

RWANDA
STANDARD

DRS
186-5

Seconde dition

**Code of practice for fire safety
of building —**

Part 5:

Exit requirements and personal hazard

Reference number

DRS 186-5: 2018

FOR PUBLIC COMMENTS

In order to match with technological development and to keep continuous progress in industries, Standards are subject to periodic review. Users shall ascertain that they are in possession of the latest edition

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Foreword

Rwanda Standards are prepared by Technical Committees and approved by Rwanda Standards Board (RSB) Board of Directors in accordance with the procedures of RSB, in compliance with Annex 3 of the WTO/TBT agreement on the preparation, adoption and application of standards.

The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical committees are ratified by members of RSB Board of Directors for publication and gazettment as Rwanda Standards.

DRS 186-5 was prepared by Technical Committee RSB/TC 28, *Fire safety of building — Code of practice*:

In the preparation of this standard, reference was made to the following standard:

IS 2189:2008; *Selection, installation and maintenance of automatic fire detection and alarm system - Code of practice*

The assistance delivered from the above source is hereby acknowledged with thanks.

This second edition cancels and replaces the first edition (RS 186-5: 2013) of which has been technically revised.

DRS 186 consists of the following parts, under the general title *Fire safety of building — Code of practice*:

- *Part 1: General principles of fire grading and classification*
- *Part 2: Details of construction*
- *Part 3: Fire safety in public buildings*
- *Part 4: Selection, installation and maintenance of automatic fire detection and alarm system*
- *Part 5: Exit requirements and personal hazard*

Committee membership

The following organizations were represented on the Technical Committee on Fire safety (RBS/TC 28) in the preparation of this standard.

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College of Science and Technology

CABLELINE

Energy Utility Corporation Limited

ELECTRICOM

ISCO

Institute of Engineers Rwanda

Ministry of Disaster Management and Refugees

Ministry of Infrastructure

Rwanda Housing Authority (RHA)

Rwanda Motor Ltd

Rwanda National Police

REAL

Société Rwandaise d'Assurance (SONARWA)

SONATUBES

Rwanda Standards Board (RSB) - Secretariat

FOR PUBLIC COMMENTS

Code of practice for fire safety of building — Part 5: Exit requirements and personal hazard

1 Scope

This standard covers requirements regarding fire safety of buildings with respect to exit requirements and personal hazard. This standard is applicable to all types of buildings

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

DRS 186-1; *Code of Practice for Fire Safety of Building — Part 1: General Principles of fire grading and classification*

DRS 186-2, *Fire safety of building — Code of practice — Part 2: Details of construction*

RS ISO 7010; *Graphical symbols — Safety colours and safety signs — Safety signs used in work places and public areas*

3 Exit requirements

3.1 General

3.1.1 Ample provision for escape of population of a building when on fire is vital and all routes should be constructed to ensure that the population reaches a place of safety in the shortest period of time without undue hindrance by smoke, fumes, debris and the like.

3.1.2 Every building meant for human occupancy should be provided with sufficient exits, with adequate signage complying with RS ISO 7010, to permit safe escape of occupants in case of fire or other emergency.

3.1.3 In every building, exits should comply with the minimum requirements except those not accessible for general public use.

3.1.4 All exits should be free of obstructions.

3.1.5 No building should so altered as to reduce the number, width or protection of exits to less than that required.

3.1.6 Exits should be clearly visible and the routes to reach the exit should be clearly marked and sign posted to guide the population of the floor concerned. Signs should be painted with illuminated paint.

NOTE This provision should not apply to R-2 and R-4 occupancies up to 15 m in height

3.1.7 Adequate and reliable illumination should be provided for exits.

3.1.8 Fire check doors should be at appropriate places along the escape routes to prevent spread of fire and smoke, particularly at the entrance to lifts and stairs where a 'funnel or flue effect' may be created, including an upward spread of fire.

3.1.9 All exits should provide continuous means of access to the exterior of a building or to an exterior open space leading to a street.

3.1.10 Exits should be so arranged that they may be reached without passing through another occupied unit.

3.2 Types of exits

3.2.1 An exit may be a doorway, a corridor or passageway(s) to an internal staircase, ramps or external staircase, or to a verandah or terrace(s) which have access to the street, or roof of a building, or a refuge area. An exit may also include a horizontal exit leading to an adjoining building at the same level.

3.2.2 Lifts and escalators should not be considered as exits.

3.3 Occupant load

3.3.1 For determining the exits requirement, the number of persons within any floor area or the occupant load should be based on the actual number of occupants and shall not be less than the value specified in Table 1.

3.3.2 The occupant load of a mezzanine floor and balcony discharging to a floor below should be added to that floor occupancy load thus established.

Table 1 — Occupant load

S/N	Group of Occupants (see RS 186-1)		Occupants floor area load, m ² /person in
1	Residential	(A) 12.5	
2	Educational	(E) 4	
3	Institutional	(I) (See 3.3.3) 15	
4	Assembly	(A)	With fixed or loose seats and dance floors (see 3.3.3) 0.6
			Without seating facilities including dining rooms (see 3.3.4) 1.5
5	Mercantile:	(M)	street floor and sales basement 3
			upper sale floors
6	Business and industrial	(F) 10	
7	Storage	(S) 30	
8	Hazardous	(H) 10	

3.3.3 Occupant load in dormitory portions of homes for the aged, orphanages, insane asylums etc., where sleeping accommodation is provided, should be not less than 35 m² as gross floor area/person.

3.3.4 The gross floor area should include, in addition to the main assembly room or space, any occupied connecting room or space in the same storey or in the storey above or below where entrance is common to such rooms and spaces and they are available for use by the occupants of the assembly place.

No deductions should be made in the gross area for corridors, closets or other subdivisions; the area should include all space serving the particular assembly occupancy.

3.4 Arrangement and capacity of exits

3.4.1 The unit of exit width, used to measure the capacity of any exit, should be 50 cm. A clear, width of 25 cm should be counted as an additional half unit. Clear widths less than 25 cm should not be counted for exit width.

3.4.2 Occupants per unit exit width should be in accordance with Table 2.

Table 2 — Occupants per unit exit width to be in compliance with building code

S/N	Group of occupancy		Number of occupants		
			Stairways	Ramps	Doors
1	Residential	(A)	25	50	75
2	Educational	(B)	25	50	75
3	Institutional	(C)	25	50	75
4	Assembly	(D)	40	50	60
5	Business	(E)	50	60	75
6	Mercantile	(F)	50	30	75
7	Industrial	(G)	50	60	75
8	Storage	(H)	50	60	75
9	Hazardous	(J)	25	30	40

3.4.3 When horizontal exit is provided in buildings of mercantile storage, industrial, business and assembly occupancies, the capacity per storey per unit width of exit of stairways in Table 2 may be increased by 50 %; and in buildings of institutional occupancy, it may be increased by 100 %.

3.4.4 Exits should be located in such way the travel distance on floor not exceed the distance given in Table 3.

3.4.5 The travel distance to an exit from the dead end of a corridor should not exceed half the distance specified in Table 3 and not exceed 6m for educational, Assembly and institutional occupancies. .

3.4.6 Whenever more than one exit is required for any room, space of floor of a building, exits should be placed as remote from each other as possible and should be arranged to provide direct access in separate directions from any point in the area served.

Table 3 — Maximum travel distance construction

S/N	Group of occupancy (See RS 186-1)	Type 1 and 2 (m)	Type 3 and 4 (m)
1	Residential	22.5	22.5
2	Educational	22.5	22.5
3	Institutional	22.5	22.5

4	Assembly	30.0	30.0
5	Business	30.0	30.0
6	Mercantile	30.0	30.0
7	Industrial	45.0	30.0
8	Storage	30.0	30.0
9	Hazardous	22.5	22.5

3.5 Number of exits

3.5.1 General requirement

3.5.1.1 All buildings which are more than 15 m in height and all buildings used as educational, assembly, institutional, industrial, storage, and hazardous occupancies and mixed occupancies with any of the aforesaid occupancies, having area more than 500 m² on each floor should have a minimum two staircases

3.5.1.2 The staircases should be of enclosed type; at least one of them should be on external walls of buildings and should open directly towards to the exterior, interior, open space or to an open place of safety.

Further, the provision or otherwise of alternative staircase should be subject to the requirements of travel distance being complied with.

3.5.2 Rooming house of residential buildings

3.5.2.1 Every sleeping room above the street floor should have access to two separate means of exits and at least one of which should consist of an enclosed interior stairway or an exterior stairway, or a fire escape or horizontal exit.

Exits should be arranged as to provide a safe path of travel to the outside of the building without traversing any corridor or space exposed to an unprotected vertical opening.

3.5.2.2 Any sleeping room below the street floor should have direct access to the outside of the building.

3.5.3 One or two family private dwellings or residential building

3.5.3.1 For more than two rooms, every occupied room excluding areas used solely for storage, should have at least two means of exit.

At least one of the exit should be a door or a stairway providing a means of unobstructed travel to the outside of the building or street or grade level and not more than one of which may be a window. No room or space should be occupied which is accessible only with a ladder, folding stairs or through a trap door.

3.5.3.2 All locking devices which would impede or prohibit exit, such as chain type bolts, limited opening sliding type locks and burglar locks which are not disengaged easily by quick-releasing catches, should be prohibited.

3.5.3.3 All closet door latches should be such that even children may open the doors from inside.

3.5.3.4 All bathroom door locks or fasteners should be designed to permit the opening of the locked or closed door from the outside in an emergency without the use of a special key. Every below-street-level sleeping room should have direct access to the outside of the building.

3.5.4 Dormitories

Dormitories, except those mentioned in 3.5.6 should have exits arranged in such way that from any sleeping room or open dormitory sleeping area, there should be access to two separate and distinct exits in different directions without common path of travel.,

In case the room or space is subject to occupancy by not more than 10 persons and has a door opening directly to the outside of the building at street or grade level, or to an outside stairway in which case one exit is accepted.

3.5.5 Apartment House

3.5.5.1 Every individual living unit should comply with the requirements for occupancy sub-division R-2 in respect of exit .

3.5.5.2 Every living unit should have access to at least two separate exits reached by travel in different direction. The common path of travel should be permitted for the first 6 m and single exit shall be permitted under any of the conditions given in 3.5.5.3.

3.5.5.3 The access of any building of less than two stories with basement containing a heating plant, group storage, incinerator room or paint shop or other hazardous occupancy, shall be limited to the exterior of the building.

3.5.5.4 At least half of required exits should discharge direct to the outside of the buildings; any other exit should be the same as required for the hotels 3.5.6.

3.5.6 Hotels

3.5.6.1 The access to every floor including basements occupied for hotel purposes should have at least two separate exits in different direction from every point in any open area, or any room door.

3.5.6.2 Any room or compartment at street or grade level may use such outside door as a single exit provided no part of the room or area is more than 15 m from the furthest point.

3.5.6.3 Where stairways or other exits serve two or more upper floors, the same stairway or other exit required to serve any one upper floor may also serve other upper floors except that no inside open stair-way or ramp may serve as a required egress facility from more than one floor.

NOTE under this provision, if the second and third floors were each required to have three stairways, the second floor may use the stairways serving the third floor so that the total number of stairways required is three, and not six.

3.5.7 Basement exits for residential buildings

3.5.7.1 Basement exits should be sufficient to provide for the occupancy of the basement as determined in accordance with 3.1.2 and should not be less than two independent basement exits.

3.5.7.2 Basements or sub-basements not open to the public and used only for heating equipment, storage and service operations (other than kitchens which are considered part of the hotel occupancy) should have exits appropriate to the actual occupancy.

3.5.7.3 For mixed occupancy where there may be doubt as to which other section is applicable, such basements should have exits determined on the basis of lesser exit capacity.

3.5.8 Education

3.5.8.1 At least two separate exits should be available in every floor area and should be isolated from each other as practicable and arranged in such way that there are no pockets or dead ends of appreciable size in which occupants may be trapped.

3.5.8.2 Every room with a capacity of over 100 persons should have at least two door-ways isolated from each other. Such doorways should provide access to separate exits but may open upon a common corridor leading to separate exits in opposite directions.

3.5.8.3 Exterior doors should be operated by bars or an equivalent panic hardware device except that doors leading from classroom directly to the outside may be equipped with the same type of lock as is used on classroom doors leading to corridor with no provision for locking against egress from the classroom.

3.5.9 Institutional

3.5.9.1 Not less than two exits of one or more of the following types should be provided for every floor, including basement, of every building or compartment:

- a) doors leading directly outside the building;
- b) stairways;
- c) ramps; and
- d) horizontal exits.

3.5.9.2 All required exits which serve as egress from hospital or infirmary sections should be not less than 150 cm in clear width, including patient bedroom doors, to permit transport of patients on beds, litters or mattresses. The minimum widths of corridors serving patients bedrooms in building should be 240 cm.

3.5.9.3 Revolving doors should not be counted as required exits and should not be installed, except in situations, such as revolving doors at a main entrance where they are not subject to emergency exit use by patients.

3.5.9.4 Elevators constitute a desirable supplementary facility but are not counted as required exits.

3.5.9.5 Each storey accommodate 35 or more patients should be divided into at least two compartments by smoke barriers and the Authority may require storeys housing a lesser number of patients to be divided into compartments when, in its judgment, such division is essential for the protection of the patients.

3.5.9.6 Doors in smoke barriers should be installed such that these may normally be kept in open position but will close automatically or may be released manually to self-closing action.

Corridor door openings in smoke barriers should not be less than 150 cm in width. Provision should also be made for double swing single/double leaf type door.

3.5.9.7 Exits and other features for penal and mental institutions, and custodial institutions should be the same as specified for hospitals. Reliable means should be provided to permit the prompt release of inmate from any locked section in case of fire or other emergency.

3.5.9.8 Wherever any inmates are confined in any locked rooms or spaces, adequate guards or other personnel should be continuously on duty or immediately available to provide for release of inmates or for such other action as may be indicated in case of fire or other emergency.

3.5.9.9 No building constructed in whole or in part of combustible materials should be used to combine inmates in cells or sleeping quarters unless automatic sprinkler protection is provided.

3.5.9.10 All buildings or sections of buildings penal and mental institutions used for manufacturing, storage or office purposes should have exits in accordance with the provisions of occupancies.

3.5.10 Assembly buildings

3.5.10.1 Every place of assembly, every tier or balcony, and every individual room used as a place of assembly should have exits sufficient to provide for the total capacity.

3.5.10.2 Every place of assembly of subdivision A-1 should have at least four separate exits isolated from each other.

3.5.10.3 Every place of assembly of sub-division A-2 should have at least two separate exits isolated from each other, and if capacity over 600, three exits should be provided with each exit not less than of 2 unit widths.

3.5.10.4 Every place of assembly of sub-divisions A-3, A-4 and A-5 should have at least two means of exit consisting of separate exits or doors leading to corridor or other spaces giving access to two separate and independent exits in different directions.

For places of assembly having a capacity of less than 100 persons, one 2-unit doorway may be permitted in rooms where no part of the room is more than 15 m from the doorway, measured along the line of travel, and the doorway leads directly outside the building at grade level or leads to a corridor or other space giving access to two separate and independent exits.

3.5.10.5 Clear aisles not less than 1.2 m in width should be formed at right angles to the line of seating in such number and manner that no seat should be more than seven seats away from an aisle. Rows of seats opening on to an aisle at one end only should have not more than seven seats.

3.5.10.6 Under the conditions when all these aisles do not directly meet the exit doors, cross-aisles should be provided parallel to the line of seating so as to provide direct access to the exit, provided that not more than one cross-aisle for every 10 rows should be required.

3.5.10.7 The width of cross aisles should be a minimum of 1 m. Steps should not be placed in aisles to overcome differences in levels unless the gradient exceeds 1 in 10.

3.5.10.8 The fascia of boxes, balconies and galleries should have substantial railings not less than 65 cm high above the floor. The railings at the end aisles extending to the fascia should be not less than 75 cm high for the width of the aisle, or 90 cm high at the foot of steps.

3.5.10.9 Cross-aisles except where the backs of seats on the front of the aisle project 60 cm or more above the floor of the aisle, should be provided with railings not less than 90 cm high.

3.5.10.10 No turnstiles or other devices to restrict the movement of persons should be installed in any place of assembly in such a manner as to interfere in any way with the required exit facilities.

3.5.10.11 In theatres and similar places of public assembly where persons are admitted to the building at a time when seats are not available for them and are allowed to wait in a lobby or similar space until seats are available, such use of lobby or similar space should not encroach upon the required clear width of exits.

3.5.10.12 Such waiting should be restricted to areas separated from the required exit ways by substantial permanent partitions or fixed rigid railing not less than 105 cm high. Exits should be provided for such waiting spaces on the basis of one person for each 0.3 m² of waiting space; such exits should be in addition to the exits specified for the main auditorium area and should conform in construction and arrangement to the general rules of exits given above.

3.5.10.13 No display or exhibit should be so installed or operated as to interfere in any way with access to any required exit, or with any required exit sign. All displays or exhibits of combustible material or construction and all booths and temporary construction in connection with it should be so limited in combustibility or protected as to avoid any undue hazard of fire which might endanger occupants before they have opportunity to use the available exits.

3.5.10.14 No mirrors should be placed in or adjacent to any exit way in such a manner as to confuse the direction of the exit.

3.5.10.15 Places of assembly in buildings of other occupancy may use exits common to the place of assembly and other occupancy. Provided the assembly area and other occupancy are considered separately, each has exits sufficient to meet the requirements.

3.5.10.16 Exits should be sufficient for simultaneous occupancy of both the places of assembly and other parts of the building, unless the conditions are such that simultaneous occupancy will not occur.

3.5.10.17 For any place of assembly under subdivision D-1, at least half the required means of exits should lead directly outdoors or through exit ways completely separated from exits serving other parts of the building.

3.5.11 Business

3.5.11.1 In the case of mezzanines or balconies open to the floor below, or other unprotected vertical openings between floors, the population of the mezzanine or other subsidiary floor level should be added to that of the main floor for the purpose of determining the required exits, provided, however, that in no case should the total number of exits, units be less than that required if all the vertical openings were enclosed.

3.5.11.2 Not less than two exits should be provided for every floor, including basements occupied for office purposes or uses incidental thereto.

3.5.12 Mercantile

3.5.12.1 In the case of mezzanines or balconies open to the floor below, or other unprotected vertical openings between floors, the population or area of the mezzanine or other subsidiary floor level should be added to that of the main floor for the purpose of determining the required exits, provided, however, that in no case should the total number of exits units be less than that required if all vertical openings were enclosed.

3.5.12.2 At least two separate exits should be accessible from every part of every floor, including basements; such exits should be as remote from each other as practicable and so arranged as to be reached by different paths of travel in different directions except that a common path of travel may be permitted for the first 15 m from any point.

3.5.13 Industrial

3.5.13.1 In buildings used for aircraft assembly or other occupancy requiring undivided floor areas so large that the distance from points within the area to the nearest outside walls where exit doors could be provided are in excess of 45 m, requirements for distance to exits may be satisfied by providing stairs leading to exit tunnels or to overhead passageways.

3.5.13.2 In cases where such arrangements are not practicable, permit other exits arrangements for one storey buildings with distance in excess of the maximum distances specified in 3.4.

3.5.13.3 If completely automatic sprinkler protection is provided and if the heights of ceiling curtain boards and roof ventilation are such as to minimize the possibility that employees will be overtaken by the spread of fire or smoke within 180 cm of the floor level before they have time to reach exits, provided, however, that in no case may the distance of travel to reach the nearest exit exceed 120 m where smoke venting is required as a condition for permitting distances of travel to exits in excess of the maximum otherwise allowed.

3.5.13.4 Basements used only for storage, heating and other service equipment, and not subject to industrial occupancy should have exits in accordance with the requirements of Group H occupancies.

3.5.13.5 The following exceptions should apply to special purpose industrial occupancies:

- a) exits need be provided only for the persons actually employed; spaces not subject to human occupancy because of the presence of machinery or equipment may be excluded from consideration; and
- b) where unprotected vertical openings are necessary to manufacturing operations, these may be permitted beyond the limits specified for industrial occupancy provided every floor level has direct access to one or more enclosed stairways or other exits protected against obstruction by any fire in the open areas connected by the unprotected vertical openings or smoke there from.

3.5.13.6 Exceptions for high hazard industrial occupancies are provided for in 3.5.15.

3.5.14 Storage

3.5.14.1 Every building or structure used for storage, and every section thereof considered separately, should have access to at least one exit so arranged and located as to provide a suitable means of escape for any person employed therein and in any room or space exceeding 1 400 m² gross area, or where more than 10 persons may be normally present, at least two separate means of exit shall be available, as remote from each other as practicable.

3.5.14.2 Every storage area should have access to at least one means of exit which can be readily opened. This should not be subject to locking so long as any persons are inside and should not depend on power operation.

3.5.14.3 The following special provisions should apply to parking garages of closed or open type, above or below ground but not to mechanical parking facilities where automobiles move into and out of storage mechanically which are not normally occupied by persons and thus require no exit facilities.

3.5.14.4 Where repair operations are conducted, the exits should comply with the requirements of Group G occupancies in addition to compliance with the following:

- a) where both parking and repair operations are conducted in the same building, the entire building should comply with the requirements for Group G occupancies unless the parking and repair sections are effectively separated by separation walls;
- b) every floor of every closed parking garage should have access to at least two separate means of exit so arranged that from any point in the garage, the paths of travel to the two means of exit should be in different directions, except that a common path of travel may be permitted for the first 15 m from any point;
- c) on the street floor, at least two separate exit doors should be provided except that any opening from the passage of automobiles may serve as a means of exit provided no door or shutter is installed thereon. Street floor exits in closed garages should be so arranged that no point in the area is more than 30 m from the nearest exit, or 45 m in the case of garages protected by automatic sprinklers, distance being measured along the natural path of travel;
- d) on floors above the street, at least two means of exit should be provided, one of which should be an enclosed stairway. The other means of egress may be a second exit of any of the types, or in a ramp type, or in a ramp type garage with open ramps not subject to closure, the ramp may serve as the second means of exit;

- e) upper floor exits in closed garages should be so arranged that no point in the area should be more than 30 m from the nearest exit other than a ramp on the same floor level, or 45 m in the case of garages protected by automatic sprinklers;
- f) on floors below the street (either basement or outside underground garages), at least two exits should be provided, not counting any automobile ramps except that for garages extending only one floor level below the street, a ramp leading direct to the outside may constitute one required means of exit. In garages below street level, exits should be so arranged that no part of the area should be more than 30 m from the nearest stair exit; and
- g) if any gasoline pumps are located within any closed parking garage, exits should be so located that travel away from the gasoline pump in any direction should lead to an exit, with no dead-end in which the occupants might be trapped by fire or explosion at any gasoline pump. Such exit should lead to the outside of the building on the same level, or downstairs; no upward travel should be permitted unless direct outside exits are available from the floor and any floor below (as in the case of a basement garage where the grade is one storey or more lower at the rear than at the street).

3.5.14.5 Exits from aircraft hangars (storage or servicing areas) should be provided at intervals of not more than 45 m on all exterior walls of aircraft hangars.

3.5.14.6 There should be a minimum of two exits serving each aircraft storage or servicing area. Horizontal exits through interior fire walls should be provided at intervals of not more than 30 m.

3.5.14.7 "Dwarf" or "smash" doors in doors accommodating aircraft may be used to comply with these requirements. All doors designated as exits should be kept unlocked in the direction of exit travel while the area is occupied.

3.5.14.8 Exits from mezzanine floors in aircraft storage or servicing area should be so arranged that the maximum travel to reach the nearest exit from any point on the mezzanine should not exceed 22.5 m. Such exits should lead directly to a properly enclosed stairwell discharging directly to the exterior or to a suitably cut-off area or to outside fire escape stairs.

3.5.14.9 The following provisions should apply to grain elevators:

- a) there should at least be one stair tower from basement to first floor and from first floor to top floor of the workhouse enclosed in a dust-tight non-combustible shaft;
- b) non-combustible doors of self-closing type should be provided at, each floor landing;
- c) an exterior fire escape of the stair or basket ladder type should be provided from the roof of the workhouse to the ground level or to the roof of an adjoining annexe with access from all floors above the first; and.
- d) an exterior fire escape or either the stair or basket ladder type should be provided from the roof of each storage annexe to the ground level.

3.5.14.10 Every area used for storage of hazardous commodities should have an exit within 22.5 m of any point in the area where persons may be present or 30 m where automatic sprinkler protection is provided.

3.5.15 Hazardous and high hazards industrial occupancies

3.5.15.1 Exits should be so located that it will not be necessary to travel more than 22.5 m from any point to reach the nearest exit.

3.5.15.2 From every point in every floor area, there should at least be two exits accessible in different directions; where floor areas are divided into rooms, there should be at least two ways of escape from every room, however small, except toilet rooms, so located that the points of access thereto are out of or suitably shielded from areas of high hazard.

3.5.15.3 In addition to types of exits for upper floors specified for Group G occupancies, slide escapes may be used as required exits for both new and existing buildings.

3.6 Doorways

3.6.1 Every exit doorway should open into an enclosed stairway, or horizontal exit of a corridor, or passageway providing continuous and protected means of egress.

3.6.2 No exit doorway should be less than 100 cm in width. Doorways should be not less than 20 cm in height.

3.6.3 Exit doorways should open outwards, that is, away from the room but should not obstruct the travel along any exit. No door, when opened, should reduce the required width of stairway or landing to less than 90 cm; over-head or sliding door should not be installed.

NOTE In the case of buildings where there is a central corridor, the doors of rooms should open inwards to permit smooth flow of traffic in the corridor.

3.6.4 Exit door should not open immediately upon a flight of stairs, a landing equal to at least the width of the door should be provided in the stairway at each doorway; the level of landing should be the same as that of the floor which it serves.

3.6.5 Exit doorways should be openable from the side which they serve without the use of a key.

3.6.6 Revolving doors should not be used as required exits except in residential, business and mercantile occupancies but should not constitute more than half the total required door width. In mercantile buildings where there is possibility of congregation of a large number of people (more than 200), revolving doors should not be permitted.

3.6.7 Where the revolving door provided is completely made of glass (plate glass), a red circle or emblem or logo at 1.5 m level above sill should be painted on the glass. The thickness of the glass should not be less than 12 mm.

3.7 Corridors and passageways

3.7.1 Exit corridors and passageways should be of width not less than the aggregate required width of exit doorways leading from them in the direction of travel to the exterior.

3.7.2 Where stairways discharge through corridors and passageways, the height of corridors and passageways should be not less than 2.4 m.

3.8 Internal staircases

3.8.1 Interior stairs should be constructed of non-combustible materials throughout.

3.8.2 Interior staircase should be constructed as a self-contained unit with an external wall constituting at least one of its sides and should be completely enclosed.

3.8.3 A staircase should not be arranged round a lift shaft unless the latter is totally enclosed by a material of fire-resistance rating as that for the type of construction itself.

3.8.4 Hollow combustible construction should not be permitted.

3.8.5 Hollow combustible construction should not be permitted.

3.8.6 No gas piping should be laid in the stairway.

3.8.7 Notwithstanding the detailed provision for exits given above the following minimum width should be provide for staircases:

a) residential buildings (dwellings) 1.0 m;

NOTE For row housing with 2 storeys, the width should be 0,75 m

b) residential hotel buildings;

c) assembly buildings like auditorium, theatres and cinemas;

d) educational buildings:

i) up to 24 m in height; and

ii) more than 24 m in height.

e) institutional buildings like hospitals:

i) up to 10 beds; and

ii) more than 10 beds.

f) all other buildings.

3.8.8 The minimum width of tread without closing should be 25 cm for internal staircase of residential buildings. This should be 30 cm for assembly, education, institutional, business and other buildings. The treads should be constructed and maintained in a manner to prevent slipping.

3.8.9 The maximum height of riser should be 19 cm for residential buildings and 15 cm for other buildings and the number should be limited to 15 per flight.

3.8.10 Hand rails should be provide at a minimum height of 100 cm and not exceeding 120 cm to be measured from the base of the middle of the treads to the top of the hand rails. Further, the gap between the two verticals should not exceed 30 cm. This gap should be reduced to 15 cm where children are likely to use the staircase.

3.8.11 The number of people in between floor landings in staircase should not be less than the population on each floor for the purpose of design of staircase.

3.9 Fire escapes or external stairs

3.9.1 Fire escapes should not be taken into account in calculating the evaluation time of a building.

3.9.2 All fire escapes should be directly connected to the ground.

3.9.3 Entrance to the fire escape should be separate and remote from the internal staircase.

3.9.4 Care should be taken to ensure that the wall opening or window opens on to or close to a fire escape.

3.9.5 The route to the fire escape should be free of obstructions at all times.

3.9.6 The fire escape should be constructed of non-combustible materials, and any doorway leading to the fire escape should have the required fire resistance.

3.9.7 No staircase, used as a fire escape should be inclined at an angle greater than 45° to the horizontal.

3.9.8 Fire escape stairs should have straight flight not less than 75 cm wide with 20 cm treads and risers not more than 19 cm. The number of risers should be limited to 15 per flight.

3.9.9 Hand rails should be of a height not less than 100 cm and not exceeding 120 cm.

3.10 Spiral fire escape

3.10.1 The use of spiral staircase should be limited to occupant load and to a building not exceeding 9 m in height unless they are connected to platforms, such as balconies and terraces to allow escapees to pause.

3.10.2 Spiral fire escape should be not less than 150 cm in diameter and should be designed to give adequate headroom.

3.11 Roof exit

3.11.1 In all buildings over three storeys in height where the slope of the roof is less than 20 degrees, direct access to the roofs is less than 20 degrees; direct access to the roofs should be provided from the street by means of stairway.

3.11.2 Where roofs are used as roof gardens or for other habitable purposes, sufficient stair-ways should be extended to them to provide necessary exit facilities required for such occupancy.

NOTE This does not apply to A-2 and A-4 occupancies up to 15 m height.

3.11.1 Horizontal exits

3.11.1.1 The width of horizontal exit should be the same as for the exit doorways see 3.6

3.11.1.2 A horizontal exit should be equipped with at least one fire door of self-closing type.

3.11.1.3 Floor area on the opposite or refuge side of a horizontal exit should be sufficient to accommodate occupants of the floor areas served, allowing not less than 0.3 m² per person.

3.11.1.4 The refuge area into which a horizontal exit leads should be provided with exits adequate to meet the requirements given in this standard. At least one of the exits should lead directly to the exterior of building or to a street.

3.11.1.5 Where there is a difference in level between connected areas for horizontal exits, ramps, not more than 1 in 10 in slope should be provided; steps should not be used.

3.11.1.6 Doors in horizontal exits should be openable at all times from both sides.

3.12 Fire tower

3.12.1 Fire towers are the preferred type of escape route for storeyed buildings and their application should be considered as the safest route for escape. Their number, location and size should depend on the building concerned and its associated escape routes.

3.12.2 In every mercantile, industrial, business, assembly buildings other than theatres, institutional and residential buildings, over 6 storeys or 25 m in height, at least one required means of egress should be a fire tower.

3.12.3 The enclosure of fire towers should be constructed of walls with a 4 h fire-resistance rating without openings other than the exit door-ways with platform, landings and balconies of not less than 3 h fire-resistance rating.

3.13 Ramps

3.13.1 Ramps should comply with all the applicable requirements for stairways regarding enclosure, capacity and limiting dimensions except where specified for special uses and occupancies.

3.13.2 The slope of a ramp should not exceed 1 in 10. In certain cases, steeper slopes may be permitted but in no case greater than 1 in 8.

3.13.3 For all slopes exceeding 1 in 10 and wherever the use is such as to involve danger of slipping, the ramp should be surfaced with approved non-slipping material.

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