

**SINGAPORE CIVIL DEFENCE FORCE  
FIRE SAFETY & SHELTER BUREAU**



**Civil Defence Complex 91 Ubi Ave 4 Singapore 408827 Fax : 8481488**  
Website : <http://www.scdf.gov.sg>

*Please quote our ref. no. in all future correspondences*

Our Ref: CD/FSSB/12/01/03/02

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FAX: 8481493

18<sup>th</sup> Jan 2002

Registrar, Board of Architects (BOA)  
Registrar, Professional Engineers Board (PEB)  
President, Singapore Institute of Architects (SIA)  
President, Institution of Engineers, Singapore (IES)  
President, Association of Consulting Engineers, Singapore (ACES)

Dear Sirs

**FIRE CODE REVIEW COMMITTEE-  
3RD RELEASE OF CHANGES/AMENDMENTS TO FIRE CODE 1997**

The Fire Code Review Committee, which comprises representatives from \*SIA, IES, ACES, REDAS, SISV, HDB, JTC, NTU, NUS, BCA, LTA, IFE, PSA, PSB Corp and SCDF, met monthly as from 7<sup>th</sup> Dec 1999 to review the Code of Practice for Fire Precautions in Buildings 1997 or Fire Code 1997.

- 2 FSSB is pleased to forward to you the 3rd release of changes/amendments to the Fire Code, which have been deliberated and agreed upon by members of the Fire Code Review Committee. These changes/amendments were presented at the last FSSB Seminar held on 26<sup>th</sup> & 27<sup>th</sup> Sep 2001. A reprint of the relevant pages of the Fire Code incorporating the changes/amendments, which are highlighted by a black vertical line, are given in Annexes A, B and C. The changes/amendments to the fire code, which are categorised under Annexes A, B & C, shall be implemented as follows:

Annex A - with immediate effect:  
Annex B - as from 1<sup>st</sup> May 2002; and  
Annex C - as from 1<sup>st</sup> August 2002.

- 3 Please convey the contents of this circular and Annexes A, B and C to members of your Institution/Association/Board/Organisation. You may reprint or photocopy the relevant pages incorporating the changes/amendments to the Fire Code at Annexes A, B and C for dissemination to your members. The circular is also available in our website: <http://www.scdf.gov.sg>

A PROUD MEMBER OF THE HOME TEAM



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Yours faithfully

Teo Lim Teck  
Secretary, FSSB Standing Committee  
for Commissioner  
Singapore Civil Defence Force

cc

CEO, BCA  
All members of FSSB Standing Committee  
All members of Fire Code Review Committee  
President, REDAS  
President, IFE  
President, SISV  
CEO, HDB  
Group President, PSA  
CEO, JTC  
CE, LTA (Attn: Mr Mohinder Singh)  
CE, PSB Corp. (Attn: Mr Lau Keong Ong/Ms Tan Chiew Wan)

\*SIA – Singapore Institute of Architects  
IES – Institution of Engineers, Singapore  
ACES – Association of Consulting Engineers, Singapore  
REDAS – Real Estate Developers' Association of Singapore  
SISV – Singapore Institute of Surveyors & Valuers  
HDB – Housing & Development Board  
JTC – Jurong Town Corporation  
NTU – Nanyang Technological University  
NUS – National University of Singapore  
BCA – Building Control Authority  
LTA – Land Transport Authority  
IFE – Institution of Fire Engineers  
PSA – PSA Corporation Limited  
PSB Corporation  
SCDF – Singapore Civil Defence Force

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**3<sup>RD</sup> RELEASE OF CHANGES / AMENDMENT TO FIRE CODE 1997**

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**3<sup>RD</sup> RELEASE OF CHANGES / AMENDMENTS TO FIRE CODE 1997**

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**3<sup>RD</sup> RELEASE OF CHANGES / AMENDMENT TO FIRE CODE 1997**

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- 1.2.26 A horizontal extension of a vertical exit viz exit staircase or a passage leading from a courtyard to an open exterior space, complying with the requirements of Cl.3.8 for protected shafts in respect of fire resistance ratings for enclosure walls, floors, ceilings and doors, that serves as a required exit. Exit passageway
- Exit passageway shall be required to comply with the provisions of Cl. 2.3.2.
- 1.2.27 A staircase which has its enclosure constructed of non-combustible material having a fire resistance of not less than the minimum period required by Cl. 3.3, for Elements of Structure for the part of the building in which it is situated. Exit staircase
- 1.2.28 Material fixed to the outside face of an external wall for weather protection or decorative purpose. External cladding
- 1.2.29 (a) An exit staircase which serves as a required exit shall be located outside the building and open to the outdoor air, and enclosed by parapet walls or railing only. External exit staircase  
Amended under supplement 4/2000 dated 4 Dec 2000
- (b) An external staircase shall qualify as an external exit staircase if it is located within or abutting an air-well(which is open to sky and is required to provide lighting and ventilation to the occupancy areas)having the minimum size in relation to the habitable height of the building as given in the Table 1.2.29 below: **Amended under Supplement 2/2002 dated 18th Jan 2002 (Effective date: 1<sup>st</sup> Aug 2002**
- | <u>Table 1.2.29</u>               |                              |
|-----------------------------------|------------------------------|
| <u>Minimum Air-well size</u>      |                              |
| Max. Habitable Height of Building | Min. Clear width of Air-well |
| 18m                               | 10m                          |
| 24m                               | 11m                          |
| 36m                               | 12m                          |
| 48m                               | 13m                          |
| 60m and above                     | 14m                          |
- 1.2.30 An exit passageway open to the outdoor air, that serves as a required exit. External exit passageway
- External Exit Passageway shall comply with the provisions of Cl. 2.3.2(c).

1.2.34	A smoke-stop lobby which is adjacent to a fire lift and designated for use by the fire fighting team during an emergency. The lobby shall not be used for any other purposes and the size of the lobby shall not be smaller than 6 sq m and with no dimension smaller than 2m.	Fire-fighting lobby Amended under Supplement 2/2002 dated 18 <sup>th</sup> Jan 2002 (Effective date : 18 Jan 2002)
1.2.35	For air-conditioning and mechanical ventilation systems:  (a) Flexible joints means connections between ducts and equipment normally provided to isolate vibration and to allow thermal movement.  (b) Flexible connections means flexible sections of ducts provided to connect the extremity of ventilation ductwork to terminal units, extract units and grilles.	Flexible joints and flexible connections
1.2.36	A storey of the building with habitable room. A habitable room means any room not less than 6.5 m <sup>2</sup> in area and does not include any bathroom, water-closet, open verandah, terrace, garage and lift motor room.	Habitable floor Amended under Supplement 4/2000 dated 4 Dec 2000
1.2.37	The habitable height is the height measured from the lowest level of fire engine accessway or hardstanding to the finished floor level of the highest habitable floor.	Habitable height Amended under Supplement 4/2000 dated 4 Dec 2000
1.2.38	The height of building or (where relevant) of part of a building as described in the Code, means the height of such building or part, measured from the average level of the ground adjoining the outside of the external walls of the building to the level of half the vertical height of the roof of the building or part, or the top of the walls or of the parapet (if any), whichever is the higher.	Height of building
1.2.39	Any occupancy in which the contents or activities include one or more of the following:  (a) materials that will flame up by themselves without the presence of any fire source below the ignition temperature of 200°C,	High hazard occupancy

- (ii) the finished surface of the wall and the inner side of the balustrade, if the staircase has a wall on one side and a balustrade on the other side, or
- (iii) the inner sides of the balustrades if the staircase has balustrades on both sides, and

the projection of handrail on each side of a staircase shall not exceed 80mm.

- (b) In the case of an exit door opening, between the edge of the door jamb or stop and the surface of the door when kept open at an angle of 90 degrees in the case of a single leaf door; and in the case of a double leaf door opening, between the surface of one leaf to the other when both leaves are kept open at an angle of 90 degrees. See diagram 2.2.9(b).

2.2.10 There shall be at least two door openings remote from each other and leading to exits from every room or enclosed space in which the total occupant load exceeds the maximum permissible occupant load for one door as listed in the table below: Number of exits from rooms and spaces

Type of Occupancy	Maximum Occupant Load with One Door
High Hazard	25
Patient accommodation area	50
Classrooms	50
Dormitories	50
Godowns, stores, and factories not being of high hazard type	50
Assembly	50
Rooms and spaces with occupancy of more than 50 persons shall comply with the requirements for 'Number and Width of Exits' under Cl.2.8.2 for Assembly Occupancy.	

**Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date: 18 Jan 2002)**



- (a) In a building comprising more than 4 basement storeys, entry to exit staircases serving the basement storeys at every basement storey level shall be through smoke-stop lobbies, one of which shall be designated as fire fighting lobby. The exit staircase connecting to the fire fighting lobby shall be pressurised to comply with the requirements in Chapter 7, and basement
- (b) In a building comprising 2, 3 or 4 basement storeys, entry at every basement storey level to at least one of the exit staircases serving the basement storeys shall be through a smoke-stop lobby and where only one smoke-stop lobby is provided, it shall be required to serve as a fire fighting lobby, and
- (c) Smoke-stop lobbies in basement occupancies shall be required to comply with the relevant provisions under Cl. 2.2.13(b) and shall be mechanically ventilated to comply with the requirements in Chapter 7.

2.2.15 When a floor area has access to Area of Refuge in compliance with following requirements in this Clause, the occupant load for which vertical exits are to be accounted for the floor area may be reduced to half when one Area of Refuge is provided and to one-third when two or more Areas of Refuge are provided. Area of refuge and exit reduction

- (a) Area of Refuge shall be :
  - (i) Adequate in size to hold the occupant load it receives from the floor area it serves as provision for required exit, in addition to its own occupant load calculated on the basis of 0.3 m<sup>2</sup> per person except for Health Care Occupancies when the occupant load shall comply with the provisions under Cl. 2.5.3 , and
  - (ii) Provided with at least one staircase for use by the occupants to gain access to other exit staircases or the ground level directly to an exterior open space; and

**Amended under  
Supplement  
2/2002 dated 18<sup>th</sup>  
Jan 2002  
(Effective date 1<sup>st</sup>  
May 2002)**

- (vi) if the exit staircase which connects to the internal exit passageway is pressurised, the internal exit passageway shall not be naturally ventilated but shall be mechanically ventilated, and it shall be pressurised to comply with the requirements in Chapter 7.

2.3.2 (c) External exit passageway:

- (i) an external exit passageway may be used as a required exit in lieu of an internal exit passageway, provided that the external wall between the exit passageway and the rest of the floor space may have ventilation openings of non-combustible construction, fixed at or above a level 1.8m, measured from the finished floor level of the passageway to the sill level of the openings and such ventilation openings shall be located not less than 3.0 m from any opening of an exit staircase, and
- (ii) an external exit passageway may not be subjected to the limitations of a maximum of two exit doors opening into the exit passageway, and
- (iii) an external exit passageway may be roofed over provided the depth of the roofed over portion shall not exceed 3m to avoid smoke logging, and
- (iv) an external exit passageway may be enclosed on the open side by only a parapet wall of not more than 1.0 m or more than 1.1m in height and the vertical height of the unobstructed ventilation opening measured from the parapet wall up to the top edge of the opening or eaves of overhang shall not be less than 1.2m, and

External exit passageway

**Amended  
under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan  
2002  
(Effective  
date: 18 Jan  
2002)**

	(iii) there shall be no unprotected openings of occupancy area within 1.5m horizontally or within 3m vertically below any part of the ventilation openings located in the external wall of the internal exit staircase.	Unprotected openings
2.3.3	(b) External Exit Staircase	External exit staircase
	(i) external exit staircase may be used as required exit in lieu of internal exit staircase provided it complies with the requirements of exit staircase, except for enclosure of an internal staircase, and	
	(ii) there shall be no unprotected openings within 3 m horizontally or within 3 m vertically below, or adjacent or facing (unless there is adequate separation complying with cl.3.5) any part of the external exit staircase; and	Amended under Supplement 3/2001 dated 18 May 2001
	Exception:	
	In building designed with external corridor access, the access to the external exit staircase shall be permitted by mean of the open sided external corridor adjoining the occupancy areas, subject to the following	<b>Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date: 18 Jan 2002)</b>
	(a) the external corridor shall be served by at least 2 exit staircases; and	
	(b) that unobstructed ventilation openings shall be provided along the long side of the external corridor above the parapet or balustrade: and	
	(iii) the external exit staircase shall be located so as to lead directly to a street or open space with direct access to street.	Effective date 1 June 2001
	(c) All exit staircases shall discharge at ground level directly into a safe exterior open space. However, in sprinkler protected building, maximum 50% of the total building exits may be allowed to discharge directly to the ground level circulation space subject to the following:	Discharge
	(i) The discharge point of the exit staircase shall be at a location in the circulation space at ground level within sight of and with direct access to a safe exterior open space; and	
	(ii) The maximum distance between the discharge point of an exit staircase and the exterior open space shall not exceed 10m.	

- (iii) the minimum width of a platform or landing and length shall be not less than the width of the ramp, except that on a straight-run ramp, the length of the level platform or landing need not be more than 1 m, and
  - (d) Exit ramps shall have walls, guards or handrails and shall comply with the applicable requirements of Cl.2.3.3(d) for exit staircases, and  
Guards and handrails
  - (e) All exit ramps shall be provided with non-slip surface finishes, and  
Surface
  - (f) Exit ramps shall be ventilated to comply with the requirements for ventilation of exit staircases, and  
Ventilation
  - (g) Exit ramps serving as means of escape to only one basement storey need not be protected by enclosure walls.  
Enclosure exemption
- 2.3.9 Exit doors and exit access doors shall comply with the following: Exit doors and Exit access doors
- (a) Exit doors shall be capable of being opened manually, without the use of a key, tool, special knowledge or effort for operation from the inside of the building; and  
Amended under Supplement 5/2000 dated 4 Dec 2000
  - (b) Exit doors which are required to have fire resistance rating shall comply with the relevant provisions for fire resisting doors under cl.3.9.2; and
  - (c) Exit doors and exit access doors shall open in the direction of exit travel: Door swing
    - (i) when lead to an area of refuge and exit passageway, or
    - (ii) when used in exit enclosure, including smoke stop and fire fighting lobbies in a building. It shall not apply to doors of individual residential units that open directly into an exit enclosure, or
    - (iii) when serving a high hazard area, or
    - (iv) when serving a room or space with more than 50 occupants, and
  - (d) (i) Exit doors opening into exit staircases and exit passageways shall not impede the egress of occupants when such doors are swung open, and  
Exit door opening  
Amended under Supplement 5/2000 dated 4 Dec 2000

- 2.4.5
- (c) Provision of exits from each residential apartment or maisonette shall comply with the requirements under Cl. 2.4.6 , and
  - (d) Travel distance from the most remote exit door to the exit staircase from each apartment or maisonette shall not exceed 15 m, and
  - (e) Exit staircase shall comply with the requirements of Cl.2.3.3 for exit staircases, and
  - (f) Approach to the exit staircase shall be through cross-ventilated lobby. The ventilation openings having a minimum width of 2000 mm and a minimum height of 1200mm shall be unobstructed from parapet wall or balustrade level upwards and be positioned on opposite sides of the lobby such that they provide cross-ventilation throughout the entire space of the lobby. Where multiple ventilation openings are provided on opposite sides of the lobby, the minimum width and height of each opening shall not be less than 1000 mm and 1200mm respectively, provided the aggregate width of the openings at each opposite side is not less than 2000mm. See diagram 2.4.5(f).
  - (g) Fire lift shall be provided to comply with the requirements in Chapter 6, and
  - (h) Dry rising main shall be provided to comply with the requirements in Chapter 6, and
  - (i) Access to the building for fire fighting appliances shall be provided to comply with the requirements in Chapter 4.

**Amended  
under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan 2002  
(Effective date:  
1<sup>st</sup> May 2002)**

2.4.6 Exits from Residential Unit

- (a) In each residential apartment or maisonette unit, the exit or exits shall be provided such that the travel distances measured from any point within the unit to the entrance door or doors of the unit shall not exceed 20m (see diagram 2.4.6(a)); and
- (b) In addition, in the case of a maisonette unit comprising not more than two storeys, where a single door is provided,
  - (i) the door shall not be located on the upper storey of the unit; and
  - (ii) the floor area of the upper storey shall not exceed 60 m<sup>2</sup>, unless a separate exit is provided on this upper storey.
- (c) all exits from residential or maisonette units shall have direct access to exit staircase, exit passageway or exterior open space.

Exits from residential unit  
**Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date: 1<sup>st</sup> May 2002)**

2.4.7 Travel distance shall be measured from the door or doors of the residential apartment or maisonette unit. Where a residential apartment is required to be provided with two doors at the same storey level, and if only one way escape or one exit staircase only is provided, the travel distance shall be measured from the most remote door. If two way escape is achieved, the travel distance shall be measured from each of the doors.

Measurement of travel distance

2.4.8 In a block of residential apartments or maisonettes, smoke free approach to an exit staircase is permitted by means of an external corridor subject to compliance with the following:

Smoke free approach to exit staircase  
**Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date: 1<sup>st</sup> May 2002)**

- 2.4.8 (a) Such external corridors conform to the requirements of external exit passageways for minimum width, headroom clearance, changes in floor level, The provision of parapet wall or balustrade which shall not exceed 1.1m or lower than 1m in height along the outer side of the corridor. The corridor may be roofed over, provided the depth of the roofed over portion shall not exceed 3000mm. The vertical height of the unobstructed ventilation opening measured from the parapet wall or balustrade up to the top edge of the opening or eaves of overhang shall not be less than 1.2m.
- (b) The residential apartment or maisonette shall be separated from the external corridor by an external wall with fire resistance rating of at least 1 hour, except that ventilation openings of non-combustible construction may be fixed at or above a level of 1.1 m, measured from the finished floor level of the external corridor to the sill level of the opening.

**Amended  
under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan 2002  
(Effective  
date: 1<sup>st</sup> May  
2002)**

2.4.9 Travel Distance

- (a) In a block of residential apartment or maisonette where the means of escape is through an external corridor, the one-way travel distance measured from the door of the apartment or maisonette to exit staircase may be extended to 20m provided that such provision shall not apply to residential apartments or maisonettes in a building exceeding 24 m permitted under Cl. 2.4.5, and One-way travel distance
- (b) In a block of residential apartments or maisonettes, the two-way travel distance may be extended to 45 m if the means of escape is through an external corridor as in Cl. 2.4.8. Two-way travel distance

In the case of buildings which are required to be provided with rising mains, the number and distribution of rising mains specified in Chapter 6 shall be complied with.

2.4.10	<p>The provisions of Cl.2.3.3(a)(ii) and (b)(ii) that there shall be no unprotected openings within 3m horizontally or vertically below ventilation openings of exit staircases may not be applicable in the case of exit staircases for residential apartments or maisonettes provided:</p> <p>(a) the exit staircases are cross-ventilated and maintained under smoke-free condition at all times; and</p> <p>(b) unprotected openings of the apartment or maisonette units are not facing or ventilating into the exit staircase enclosures as shown in diagram 2.4.10.</p>	Protection of staircases
2.4.11	<p>Doors of residential apartments or maisonettes opening into external corridors need not have fire resistance rating.</p>	Residential doors opening into external corridors.
2.4.12	<p>An attic in buildings under purpose group I and II may be constructed of timber boardings on timber joists, provided it is protected to achieve the fire resistance rating required of the elements of structure of the building or compartment.</p>	Attic floor. Amended under Supplement 4/2000 dated 4 Dec 2000
2.5	<b>HEALTH CARE OCCUPANCY</b>	
2.5.1	<p>The provisions stated herein shall apply to Health Care Occupancies which may be identified under the following categories:</p> <p>(a) Hospital</p> <p style="padding-left: 40px;">A building used for medical and surgical care and shall include general hospitals, hospitals for psychiatric care, children's hospitals, with 24 hours or in-patient service.</p> <p>(i) Basement</p> <p style="padding-left: 40px;">Patient accommodation area containing beds shall not be located in the basement storey.</p> <p>(ii) Number of exits per ward</p> <p style="padding-left: 40px;">Each patient accommodation ward area shall be provided with at least 2 exits, which shall be remotely located from each other, if the occupant load exceeds 50 persons.</p>	<p>General</p> <p><b>Amended under Supplement 2/2002 dated 18th Jan 2002 (effective date 1<sup>st</sup> Aug 2002)</b></p>



(iii) Provision of area of refuge

Every upper storey used for the accommodation of patients shall be provided with at least an area of refuge for horizontal evacuation purposes. The size of the area of refuge and the routes leading to it shall comply with clauses 1.2.4 and 2.5.3.

(iv) Size and compartmentation of patient accommodation area

(a) Each patient accommodation ward shall not exceed a floor area of 750m<sup>2</sup> and an occupant load of 75 persons, calculated on the basis of gross floor area of 10m<sup>2</sup> per person.

(b) Each patient accommodation ward area shall be constructed as a compartment having fire resistance rating of at least 1-hour for walls/ceilings and ½-hour fire door for protection of door openings. The internal walls between wards shall be constructed to have min. 1-hour fire resistance rating and door opening shall be protected by ½ hour fire door. For walls and doors between ward and main exit access corridor (either internal or external corridor), the requirements given in subclause 2.5.1(a)(vi) and 2.5.1(a)(vii) respectively shall be complied with. This requirement shall not be applicable to patient accommodation floor which is sprinkler protected.

(v) Provision of Escape Bed-lifts

(a) An escape bed-lift shall be provided adjacent to a protected exit staircase to serve every storey and/or every area of refuge above the 1<sup>st</sup> storey containing Operating Theatre Department, Coronary Care Unit, Intensive Care Units, Intensive Therapy Units, Neo Natal Units and patient accommodation areas where patients could not be able to be evacuated, in the event of a fire, by any means other than a bed, patient trolley or similar conveyance.

(b) A protected shaft containing an escape bed-lift shall be constructed to comply with the relevant requirements under clause 3.8.

- (c) The entry into the escape bed-lift and the protected exit staircase shall be through a common protected lobby. The protected lobby shall have a floor area of not less than 9 sq m, having a depth of min. 2.5m perpendicular to the lift landing door, and shall be large enough to hold a minimum of two beds, attendant staff and additional equipment. In the situation where the protected lobby is also acting as a smoke stop lobby or fire fighting lobby, the floor area of the lobby shall be of sufficient size to allow the evacuation of the required number of beds and the movements of other occupants into the protected staircase.
- (d) Escape bed-lift is to be used for the evacuation of patients in beds including those confined to wheel-chairs or physically disabled, in a fire emergency, although it can be used as a normal passenger lift during normal times in the day to day running of the hospital. A signage shall be posted outside the bed-lift stating "FIRE ESCAPE BED-LIFT"
- (e) The escape route for the escape bed-lift at the 1<sup>st</sup> storey level shall be made protected from other occupancy areas by minimum 1- hour fire resistance separation and shall discharge directly into a safe exterior space.
- (f) An escape bed-lift that opens directly into an external corridor and is sited adjacent to a protected exit staircase does not require a protected lobby, provided there is no unprotected opening within 3m horizontally from the escape bed-lift door opening. The escape bed-lift provided under the above situation may be treated as common bed-lift that can serve multiple compartments located on the same floor.
- (g) An escape bed-lift shall be provided with the following features :
  - (i) a duplicate power supply from an emergency generating plant;

- (ii) a switch labelled “Evacuation Bed-Lift” situated next to the lift landing door at the final exit storey, which enables an authorised person nominated by the building management to take control of the lift car during an emergency. Operation of the switch should isolate the lift landing call controls and return the lift immediately to the final exit storey, where upon the lift can only operate in response to the lift car control panel. Such a switch is not needed in 2-storey buildings; and
- (iii) a communications system (except in 2-storey building) should be installed to allow communication between occupants at each lift landing and the operator in the lift car.
- (h) The installation of escape bed-lifts shall be in accordance with SS CP 2 Code Of Practice For Installation, Operation And Maintenance Of Electric Passenger And Good Lifts.
- (vi) Internal access corridor to wards

Patient accommodation ward with access through an internal access corridor shall comply with the requirements as follows:

- (a) Each ward shall be separated from the internal access corridor by a wall having fire resistance of at least 1-hour; and
- (b) Doors opening into internal access corridor shall have fire resistance of at least ½-hour and fitted with automatic self-closing device to comply with the requirements of cl.3.9.2; or held open by electromagnetic or electromechanical device; and
- (c) Requirements on fire compartmentation under (vi)(a) and (vi)(b) will not be applicable if the patient accommodation floor is sprinkler protected; and

- (d) Internal access corridors shall be naturally ventilated with fixed openings in an external wall, such ventilation openings being not less than 15 percent of the floor area of the internal access corridor; and
  - (e) The ventilation opening in the external walls shall not be less than 3.5 sq m and shall be unobstructed from parapet wall or balustrade level upwards and be positioned on opposite sides of the internal access corridor such that they provide effective cross-ventilation throughout the entire space of the corridor; and
  - (f) The ventilation openings in the external walls shall not be more than 12m from any part of the internal access corridor; and
  - (g) Internal access corridor may be provided with mechanical ventilation and pressurisation in lieu of natural ventilation; and
  - (h) Other non-patient accommodation areas or spaces which open into or form part of the internal access corridor and which may prejudice the means of escape provision shall be compartmentalised by min. 1-hour fire rated enclosures and min ½-hour fire doors.
- (vii) External access corridor

Patient accommodation ward with access through an external access corridor shall comply with the requirements as follows:

- (a) Patient accommodation ward shall be separated from the external access corridor by a wall having fire resistance of at least 1-hour, except that ventilation openings of non-combustible construction may be fixed at or above 1.1m, measured from the finished floor level of the external exit access corridor to the sill height of the opening; and

- (b) Doors opening into the external access corridor shall not be required to have fire resistance rating; and
  - (c) External access corridor shall conform to the requirements of external exit passageway for minimum width, changes in floor level, roof protection and provision of parapet wall or solid balustrade which shall not exceed 1000mm height along the outer side of the corridor.
- (viii) Smoke free approach to exit staircase
- (a) Entry into an exit staircase from any part of a building of more than 4 storey above ground level shall comply with cl.2.2.13 – requirements of smoke free approach to an exit staircase. Pressurisation of staircase in lieu of the provision of smoke stop lobby is not permitted.
  - (b) Any exit staircase which serves a basement storey shall comply with Cl.2.2.14 and Cl.2.3.5.
  - (c) Where a smoke stop lobby is provided to exit staircase to serve a patient accommodation floor, or any area where patients may need to be evacuated on mattresses or stretchers, the lobby shall have a minimum clear space (unobstructed by door swings) of 6 sq metres.
- (ix) Staircase landing width/depth
- (a) Exit staircases that serve patient accommodation floor and are to be used by patients in an emergency fire situation shall be designed to allow evacuation of patients on mattresses or stretchers.
  - (b) The width of stair, landing width and depth shall comply with the following table:

Table 2.5.1 (a)(viii)(b)			
STAIR WIDTH	MIN LANDING WIDTH	MIN LANDING DEPTH	
1000	2800	1900	) ) ) Allows mattress or stretcher evacuation only (ie no pedestrian passing).
1250 1500	2800 3200	1900 1550	) ) ) Allows mattress or stretcher evacuation and restricted ambulant passing.
1750 2000	3600 4000	* 1350 * 1250	) ) ) Allows mattress or stretcher evacuation and ambulant passing.

\* For the purpose of calculating the exit capacity of the staircase, clear landing depth, instead of the clear stair width, should be taken.

(b) A building or part thereof, used for the housing and nursing care of persons, who because of mental or physical incapacity, may be unable to care for their own needs and safety without the assistance of other persons. Such buildings shall include nursing and convalescent homes, homes for the aged and hospices.

(i) Fire safety requirements under Cl.2.5.1(a) – Hospital shall be fully complied with.

(c) Custodian Care Facility

A building or part thereof, used for the housing, on a 24 hour basis, of persons who, because of age, or physical or mental disabilities, are unable to care for their self preservation and safety. Such buildings shall include nurseries for children under 6 years of age and institutions for the mentally disabled.

(i) Nurseries, including Childcare Centres, Kindergarten, if located within a building of mixed use, shall be compartmentalised from other spaces and occupancies by walls and doors having at least 1-hour fire resistance rating and provided with its own means of escape.

- (ii) Institutions for the mentally disabled shall be designed with each storey having an area of refuge in accordance with Cl.1.2.4 and Cl.2.5.3. Fire safety requirements under Cl.2.5.1(a)- Hospital, shall be fully complied with, except Cl.2.5.1(a)(v) on Provision of escape bed-lift and Cl.2.5.1(a)(ix) on Staircase landing width/depth.

(d) Supervisory Care Facility

A building or part thereof, used for the housing, on a 24 hour basis, of mental health patients who may be capable of self preservation but require supervision and are receiving therapy, training or other health related care and for whom there may be security measures not under their control.

- (i) Fire safety requirements under Cl.2.5.1(a) – Hospital, shall be fully complied with, except Cl.2.5.1(a)(v) on Provision of escape bed-lift and Cl.2.5.1(a)(ix) on Staircase landing width/depth.

(e) Ambulatory Health Care Centre

A building or part thereof, used for providing services on an out-patient basis for:

- \* treatment for patients which would render them incapable of taking action for self preservation or safety under emergency conditions without assistance from others, such as hemodialysis units, or
- \* surgical treatment requiring general anaesthesia.

- (i) Ambulatory Health Care Centre, if located within a building of mixed use, shall be compartmentalised from other tenants and occupancies by walls and doors having at least 1-hour fire resistance rating. The Ambulatory Health Care Centre shall be provided with its own means of escape to at least one exit staircase.

- (ii) Fire Safety requirements under (a) – Hospital, shall be fully complied with except Cl.2.5.1(a)(iii) on Provision of area of refuge for horizontal evacuation, Cl.2.5.1(a)(v) on Provision of escape bed-lift and Cl.2.5.1(a)(ix) on Staircase landing/depth.

## 2.5.2 Number of Doors

- (a) In compliance with the provisions of Cl. 2.2.10 for number of doors from rooms and spaces, two openings for doors located remote from each other shall be provided for any patient's sleeping room or suite of patients' sleeping room having an occupancy load exceeding 50 patients, and
- (b) Rooms and spaces with occupancy of 50 persons or more shall comply with the requirements of Cl. 2.8.2 for Assembly Occupancy.

Number of doors  
**Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date : 18 Jan 2002)**

## 2.5.3 Area of refuge - Occupancy load

Where Area of Refuge serves as required exit, the calculation of area for refuge occupants shall be based on the following:

- (i) Hospitals - 2.8 m<sup>2</sup>/person.
- (ii) Nursing Homes - 2.8 m<sup>2</sup>/person.
- (iii) Custodian Care Facility - 1.4 m<sup>2</sup>/person.
- (iv) Supervisory Care Facility - 0.56 m<sup>2</sup>/person.
- (v) Ambulatory Health Care Centre - 1.4 m<sup>2</sup>/person.

Amended under Supplement 3/2001 dated 28Mar 2001

On storey of hospitals or nursing homes where patient accommodation is not provided, at least 0.56 m<sup>2</sup> per occupant shall be taken for the calculation of the area for refuge of occupants.

## 2.6 **OFFICE/SHOP/FACTORY/WAREHOUSE OCCUPANCY**

- 2.6.1 In an office, shop, factory and warehouse building, at least two independent exit staircases or other exits shall be provided in compliance with the requirements of Cl. 2.2.11, except that one exit staircase is permitted to serve the upper storeys, if the building is of non-combustible construction and not exceeding four storeys, subject to:

Number of exit staircases or exits per storey  
**Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date 18 Jan 2002)**



- 2.6.1 (a) The maximum travel distance on any storey served by single exit staircase complying with column (ii) of Table 2.2A; and
- (b) Exit staircase conforming to the requirements of Cl.2.3.3 , and
- (c) The gross area of each upper storey of shop, factory and warehouse building not exceeding 200m<sup>2</sup>, including service ducts, lift shafts, toilets, staircase etc.
- (d) The habitable height of the shop, factory or warehouse building not exceeding 15m ; and
- (e) Access to the building for fire fighting appliances being provided for in compliance with the requirements in Chapter 4.

**Amended  
under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan 2002  
(Effective date  
: 18 Jan 2002)**

## 2.7

### **HOTELS**

- 2.7.1 Hotel bedrooms with access through an internal corridor shall comply with the requirements as follows:
- (a) Hotel bedrooms shall be separated from the internal corridor by a wall having fire resistance of at least 1 hour, and
- (b) Doors opening into internal corridors shall have fire resistance of at least half an hour and fitted with automatic self-closing device to comply with the requirements of Cl. 3.9.2, and

Internal  
corridor  
to hotel  
Bedrooms

2.9.2	(a)	Each dormitory bedroom shall not exceed 120m <sup>2</sup> and occupant load of 40 persons.	Size
	(b)	The occupant load shall be based on gross floor area on the basis of 3m <sup>2</sup> per person or based on the actual number of occupants for which each occupied space of the floor is designed as shown on the plan, whichever is greater.	Occupant load
	(c)	There shall be at least two door openings remote from each other and leading to exits from every dormitory bedroom or enclosed space in which the total occupant load exceed the 50 persons as permitted under cl.2.2.10.	Number of exits per bedroom <b>Amended under Supplement 2/2002 dated 2002 (Effective date : 18 Jan 2002)</b>
	(d)	There shall be at least two independent exit staircases or other exits from every storey of a building.	No of exit staircases or exit per storey
	(e)	The travel distance, measured from the most remote point of the dormitory bedroom to the nearest exit staircase or other storey exit, shall not exceed the maximum travel distance permitted under Table 2.2A.	Maximum travel distance
2.9.3	Dormitory bedrooms with access through an internal corridor shall comply with the requirements as follows:		Internal corridor to dormitory bedrooms
	(a)	Dormitory bedrooms shall be separated from the internal corridor by a wall having fire resistance of at least 1-hour; and	
	(b)	Doors opening into internal corridors shall have fire resistance of at least half an hour and fitted with automatic self-closing device to comply with the requirements of cl.3.9.2, and	

3.5.7 For high and low parts of different compartments of a building abutting each other, either one of the following requirements shall be complied with to prevent spread of fire from the roof close to and lower than the external of the higher part:

Vertical  
fire spread

- (a) the roof over the lower part of the building shall be fire rated in accordance with the element of structure for minimum 1 hour for a distance of 5m measured horizontally from the external wall of the higher part of building; or
- (b) the external wall of the higher part of the building overlooking the roof below shall have the necessary fire resistance rating in accordance with the element of structures for minimum 1 hour for a vertical height of not less than 9m measured from the roof of the lower part of the building.
- (c) the above requirements shall not be applicable to buildings or lower parts of the building which are sprinkler protected , or old shophouses which are subject to URA's Conservation Programme or built before 1969 referred to under cl.1.1.1 and cl.1.1.2.

**Amended  
under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan 2002  
(Effective date  
: 18 Jan 2002)**

### 3.6 SEPARATING WALLS

3.6.1 Every separating wall shall:

Requirements  
of separating  
walls

- (a) Form a complete barrier in the same continuous vertical plane through the full height between the buildings it separates, including roofs and basements and shall be imperforate except for provisions of openings permitted under Cl. 3.6.2, and
- (b) Have the appropriate fire resistance to comply with the requirements of Cl.3.3, and
- (c) Be constructed of non-combustible materials, together with any beam and column which form part of the wall and any structure which it carries.
- (d) Not include glass fire resisting walls.
- (e) Exception

Subclause (a) need not be applied to wall between car porches of buildings under purpose group I. For terrace-housing situation, this exception will not apply if the carporch is spanning from one side boundary to the other.

- 3.15.6 Materials used for construction of ceiling supports shall comply with the provisions of cl.3.11.9(b) & cl.3.11.9(c).
- 3.15.7 Construction of ceilings and ceiling support located within sprinkler protected building shall comply with the provision of cl.3.11.10(b).
- 3.15.8 Materials used for fire stopping shall comply with the relevant provisions of cl.3.12.2 and 3.12.3.
- 3.15.9 Materials used on the surfaces of walls and ceilings are required to meet the requirements for restriction of spread of flame and to comply with the performance requirements as stipulated under cl.3.13.
- 3.15.10 Materials used for roof construction shall comply with the provisions of cl.3.14.1 & 3.14.2.
- 3.15.11 Internal non-load bearing walls in buildings shall be constructed of non-combustible material and the materials for surface finishes of internal non-load bearing walls shall not be treated as part of the wall and shall comply with the relevant provisions of cl.3.13
- 3.15.12
- (a) Composite panels which consist of plastic or combustible core shall not be used either for the construction of external walls or as claddings to external walls of all buildings unless otherwise permitted by the Relevant Authority.
  - (b) Materials with surface flame spread rating of not lower than Class 2 shall be permitted to be used for the construction of partition for toilet cubicles only.
- 3.15.13 In buildings which are protected by an automatic sprinkler system, fire rated glass can be used for the construction of enclosures to smoke stop and fire fighting lobbies, subject to the following:
- (a) The walls and doors shall have the necessary fire resistance, including insulation, when subject to test under BS 476: Part 20-23; and
  - (b) The walls and doors shall meet the class A of the Impact Performance requirements when subject to test under BS 6206 or AS 2208

**Amended  
under  
Supplement  
2/2002 date  
18<sup>th</sup> Jan 2002  
(Effective  
date: 18 Jan  
2002)**

**New clause  
added under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan 2002  
(Effective date  
: 18 Jan 2002)**

Type of development	No of hydrant that will be used for fire fighting	Common water supply for hydrant to be used	Stored water supply
2 Non-residential development (based on floor area of the biggest floor)			
a <1,000m <sup>2</sup>	Two	Not less than 38 l/s at 3.5 bar for 1 <sup>st</sup> hydrant & 19 l/s at 3.5 bar for 2 <sup>nd</sup> hydrant.	45 min
b Every subsequent increase of 1,000m <sup>2</sup> of floor area	An additional hydrant	For each subsequent hydrant, 19 l/s will be added to the common supply for the hydrant.	45 min

4.4.3 All hydrant mains which pass through a building shall have its full length within the building protected with fire resistance construction complying with Cl. 3.8.7(c) of at least the same fire resistance as the element of structure, provided the following requirements are complied with :

- (a) The hydrant mains shall be located in common circulation areas, such as carparking spaces and driveways; ie they shall not pass through private or confined spaces;
- (b) No services (except sprinkler pipes) shall be located above or crossing over the hydrant mains;
- (c) The hydrant mains shall be located away from explosion risk areas; and
- (d) The protective enclosure to the hydrant mains shall be labelled with the words "HYDRANT MAIN" of minimum 50mm height at suitable intervals.

Protection of hydrant mains in buildings

**Sub-clause 4.4.3(a) under Supplement 3/98 dated 14 Aug 98 has been deleted under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date : 18 Jan 2002)**

6.5 **FIXED AUTOMATIC FIRE EXTINGUISHING SYSTEMS**

- 6.5.1 Installation of any fixed automatic fire extinguishing systems which are not deemed to be required by this Code shall not be accepted as substitute of any provision stipulated in this Code unless otherwise approved as such by the Relevant Authority. Such systems will be considered as additional protection for property safety and their installation shall not adversely affect the performance of the stipulated systems. Installation
- 6.5.2 Design and installation of such automatic fire extinguishing systems shall comply with corresponding Code of Practice acceptable to the Relevant Authority.

6.6 **LIFTS**

- 6.6.1 Lift hoistways shall be vented in accordance with the SS CP 2 Code of Practice for Installation, Operation and Maintenance of Electric Passenger and Goods Lifts. Hoistway ventilation
- 6.6.2 Emergency Power Supply
  - (a) Emergency power supply for lighting, ventilation and alarm systems for all passenger lifts shall comply with the requirements in SS CP 2 Code of Practice for Installation, Operation and Maintenance of Electric Passenger and Goods Lifts. Emergency power supply
  - (b) Buildings which require the provision of standby generating plant for special emergency operations.  
  
Provision for special emergency operation for lifts shall comply with the requirements in SS CP 2 for the following:
    - (i) Public buildings;
    - (ii) Buildings under purpose group II exceeding the habitable height of 60m;
    - (iii) Buildings under purpose group II where the passenger lifts serve the upper storey residential floors and the non-residential basement;
    - (iv) Mixed developments where the passenger lifts serve both the residential and non-residential floors;

**Amended under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date : 1<sup>st</sup> May 2002)**

- (v) Industrial buildings under purpose group VI and VIII, which are multi-storey.
  - (vi) All basement occupancies
- (c) In any public building or part thereof, in which the habitable height exceeds 60 m, the emergency power supply shall be so sized and arranged such that:
- (i) at least one lift (other than the fire lift) with access to every storey, or
  - (ii) one lift from each vertical zone if the lifts are arranged to serve different zones in the building,

**Amended  
under  
Supplement  
2/2002 dated  
18<sup>th</sup> Jan 2002  
(Effective  
date : 1<sup>st</sup> May  
2002)**

#### 6.6.4 Homing of lifts

- (a) Homing of lifts for buildings which are required to be provided with fire alarm system.

In a fire emergency when any one of the fire detection devices or fire alarm systems is activated, all the passenger lifts shall be brought to the designated floor (usually) 1<sup>st</sup> storey) and park there with the lift landing doors remaining opened.

- (b) Homing of lifts for buildings which are required to have standby generating plant.

In the event of power failure or power interruption in the building, the supply to the lifts shall be automatically switched over to the emergency power supply from the generating plant and the lifts shall be brought to the designated floor and park there with the lift landing doors remaining opened.

- (c) Homing of lifts for buildings which are not required to have standby generating plant.

All passenger lifts, including hydraulic lifts, shall be provided with Automatic Rescue Device (ARD). The ARD shall permit the lifts to move and park at the nearest lift landing floor with the lift/landing doors in the opened position in the event of power failure. Homing any of the lifts to a basement storey is not permitted.

- (d) Homing of lifts for Mixed developments comprising residential and non-residential components

(i) All passenger lifts which serve the residential and non-residential floors shall be required to home to the designated or alternative designated floor in the event of power failure and / or fire. The lifts shall be provided with secondary power supplies from standby generating plant of sufficient capacity.

(ii) Where the passenger lifts serve only the residential floors and by-pass the non-residential floors in a protected shaft, the lifts shall be required to be installed with Automatic Rescue Device (ARD), provided the habitable height of the highest floor does not exceed 60m.

Homing of lifts

**New Sub-clauses inserted under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date : 1<sup>st</sup> May 2002)**



(iii) Where the passenger lifts serve the upper residential floors and the basement non-residential floor/s, including car parks, the lifts shall be provided with emergency power supply from standby generating plant for homing to the designated floor when there is a power failure in the building. In a fire emergency, the passenger lifts shall be brought to the designated floor when any of the fire alarm system in the basement non-residential floor/s is activated.

(e) Alternative designated floor

(i) Where the lifts open directly into an occupancy area in a designated floor, for example, a shopping floor or an office floor, an alternative designated floor (eg 2<sup>nd</sup> storey) shall also be identified. The lifts shall be brought to the alternative floor in the event that there is a fire in the designated floor, in close vicinity of the lift landing door. The activation of any detector or sprinkler head covering the lift landing space at the designated floor would cause the lift to be re-directed to home to the alternative floor.

(ii) In building under (e)(i) which are not provided with sprinkler or automatic fire alarm system, suitable sensors shall be provided at ceiling level to cover the lift landing space. The activation of any sensor would cause the lifts to be re-directed to home to the alternative floor.

The alternative floor shall have minimum fire hazard and pre-selected for the homing of passenger lifts, and where people can escape to safety in an exit staircase or other exit from the lift landing door.

(iii) The above requirements on homing of lifts to an alternative floor need not be applied to standalone open-sided carpark and residential buildings under purpose groups I & II.

(f) Hydraulic lifts.

Where a hydraulic lift serves two upper storeys only, the lower of which has a final exit leading to the exterior space, the provision of an alternative power supply or ARD is not required, provided the lift car is arranged to lower itself to the 1<sup>st</sup> storey by gravity during power failure mode.

**New Sub-clauses inserted under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date: 1<sup>st</sup> May 2002)**

- (d) Where the Relevant Authority has allowed under subclause 2.3.5(d) upper storey staircase to be continuous with that serving the basement, appropriate signages, including pictorials shall be placed at strategic location inside the staircase to direct occupants out of the building in times of emergency.
- (e) The legends, dimensions, design and installation of the exit signs and directional signs shall comply with SS CP 19.
- (f) The use of self-illuminating exit and directional signs with letters in green and powered by radioactive material may be allowed within the auditorium of cinemas or theatres provided they comply with the requirements of this Code and any relevant codes and regulations. Self-illuminating signs
- (g) Self-illuminating fire safety signs complying with BS 5499 Pt 2 can be used in lieu of emergency signs powered by electricity.

## 8.2 VOICE COMMUNICATION SYSTEM AND FIRE COMMAND CENTRE

8.2.1(a) One way emergency communication system and a fire command centre shall be provided as follows:

- (i) For all large buildings under Purpose groups III, IV, V & VII (gross floor area greater than 5000 sq m or having a total occupant load exceeding 1000 persons) and large industrial buildings under Purpose group VI & VIII, including mega warehouses, (gross floor area greater than 5000 sq m).
  - (ii) For all buildings belonging to purpose groups III, IV, V, VI, VII, and VIII of more than 24m in habitable height.
  - (iii) For hotel or health care occupancies of less than 24m in habitable height. Loudspeakers for the public address system shall be provided in every lift lobby, staircase enclosure and other strategic positions within audible distance of all parts of all storeys of the building.
- (b) Two way emergency communication system shall be provided between the Fire Command Centre, under sub-clauses 8.2.1(a), (i) and (ii) above, and the following area:
- (i) Every fire fighting lobby, including 1<sup>st</sup> storey;
  - (ii) all fire fighting related mechanical equipment rooms inclusive of sprinkler pump room, wet rising main pump room, hose reel pump room, switch rooms and generator rooms;
  - (iii) all rooms housing smoke control equipment;

System requirements

**Existing clause revised under Supplement 2/2002 dated 18<sup>th</sup> Jan 2002 (Effective date 1<sup>st</sup> May 2002)**  
Construction

- (iv) all lift machine rooms;
  - (v) fire lift;
  - (vi) each area of refuge; and
  - (vii) air-handling control rooms.
- (c) For building of mixed commercial cum residential usage, the requirements of sub-clauses a(ii) of this clause shall be applicable provided that:

where the commercial component of the building occupies only the lower portion of the building and is separated from the residential occupancies, then for the purpose of compliance with the said requirements, the measurement of habitable height shall be taken to that part of the commercial component of the building, and

where a commercial component of the building is located above any residential occupancies, the provisions of a(ii) shall be applicable if the habitable height of the building exceeds 24m.

- (d) For a building of mixed commercial cum residential usage, the requirement of sub-clauses (a) and (b) of this clause shall be applicable provided that:
- (i) Where the commercial component of the building occupies only the lower portion of the building and is separated from the residential occupancies, then for the purposes of compliance with the said requirements, the measurement of habitable height shall be taken to part of the building, and
  - (ii) Where a commercial component of the building is located above any residential occupancies, the provisions of (a) and (b) may be required at the discretion of the Relevant Authority.

8.2.2 Where a one way or two way emergency communication system is required by this code, it shall comply with the requirements stipulated in SS CP25: Code of Practice for Emergency Voice Communication Systems in Buildings.