping, even if only occasionally, shall be classified as a *group sleeping area purpose group SA*.

COMMENT:

1. See Paragraph 3.3.2 h) which requires wider *escape routes* and Paragraph 3.4.2 e) which requires shorter *open path* lengths in *wharenuī* with specific *surface finishes*.
2. Paragraph 6.7.2 limits the maximum numbers permitted to sleep in a *group sleeping area* such as a *wharenuī*.

6.8 Purpose Groups SR and SH

6.8.1 Every *household unit* in *purpose group SR* shall be a single *firecell* separated from every other *firecell* by *fire separations* having a *FRR* derived from the *F rating* in Table 4.1/5, or 30/30/30, whichever is the greater.

6.8.2 An individual *SH* or *SR household unit* may contain one or more upper floors provided that the *open path* length provisions of Table 3.3 are satisfied.

COMMENT:

1. For *purpose groups SR* and *SH*, Table 3.3 permits maximum lengths of 24 m for the *dead end*, and 60 m for the total *open path* where no *FSPs* are installed.
2. See Paragraphs 1.3.3 and 1.3.4 for other *purpose group SH* requirements.

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6.8.3 Service vehicle loading and unloading areas within the perimeter walls of a *building* containing *purpose group* SR, shall meet the requirements of Paragraphs 6.10.3 to 6.10.5.

COMMENT:

Service vehicles include commercial vehicles such as delivery vans, refuse pick-up vehicles and the like.

6.8.4 Where a car parking garage is provided solely for the use of the occupants of an individual *household unit* in *purpose group* SR, it is acceptable for that garage to be included within the *household unit firecell*. However, where garaging is provided for vehicles of occupants of more than one *household unit*, that space shall be a separate *firecell* complying with the requirements of Paragraphs 6.10.3 to 6.10.5.

6.8.5 For *purpose group* SR, Table 4.1/5 describes the required *fire safety precautions*, and Paragraphs 7.10.6 to 7.10.8 describe the *fire* rating requirements for *external walls*.

6.8.6 Each *household unit* in *purpose group* SR, whether or not containing upper floors, shall be treated as a single floor *firecell* when applying Table 4.1/5 to determine the required *fire safety precautions*.

COMMENT:

1. This means that for individual SR *household units* located only side by side at ground level, the only *fire* safety requirement is for *fire separations* (*FRR* no less than 30/30/30) between adjoining units. See Paragraph 6.2.1 concerning F0 rated *firecells*.
2. For three or more *household units* vertically one above the other, the provisions of Table 4.1/5 apply to all units in the *building*.

6.9 Purpose Group IE

6.9.1 *Exitways* unless external and separated by distance, shall comprise *protected paths* which are *smokecells*, and/or *safe paths* which are *firecells*. Restrictions on the length of *protected paths* are given in Paragraph 3.4.

6.9.2 The *safe path* shall be separated from all adjoining *firecells* by *fire separations* having the same *FRR* throughout its length. The *FRR* shall be the greater of *F* 30 or the *F* rating of the highest rated adjoining *firecell* as determined by Table 4.1.

6.9.3 *Safe paths* which are stairs leading from lower floors or *basements* and which continue to floors above the level of the *final exit*, shall have the lower levels *fire* separated from the *final exit* level. The *fire separation* shall have a *FRR* of 30/30/30, or that required for the lower level, whichever is the greater.

6.9.4 *Safe paths* which are long corridors shall be subdivided by *smoke separations* in accordance with Paragraph 6.13.

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

Ventilation in enclosed exitways for purpose groups SC, SD, SR and SA

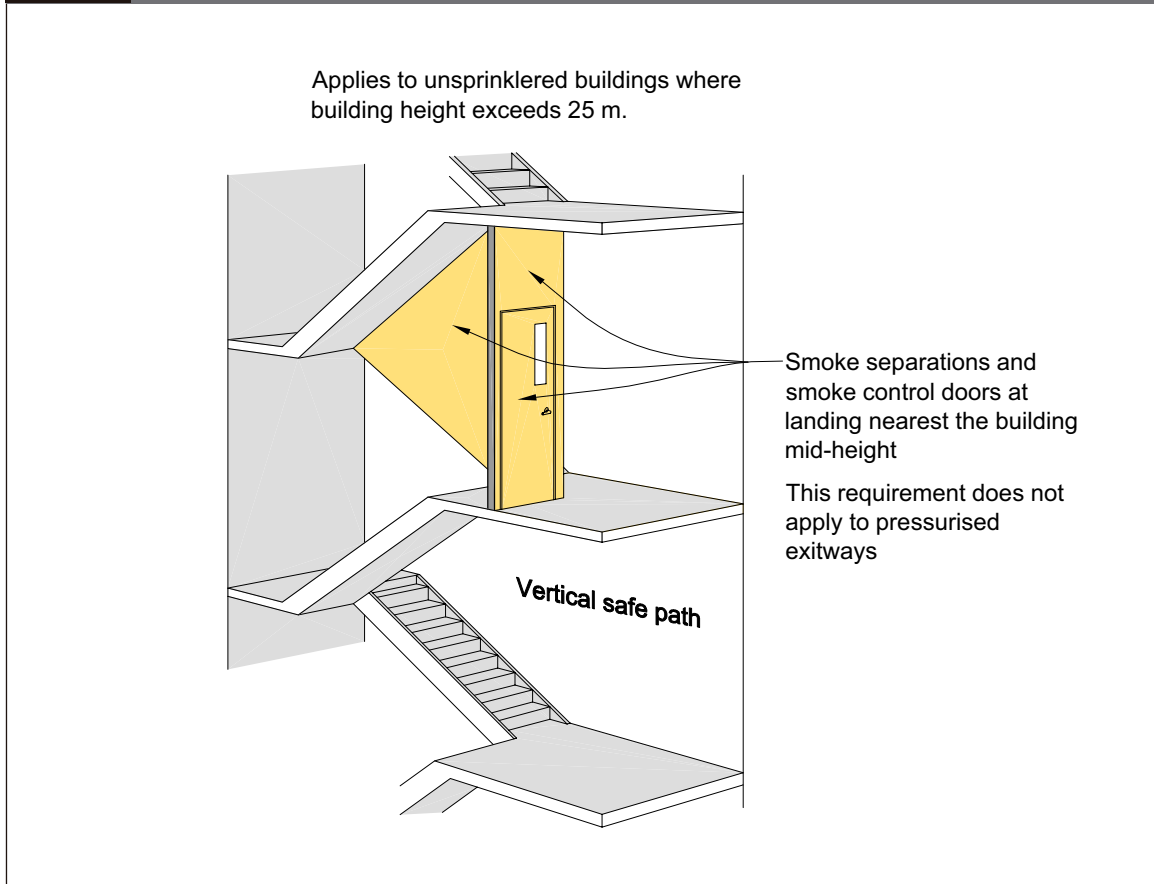
6.9.6 Where pressurisation complying with AS/NZS 1668: Part 1 is not provided, for *purpose groups* SC, SD, SR and SA, *exitways* serving two or more *suites* or *household units* shall be ventilated in accordance with Paragraphs 6.9.7 and 6.9.8 except that, no ventilation is required when any of the following conditions occur:

- a) The *suite* or *household unit* opens directly into a *safe path* or *protected path*, not shared by any other *suite* or *household unit*, before reaching a shared *exitway*, or
- b) The *escape height* is no greater than 4.0 m, or
- c) Upon leaving the *suite* or *household unit*, there is more than one direction of escape, or

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Figure 6.1: Vertical Safe Path Smoke Control
 Paragraphs 3.17.12 a) and 6.9.11



Solid waste storage

6.10.2 Enclosed solid waste storage areas within any *firecell* shall themselves be a separate *firecell* separated from adjacent *firecells* by *fire separations* having a *FRR* of no less than 60/60/60 (see Paragraph 6.16.5 for waste chutes).

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Car parking

6.10.3 Car parking spaces within a *building* (see Figure 6.2) shall be separate *firecells*. Within the car park *firecell*, all floors (including *intermediate floors*) and their supporting structures shall be *fire* rated.

COMMENT:

A car park may be one *firecell* extending from below the level of the *final exit* to any number of floors above, with each floor (except the lowest) being an *intermediate floor*.

6.10.5 *FRRs for building elements in car parking spaces shall be based on the S rating as derived from the formula:*

$$S = Ct_e$$

Where:

t_e (equivalent time of fire exposure in minutes) is derived from Table 5.1, and C is a variable having the following values:

For fire separations between firecells:

- C = 1.0 if unsprinklered, or
- = 0.5 if sprinklered.

For floors and supporting elements within the car park firecell:

- C = 0.5 if unsprinklered, or
- = 0.25 if sprinklered.

6.10.6 Where smoke control in a car parking firecell is by natural cross-ventilation, perimeter walls on each floor shall have permanent openings to the outside environment. The size of those openings shall 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 no less than half the total perimeter wall length.

6.11 Purpose Group ID

6.11.1 Firecells in which ID is the primary purpose group, shall meet the same fire safety precautions as specified in Table 4.1 for purpose group WM, and shall be separated from adjacent firecells by fire separations having a FRR of no less than 60/60/60.

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6.11.2 Where purpose group ID provides only support functions to another purpose group, and meets the requirements of Paragraphs 5.6.7 and 5.6.8 the ID function need not be individually fire separated and may be included with the primary purpose group.

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Plant, boiler and incinerator rooms

6.11.3 Within a building any space (see Figure 6.3) containing an incinerator, plant, boiler or machinery which uses solid fuel, gas or petroleum products as the energy source, (but excluding space heating appliances), shall be a separate firecell with a rating of F60, or F90 if the adjacent firecells contain SC and SD purpose groups, and shall have:

- a) At least one wall an external wall,
- b) Access direct from the outside. If internal access is also provided, it shall be through a protected path equipped with a heat detector which activates a warning alarm in frequently occupied spaces within the building, and
- c) Its floor level no lower than the ground level outside the external wall if gas is the energy source.

6.11.4 Where plant is contained in a building separated by 3.0 m or more from any adjacent building, only Paragraph 6.11.3 c) shall apply.

6.12 Firecell Construction

6.12.1 Each of the building elements enclosing a firecell may have different FRRs depending on the characteristics of the firecell, the reason for the FRR, and the purpose groups contained on either side of any fire separation. A zero rating may apply to some walls and most roofs.

6.12.2 Except as provided for in Paragraph 6.14.1 each floor in a multi-storey building shall be a fire separation.

6.12.3 Fire and smoke separations shall have no openings other than:

- a) For closures such as doorsets, and for penetrations, satisfying the provisions of Paragraphs 6.17 and 6.19, and
- b) Glazing permitted by Paragraph 5.8.

Fire dampers

6.19.14 Unless fully enclosed by *construction* with a *FRR* of no less than that required for the *fire separation*, any air duct passing through a *fire separation* shall be equipped with a *fire damper*, which in the event of duct failure or collapse, closes the opening through the separation. The *fire damper* shall have a *FRR* of no less than that of the *fire separation*, and shall be readily accessed for servicing.

COMMENT:

Fire dampers are not effective in stopping smoke and are thus not required in *smoke separations*. Smoke control in ducts is affected by smoke control devices in the air-handling system. Refer Paragraph 6.23.2.

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Fire shutters

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

COMMENT:

Any floor having any permanent opening is treated as an *intermediate floor*, and the smoke control requirements of Paragraphs 6.21.3 and 6.21.4 apply.

6.19.16 The *fire shutter* shall be automatically activated by a signal from any installed detector system, e.g. smoke or heat detectors, or sprinklers.

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

6.20 Interior Surface Finishes, Floor Coverings and Suspended Flexible Fabrics

General principles

6.20.1 Within individual *household units* of *purpose groups* SR and SH there are no restrictions on the use of suspended flexible fabrics, and the only *surface finish* requirements are those given in Table 6.3 for *foamed plastics*.

6.20.2 For other *purpose groups* the *surface finish* requirements, which depend on the specific *purpose group* and location, are given in Table 6.2. These may be modified in accordance with Paragraph 6.20.5 where sprinklers are used.

6.20.3 In unsprinklered *firecells*, in any position not covered by the exceptions of Paragraphs 6.20.1 and 6.20.4, interior *surface finishes* on walls and ceilings shall have a *SFI* of no greater than 9, and where the *SFI* exceeds 5, the *SDI* shall not exceed 8.

Exceptions

6.20.4 *Surface finish* requirements do not apply to:

- a) Electrical switches, outlets, cover plates and similar small discontinuous areas.
- b) Pipes and cables.
- c) *Handrails* and general decorative trim such as architraves, skirtings and window components including reveals.
- d) Damp-proof courses, seals, caulking, flashings, thermal barriers in cold store walls, and ground moisture barriers.
- e) Timber joinery and structural timber *building elements* such as columns, beams and portals.
- f) Individual *doorsets* and continuous areas of permanently installed openable wall partitions, having a surface area of not more than 25% of the room floor area or 5 m², whichever is the greater.

COMMENT:

This provision effectively provides an exemption for *surface finishes* on most door leaves but not for folding or similar doors used to divide spaces into separate rooms.

- i) the height of the highest *intermediate floor* above the *firecell* floor level, and
- ii) the average floor to atrium ceiling height measured from the highest open *intermediate floor*, and
- iii) that the plan dimensions do not exceed the provisions of Paragraph 6.22.9.

COMMENT:

If the highest *intermediate floor* is not open to the atrium space, but is enclosed by a *smoke separation*, the average height (described in Paragraph 6.22.8 a) ii) may be measured from the next lower *intermediate floor*. This permits the atrium space between enclosed *intermediate floors* to be used as part of the smoke reservoir.

- b) For atriums with no natural smoke ventilation or mechanical smoke extraction, the reservoir volume shall meet the requirements of Table 6.4.
- c) For atriums having natural smoke ventilation or mechanical smoke extract, the smoke reservoir requirements shall be satisfied by complying with the vent area and extract provisions of Tables 6.5 and 6.6.

6.22.9 A smoke reservoir shall be no greater than 1000 m² in plan area and have a maximum dimension of 60 m in any direction.

COMMENT:

1. The restriction on smoke reservoir area prevents excessive cooling which could reduce smoke buoyancy.
2. It is acceptable to have more than one smoke reservoir in a *limited area atrium firecell* but the restriction on the maximum area of *intermediate floors* (Paragraph 6.22.2) still applies.

Natural smoke ventilation

6.22.10 For natural smoke ventilation, the minimum permitted open area for smoke vents at the top of the atrium and for make-up inlet air vents within 1.5 m of the *firecell* floor level, shall be determined from Table 6.5. There is no specific requirement for the

horizontal distribution of inlet and smoke vent areas around the atrium perimeter, as the limitation on smoke reservoir size (Paragraph 6.22.9) ensures effective natural smoke ventilation. Flexibility in the respective areas of inlet and smoke vents is permitted by using any of the following combinations:

- a) Inlet vents with 200% and smoke vents with 100% of the area required by Table 6.5, or
- b) Both inlet and smoke vents with 135% of the area required by Table 6.5, or
- c) Inlet vents with 112.5% and smoke vents with 225% of the area required by Table 6.5.

COMMENT:

Although there is no specific requirement for the distribution of inlet and smoke vents, Paragraph 6.22.13 applies and they should, where practicable, be distributed to avoid pockets of smoke stagnation within the smoke reservoir.

Mechanical smoke extract

6.22.11 For mechanical smoke extract systems, smoke extract rate and inlet vent areas for make-up air shall comply with Table 6.6. The number of extract points required by Table 6.6 is a minimum but, in no case shall extract points be located closer than 10 m apart and there shall be at least one extract point for every 20 m over the length of the atrium.

6.22.12 The mechanical smoke extract system shall be:

- a) Capable of removing smoke from all spaces within the *firecell*,
- b) Activated automatically by the smoke detection system (required by Paragraph 6.22.2 g)) in response to *fire* anywhere in the *firecell*. A manual control shall also be provided, located in a position approved by the Fire Service,

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Emergency power supply

6.23.3 Where required by Table 4.1, an emergency power supply system complying with NZS 6104 shall be installed to ensure that in a *fire*, emergency power is available for:

- a) Operating all components of the smoke control system,
- b) Returning all passenger carrying lifts to the floor level of the lowest *final exit*, and for operating designated *fire* fighters' lifts, and
- c) Operating the emergency lighting system. (See NZBC F6 for the requirements of lighting for emergency.)

6.23.4 The emergency power supply shall have sufficient capacity for continuous operation of all the systems in Paragraph 6.23.3 for a period of time no less than that required for emergency lighting in F6/AS1 Paragraph 1.1.3.

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Paragraphs 5.6.5 c), 6.19.1, 6.19.3, 6.19.4 c) and d), 6.19.12 and 6.19.13

Minimum Performance	Location of the closure	Row
-/-	In a <i>final exit</i> .	1
-/- Sm	In a separation required only for smoke control, e.g. between an <i>open path</i> and a <i>protected path</i> in all <i>purpose groups</i> (Notes 1 and 2).	2
-/*/*	In a <i>fire separation</i> between a <i>protected shaft</i> and <i>firecell</i> , which is not an <i>exitway</i> , where the <i>escape route</i> does not pass through the closure.	3
	In a <i>fire separation</i> between <i>firecells</i> which are neither SR, SA, SC, SD <i>purpose groups</i> nor <i>other property</i> , and where the <i>escape route</i> does not pass through the closure.	
-/*/* Sm	In a <i>fire separation</i> between <i>firecells</i> which are SR, SA, SC or SD <i>purpose groups</i> or <i>other property</i> .	4
	All closures in a <i>fire separation</i> between <i>firecells</i> where the <i>escape route</i> passes through any closure in that <i>fire separation</i> .	
	In a <i>fire separation</i> between an unsprinklered <i>firecell</i> and a <i>safe path</i> or <i>protected path</i> (Note 2).	
-/*/- Sm	In a <i>fire separation</i> between an unsprinklered <i>protected shaft</i> and a <i>safe path</i> or <i>protected path</i> (Note 2 and for lift doors Note 3).	5
	In a <i>fire separation</i> between sprinklered <i>firecells</i> where the closure is part of an <i>escape route</i> .	
	In a <i>fire separation</i> between a sprinklered <i>firecell</i> and a sprinklered <i>safe path</i> (Note 2).	
	In a <i>fire separation</i> between a sprinklered <i>firecell</i> and a sprinklered <i>protected shaft</i> (Note 3 for lift doors).	

Notes:

Sm indicates that the closure has smoke control capability.

* means the *FRR* required for the *fire separation*, except that the *insulation* rating need be no greater than 30 minutes.

- Paragraph 3.17.12 requires *smoke control doors* (i.e. -/- Sm) to be used in certain circumstances.
- Smoke control capability (Sm) may be deleted if the *safe path*, or *protected path* is pressurised (*fire safety precaution* Type 13). This is because the airflow created by pressurisation is intended to inhibit smoke *penetration*.
- Smoke control capability Sm may be deleted for *doorsets* opening into a lift shaft if:
 - The *firecell* is sprinklered and has an automatic smoke detection system, or
 - A *smokecell* is placed between the doors and the rest of the *firecell*, but refer to Paragraph 3.12.3 for when a lift shaft can be included within a vertical *safe path* permitting a door without smoke control capability to be used.

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Oct 2005**Table 6.2: Requirements for Interior Surface Finishes and Suspended Flexible Fabrics to Inhibit Fire Spread**
Paragraphs 6.18.2 d), 6.20.2, 6.20.5, 6.20.7, 6.20.16, 6.20.20 and 6.20.21

Building elements	Purpose group or location (Note 1)	Maximum permitted index			Row
		SFI	SDI	FI	
Walls, ceilings (Note 2)	<i>Exitways in all purpose groups.</i>	0	3	-	1
	<i>Sleeping areas in purpose groups SC and SD.</i>				
	<i>All occupied spaces in purpose groups CS and CL excluding exitways (see also Paragraph 6.20.7).</i>				
	<i>All occupied spaces in purpose group CM where the occupant load is greater than 50.</i>	2	5	-	2
	<i>Sleeping areas in purpose group SA (see also Paragraph 6.20.6 for trampers' huts).</i>				
	<i>Passageways, corridors and stairways not being part of an exitway in all purpose groups except SH and SR.</i>	7	5	-	3
	<i>Minimum requirement for all occupied spaces in all purpose groups except within household units in purpose groups SR and SH.</i>	5 or 9	10 8	-	4
<i>Within individual household units in purpose groups SR and SH.</i>		Nil requirement		5	
Flooring (coverings)	<i>Exitways.</i>			<i>Non-combustible, or have low radius of effects of ignition (see Paragraph 6.20.8).</i>	6
	<i>Any occupied space in purpose groups SC and SD.</i>				
Ducts for HVAC systems	<i>Internal surfaces.</i>	0	3	-	7
	<i>External surfaces.</i>	7	5	-	8
Acoustic treatment and pipe insulation	<i>Within air-handling plenum in purpose groups SC, SD, SA and SR.</i>	7	5	-	9
Suspended flexible fabrics	<i>Exitways serving purpose groups SC, SD, SA, SR and CO.</i>				
	<i>All occupied spaces in purpose groups CS and CL including exitways.</i>				
	<i>All occupied spaces including exitways in purpose group CM where occupant load is greater than 50.</i>	-	-	12	10
	<i>Underlay to exterior cladding or roofing when exposed to view in occupied spaces in purpose groups SC, SD, SA, WL, WM, WH, WF, CO, CM, CS, CL and IE.</i>				
Membrane structures	<i>Purpose groups CM, CS and CL.</i>			<i>Pass the standard test for flammability of membrane structures.</i>	11
Column 1	2		3		
Key:	SFI = spread of flame index	(The smaller the index number the more stringent the requirement)			
	SDI = smoke developed index				
	FI = flammability index				

Notes:

- For the purposes of this table, the term "occupied spaces" means a space that can be expected to be occupied during normal use of the building by its intended occupants. It does not include *concealed spaces* or ceiling cavities which may be accessed only through a hatch, or plant rooms and the like occupied only for maintenance purposes.
- Sprinklered firecells:** See Paragraph 6.20.5 for reduced requirements in sprinklered *firecells*.

7.9.19 Paragraph 7.9.18 applies where the floors are *fire separations* between *firecells*. It does not apply within *household units of purpose groups SH and SR* or to any *external wall* satisfying the test requirements of Paragraph 7.11.2 b).

COMMENT:

1. Horizontal *fire stop* barriers are needed to prevent progressive involvement of insulants in *fire* by restricting hot gases or flames from travelling upwards within the insulation layer. In practice it may be necessary to specify movement joints to control cracking of the render or surface coating, and these may be conveniently incorporated within barriers. Further guidance and suitable *fire barrier* details may be found in BRE Defect Action Sheet DAS 131 dated May 1989 with additional information provided in BRE Report "Fire performance of external thermal insulation for walls in multi-storey buildings", 1988.
2. *Combustible* insulants may include expanded polystyrene (EPS), polyisocyanurate, or polyurethane. The insulants may be covered on the exterior side with a sheet material or with a thin rendered cementitious or polymeric coating.

7.10 FRRs of External Walls

7.10.1 *Building elements* which are part of an *external wall* shall be *fire rated* as required by Paragraphs 5.7.5 and 5.7.6.

7.10.2 Except as provided for in Paragraphs 7.10.7 to 7.10.9, any part of an *external wall* enclosing a *firecell* and not permitted to be an *unprotected area*, shall have a rating based on the higher of the *F* or *S rating* applicable to that *firecell*.

7.10.3 When the *unprotected area* of an *external wall* is permitted to be 100%, but the *primary elements* in the line of that wall are required to be *fire rated*, the rating of those *primary elements* shall be based on no less than the *F rating*.

COMMENT:

Primary elements are required to be *fire rated* in *buildings* with an *escape height* of greater than 25 m, and where they support, or are an integral part of, other *fire rated building elements*. See Paragraphs 5.3, 5.9, 7.9.4 and 7.9.5.

Return walls and wing walls

7.10.4 Return walls and wing walls shall be rated as for *external walls* (see Paragraphs 5.7.5 and 5.7.6).

Fire resistance ratings shall be no less than required for the *fire separations* of the *firecell*, or for the *primary elements*, whichever is the greater.

COMMENT:

Fire rating of external walls on both sides equally is required by Paragraph 5.7.6 where:

- Walls are within 1.0 m of a *relevant boundary*, or
- The *firecell* contains *purpose groups SC, SD or SA* with one or more floor levels above their *final exit* or *SR* with two or more levels above the *final exit*, or
- The *building height* is greater than 10 m.

Small buildings

7.10.5 An *S rating* need not be applied to single floor small *buildings* where:

- a) The *FHC* is no greater than 1, and
- b) The floor area is no greater than 40 m², and
- c) It does not contain a sleeping *purpose group*.

However, a *FRR* of no less than 30/30/30 shall apply to any *external wall* less than 1.0 m from the *relevant boundary*.

COMMENT:

This paragraph is intended to apply to garages, sheds and similar *buildings*, not to sleeping accommodation such as granny flats.

It is considered that *other property* is adequately protected for such *buildings* by providing a simple *FRR* to the wall.

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Purpose groups SH and SR

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7.10.6 For detached dwellings (*purpose group* SH), in which the *household unit firecell* contains no more than three floor levels, the *external walls* are required to be *fire rated* only if less than 1.0 m from the *relevant boundary*. In that case the *external wall* shall have a *FRR* of no less than 30/30/30. The same provisions apply to *multi-unit dwellings* (*purpose group* SR), provided that adjacent *household unit firecells* are located only at ground level and are not one above another.

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7.10.7 Where a *building* contains *purpose group* SR with no more than two household units located vertically one above the other, and with no more than two floor levels in each, parts of the *external wall* not permitted to be *unprotected areas* shall have a *FRR* of no less than 30/30/30.

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7.10.8 For all SH and SR *buildings* not described in Paragraphs 7.10.6 and 7.10.7, *external walls* not permitted to be *unprotected areas* shall have a *FRR* derived from the *S rating*.

7.11 Exterior Surface Finishes

Roofs

7.11.1 For roofs in *purpose groups* SC and SD, *combustible* materials shall not be used as an external cladding except that, a *combustible* surfacing which is in close contact with and adhered to, either a *non-combustible* substrate or timber no less than 18 mm thick, is acceptable.

External walls

7.11.2 The peak rate of heat release and the total heat released from the *external wall* cladding system, as determined in accordance with Paragraph C9.1, shall not exceed the limits given in Table 7.5. These requirements do not apply where:

- a) *Surface finishes* are no more than 1.0 mm in thickness and applied directly to a *non-combustible* substrate, or
- b) The entire wall assembly has been tested at full scale in accordance with NFPA 285 and passed the test criteria.

COMMENT:

Other full scale facade test methods may also be acceptable to the *territorial authority*.

7.11.3 Where a *building* has *firecells* containing different *purpose groups*, the acceptable peak rate of heat release and total heat released (as specified in Table 7.5) of an *external wall* cladding system may have different values provided that:

- a) For each *purpose group* the value is no greater than required by Table 7.5 for the *building height* (not just the height of the *firecell*), and
- b) The value applied to a *firecell* is no greater than required by any *firecells* at a higher level on that wall.

COMMENT:

1. This means that where any *purpose group* requires a Type B performance, all lower floors shall have either a Type B or Type A performance in terms of Table 7.5. Should any *purpose group* require a Type A performance, all floors below shall have a Type A performance.

2. For *external walls* the acceptable properties of *external wall cladding systems* depend on the *purpose group*, the *building height*, presence of sprinklers and the distance from the *relevant boundary*.
3. An *external wall cladding system* includes any applied *surface finish* such as a paint or other coating combined with the substrate material. *Fire tests* should be carried out on samples representative of the finished product as used on the *building*, in order to determine compliance with Table 7.5.
4. While the specific heat release rate of a cladding system must be verified by *standard test* results, the following is an indication of the performance of some types of *construction*.

- *Non-combustible* materials such as concrete, brick, glass and steel meet the Type A and Type B requirements.
- Cellulose fibre-cement products with applied finishes/coatings less than 1.0 mm thick would “typically” meet Type A and Type B requirements.
- Ordinary timber products would “typically” not meet the requirements of Type A or Type B.

Purpose group SH

7.11.4 Buildings of *building height* less than 10 m and containing *purpose group SH* need not comply with Table 7.5 where an *external wall* is more than 1.0 m from the *relevant boundary*.

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Glazing area (m ²)	Method 1 – Permitted Areas of Fire Resisting Glazing Paragraphs 7.3.13, 7.3.14, 7.3.15 b), 7.4.2 and Figure 7.4					
	Minimum distance to relevant boundary (m)					
	Unsprinklered firecells			Sprinklered firecells		
	FHC 1	FHC 2	FHC 3 or 4	FHC 1	FHC 2	FHC 3 or 4
1.0 or less	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.5	0.7	0.9	0.0	0.0	0.4
2.0	0.6	0.8	1.1	0.0	0.0	0.5
2.5	0.7	0.9	1.2	0.0	0.0	0.5
3.0	0.7	1.0	1.3	0.0	0.0	0.6
3.5	0.8	1.0	1.4	0.0	0.0	0.6
4.0	0.9	1.1	1.5	0.0	0.0	0.7
4.5	0.9	1.2	1.6	0.0	0.0	0.7
5.0	0.9	1.2	1.6	0.0	0.1	0.7
5.5	1.0	1.3	1.7	0.0	0.1	0.8
6.0	1.0	1.3	1.8	0.0	0.2	0.8
6.5	1.1	1.4	1.9	0.0	0.2	0.8
7.0	1.1	1.4	2.0	0.0	0.2	0.9
7.5	1.1	1.4	2.1	0.0	0.3	0.9
8.0	1.2	1.5	2.2	0.0	0.3	1.0
8.5	1.2	1.5	2.3	0.0	0.4	1.0
9.0	1.3	1.6	2.4	0.0	0.4	1.1
9.5	1.3	1.7	2.5	0.0	0.4	1.1
10.0	1.3	1.7	2.6	0.0	0.5	1.2
11.0	1.4	1.9	2.7	0.0	0.5	1.3
12.0	1.4	2.0	2.9	0.0	0.6	1.4
13.0	1.5	2.1	3.1	0.1	0.7	1.5
14.0	1.6	2.2	3.2	0.1	0.7	1.6
15.0	1.7	2.3	3.4	0.2	0.8	1.7

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Rectangle height 1 m

Table 7.2/1: Method 2 – Enclosing Rectangles Permitted Unprotected Areas in Unsprinklered Buildings
Paragraphs 7.3.12, 7.3.13, 7.3.14, 7.3.15 b), 7.5.2, 7.5.3, 7.5.5 and Figures 7.5, 7.6 and 7.8

Distance to relevant boundary (m)	Percentage permitted unprotected area																							
	Fire Hazard Category 1						Fire Hazard Category 2						Fire Hazard Category 3 and 4											
	Width of enclosing rectangle (m)						Width of enclosing rectangle (m)						Width of enclosing rectangle (m)											
	2	3	4	6	8	10	15	20	2	3	4	6	8	10	15	20	2	3	4	6	8	10	15	20
1.0	100	100	100	97	93	91	90	89	100	96	84	74	71	70	69	68	84	64	56	50	48	47	46	46
1.1			100	98	96	94	94	94	100	100	89	78	75	73	72	72	91	69	60	53	50	49	48	48
1.2				100	100	99	99	98			95	83	79	77	75	75	99	74	64	56	53	52	51	50
1.3					100	100	100	100			100	87	83	80	79	78	100	80	68	59	56	54	53	53
1.4												92	86	84	82	81		85	72	62	58	57	55	55
1.5												97	91	88	85	85		91	77	65	61	59	57	57
1.6											100	95	92	89	88		97	81	68	64	62	60	59	59
1.7												99	95	92	91		100	86	72	67	64	62	61	61
1.8												100	99	96	95			91	75	70	67	64	64	64
1.9													100	99	98			96	79	72	69	67	66	66
2.0														100	100			100	83	76	72	69	68	68
2.1																			87	79	75	72	71	71
2.2																				90	82	78	74	73
2.3																				94	85	81	76	75
2.4																				99	88	83	79	78
2.5																			100	92	86	81	80	80
2.6																				95	89	84	82	82
2.7																				99	92	86	85	85
2.8																				100	95	89	87	87
2.9																					99	91	89	89
3.0																					100	94	92	92
3.4																						100	100	100

Notes:

1. Percentage *unprotected areas* may be linearly interpolated between enclosing rectangle widths and between distances to the *relative boundary*.
2. For enclosing rectangle widths greater than 20 m, an enclosing rectangle width of 20 m may be used.

Table 7.3: Method 4 – Return Walls and Wing Walls for Unsprinklered Firecells Protection of Other Property
 Paragraphs 7.3.13, 7.3.15, 7.7.1, 7.7.4, 7.7.5, 7.7.6 and 7.7.7

Equivalent opening height h_{eq} (m)	Return walls										Wing walls													
	Minimum separation distance between unprotected areas and notional boundary D_B (m)										Minimum length of wing wall if located on the relevant boundary L_B (m)													
	Equivalent opening width W_{eq} (m)										Equivalent opening width W_{eq} (m)													
Fire hazard category 1	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Fire hazard category 2	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.6	0.7	0.9	1.0	1.1	1.1	1.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Fire hazard category 3 & 4	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Note:
 The values of D_B or L_B may be linearly interpolated where exact values of h_{eq} or W_{eq} are not shown in the table.

Table 7.4: Method 4 – Return Walls and Wing Walls for Unsprinklered Firecells Protection of Sleeping Purpose Groups or Safe Paths on the Same Property
Paragraphs 7.3.13, 7.7.1, 7.7.4, 7.7.5, 7.7.6 and 7.7.7

Equivalent opening height h_{eq} (m)	Return walls										Wing walls													
	Minimum separation distance between unprotected areas and notional boundary D_B (m)										Minimum length of wing wall if located on the relevant boundary L_B (m)													
	Equivalent opening width W_{eq} (m)										Equivalent opening width W_{eq} (m)													
	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20	1	2	3	4	6	8	10	20
Fire hazard category 1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6
Fire hazard category 2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.6	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Fire hazard category 3 & 4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Fire hazard category 1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Fire hazard category 2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Fire hazard category 3 & 4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1

Note:

The values of D_B or L_B may be linearly interpolated where exact values of h_{eq} or W_{eq} are not shown in the table.

Amend 5
Oct 2005**Table 7.5: Acceptable Heat Release Rates for External Wall Cladding Systems**
Paragraphs 7.3.13, 7.3.14, 7.8.6, 7.8.10 a), 7.11.2, 7.11.3, 7.11.4, C9.1.3 and Figure 7.10

Building height	Distance to relevant boundary			
	Less than 1 m	1 m or more		
	All purpose groups	Purpose groups SC, SD	Purpose groups SA, SR	All other purpose groups
Single storey	A	-	-	-
Up to 7 m	A	B	-	-
Up to 25 m	A	A	B	B (Notes 1, 2)
Over 25 m	A	A	A	B

Key:

The *external wall* cladding system shall have a peak rate of heat release and a total heat released not greater than given below for the applicable performance level (Note 3).

	Peak Rate of Heat Release (kW/m ²) (Note 4)	Total Heat Released (MJ/m ²) (Note 4)	
A	100	25	(The smaller the heat release value the more stringent the requirement.)
B	150	50	
-	No requirement	No requirement	

Notes:

- See Paragraph 7.11.4 for SH *purpose group* concession.
- Where the *building* is fully sprinklered in accordance with NZS 4541 or NZS 4515 (as applicable), there is no requirement.
- See Paragraph 7.11.3 for permitted variation over the wall height where a *building* contains different *purpose groups*.
- Determined by testing to AS/NZS 3837 at an irradiance of 50 kW/m² for a duration of 15 minutes (see Appendix C Paragraph C9.1).