

Fire precautions in the design, construction and use of buildings —

Part 5: Access and facilities for fire-fighting

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee FSH/14, Fire precautions in buildings, upon which the following bodies were represented:

- Association of British Fire Trades
- Association of British Theatre Technicians
- Association of Building Engineers
- Association of Corporate Approved Inspectors
- Association of Specialist Fire Protection
- British Cables Association
- British Standards Society
- Chief and Assistant Chief Fire Officers Association
- Consumer Policy Committee of BSI
- Department for Education and Skills
- Department of the Environment for Northern Ireland
- Department of Health — NHS Estates
- District Surveyors Association
- Door and Shutter Manufacturers' Association
- Fire Brigades Union
- Fire Safety Development Group
- Guild of Architectural Ironmongers
- Health and Safety Executive
- Heating and Ventilating Contractors' Association
- Institution of Fire Engineers
- Institute of Structural Engineers
- Line of Fire
- London Fire and Emergency Planning Authority
- Ministry of Defence — UK Defence Standardization
- National House Building Council
- Nuclear Industry
- Office of the Deputy Prime Minister — Building Division
- Royal Institute of British Architects
- Royal Institution of Chartered Surveyors — Building Control Forum
- Scottish Executive — Construction and Building
- Steel Window Association
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Foreword

This part of BS 5588 has been prepared by Technical Committee FSH/14. It supersedes BS 5588-5:1991, which is withdrawn.

This new edition represents a retitling and full revision of the standard, and introduces the following principal changes:

- a) new recommendations for vehicle access, water supplies, fire control centre, drawings for fire service use and smoke control;
- b) removal of all recommendations relating to fire-fighting lifts that are now covered in BS EN 81-72;
- c) updating of recommendations to reflect new regulations and changes in practice since the previous edition.

It has been assumed in the preparation of this part of BS 5588 that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

As a code of practice, this part of BS 5588 takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 43 and a back cover.

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1 Scope

This part of BS 5588 gives recommendations and guidance on access and facilities for fire-fighting. It is not applicable to buildings under construction.

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.

BS 3251, Specification — Indicator plates for fire hydrants and emergency water supplies.

BS 5266-1, Emergency lighting — Part 1: Code of practice for the emergency lighting of premises other than cinemas and certain other specified premises used for entertainment.

BS 5306-1, Fire extinguishing installations and equipment on premises — Part 1: Hydrant systems, hose reels and foam inlets.

BS 5306-2, Fire extinguishing installations and equipment on premises — Part 2: Specification for sprinkler systems.

BS 5395-1, Stairs, ladders and walkways — Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders.

BS 5499-1, Graphical symbols and signs — Part 1: Safety signs, including fire safety signs — Specification for geometric shapes, colours and layout.

BS 5588-4:1998, Fire precautions in the design, construction and use of buildings — Part 4: Code of practice for smoke control using pressure differentials.

BS 5839-1, Fire detection and alarm systems for buildings — Part 1: Code of practice for system design, installation, commissioning and maintenance.

BS 5839-3, Fire detection and alarm systems for buildings — Part 3: Specification for automatic release mechanisms for certain fire protection equipment.

BS 5839-9, Fire detection and alarm systems for buildings — Part 9: Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems.

BS 6387:1994, Specification for performance requirements for cables required to maintain circuit integrity under fire conditions.

BS 7671, Requirements for electrical installations — IEE Wiring Regulations — Sixteenth edition.

BS 7846:2000, Electric cables — 600/1 000 V armoured fire-resistant cables having thermosetting insulation and low emission of smoke and corrosive gases when affected by fire.

BS EN 81-1:1998, Safety rules for the construction and installation of lifts — Part 1: Electric lifts.

BS EN 81-2:1998, Safety rules for the construction and installation of lifts — Part 2: Hydraulic lifts.

BS EN 81-72:2003, Safety rules for the construction and installation of lifts — Part 72: Particular applications for passenger and goods passenger lifts — Firefighters lifts.

BS EN 1155, Building hardware — Electrically powered hold-open devices for swing doors — Requirements and test methods.

BS EN 12845, Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance.

3 Terms and definitions

For the purposes of this part of BS 5588 the following definitions apply.

3.1

basement

storey with a floor which at some point is more than 1.2 m below the highest level of ground adjacent to the outside walls

3.2

bridgehead

part of a building, usually the floor below the fire (floor above in the case of basements), from which fire-fighting teams can be safely committed to attack a fire

3.3

car control station

control panel in a lift car for the use of passengers

3.4

control equipment

electrical switches, door interlocks and apparatus associated with the operation and programming of a lift service

3.5

depth

distance of the lowest point of the floor of the lowest storey of a building to the fire service access level measured at the centre of that face of the building where the distance is greatest

3.6

dual-entry fire-fighting lift

fire-fighting lift provided with two sets of doors, one used for normal operations and the other in the fire-fighting mode

3.7

ductwork

system of enclosures of any cross-sectional shape for the distribution or extraction of air

3.8

emergency lighting

lighting provided for use in the event of failure of the supply to the normal lighting

3.9

escape route

route forming part of the means of escape from any point in a building to a final exit

3.10

final exit

termination of an escape route from a building giving direct access to a street, passageway, walkway or open space, and sited to enable the rapid dispersal of persons from the vicinity of a building so that they are no longer in danger from fire and/or smoke

3.11

fire door

door or shutter, provided for the passage of persons, air or objects, which together with its frame and furniture as installed in a building, is intended (when closed) to resist the passage of fire and/or gaseous products of combustion, and is capable of meeting specified performance criteria to those ends

NOTE A fire door may have one or more leaves, and the term includes a cover or other form of protection to an opening in a fire-resisting wall or floor or in a structure surrounding a protected shaft.

3.12

fire-fighting lift

lift with fire protection measures, including controls that enable it to be used under the direct control of the fire service in fighting a fire

3.13

fire-fighting lobby

protected lobby provided within a fire-fighting shaft giving access from a fire-fighting stair to an accommodation area, and normally to any associated fire-fighting lift and fire main

NOTE Corridors serving residential accommodation can be regarded as fire-fighting lobbies.

3.14**fire-fighting shaft**

protected enclosure containing a fire-fighting stair, fire-fighting lobbies, a fire main and, if provided, a fire-fighting lift together with any machinery space

3.15**fire-fighting stair**

protected stairway communicating with an accommodation area only through a fire-fighting lobby

3.16**fire load**

quantity of heat which could be released by the combustion of all the combustible materials in a volume, including the facings of all bounding surfaces

NOTE The fire load is expressed in joules.

3.17**fire main**

water supply pipe, fitted with an outlet and control valve at specified points, installed in a building for fire-fighting purposes

3.18**fire resistance**

ability of a component or construction of a building to meet for a stated period of time the requirements specified in a fire resistance standard, e.g. BS 476 or BS EN 1363-1

3.19**fire service access level**

level at which there is suitable entry to the building and to a fire-fighting shaft from an area to which fire service appliances have access

3.20**floor area**

area enclosed by the inner surfaces of a wall, including internal walls

3.21**floor void**

cavity between a structural floor and a platform above, through which building services can pass

3.22**grille**

security or protective mesh positioned over the opening to a duct or in a door to allow air discharge into a room or space

3.23**height**

distance of the surface of the highest point of the floor of the highest storey (excluding any such storey consisting exclusively of plant rooms) to the fire service access level measured at the centre of that face of the building where the distance is greatest

3.24**lift landing**

floor space from which a lift car is normally entered at each level

3.25**lift landing door**

sliding portion of a lift well enclosure at each landing that gives access to a lift car when open

NOTE This is separate from the lift car door.

3.26**lift machine**

unit, including the motor, which drives and stops a lift

3.27

lift well

space in which a lift and counterweight (if any) move

3.28

means of escape

structural means whereby a safe route in the event of fire is provided for persons to travel from any point in a building to a place of safety

3.29

non-combustible

not capable of undergoing combustion under specified conditions
[BS EN ISO 13943]

3.30

pressure differential system

system of fans, ducts and vents provided for the purpose of creating a pressure differential between a fire zone and a protected space

3.31

pressurization system

method of smoke control using differentials, where the air pressure in the spaces being protected is raised above that in the fire zone

3.32

protected corridor/lobby

circulation area consisting of a lobby or corridor enclosed with fire-resisting construction (other than any part that is any external wall of a building)

3.33

protected shaft

stairway, lift, escalator, chute, duct or other shaft of fire-resisting construction which enables persons, objects or air to pass from one compartment to another

3.34

refuge

area that is both separated from a fire by fire-resisting construction and provided with a safe route to a storey exit, thus constituting a temporarily safe space for disabled people to await assistance for their evacuation

3.35

smoke shaft

enclosed space in a building provided for venting smoke from a fire-fighting stair or one or more fire-fighting lobbies

3.36

sprinkler

temperature-sensitive sealing device which opens to discharge water for fire extinguishing

3.37

sprinkler installation

part of a sprinkler system comprising a set of main control valves, the associated pipe work and sprinklers

3.38

sprinkler system

system for providing sprinkler protection in a building, comprising one or more sprinkler installations and the water supply

NOTE This does not include town mains and bodies of water such as lakes or canals.

3.39**vent**

device that is permanently open or can be opened to permit the passage of air or smoke between a part of a building and the external air

NOTE Examples include windows, roof lights, doors, louvres and grilles.

4 General

Fire-fighters need to be able to reach a fire quickly, with their equipment. Physical safety and lives, both those of the fire-fighters and those of the occupants of the building, and the preservation of the building and its contents, can be jeopardized by delays in reaching the area of the fire.

In most new buildings, fire service operations do not necessarily contribute to the evacuation of occupants, except where progressive horizontal evacuation techniques are used, e.g. in some residential buildings. Rescue by the fire service can provide an additional factor of safety, but this is not generally taken into account in any calculation of probable risk to the building or occupants for the design of a building.

Fire-fighting facilities should be selected and designed to assist the fire service in protecting life, protecting fire-fighters, reducing building losses, salvaging property and goods and minimizing environmental damage. Early consultation with the approving authority is recommended when deciding upon which facilities should be provided.

NOTE 1 The exact choice of facilities depends on the use, size or layout of the building, the nature of its contents, and the site upon which it is situated.

Fire-fighting facilities should include, where appropriate:

- a) provision for summoning the assistance of the fire service as early as possible;
 - b) means of enabling the fire service to locate and reach the building on fire as quickly as possible, including information facilities and the provision of vehicular access for fire appliances to the perimeter of the building or site;
 - c) provision of and access to sufficient supplies of a fire-fighting medium;
- NOTE 2 The usual fire-fighting medium is water, but other media may be used, e.g. bulk foam supplies.
- d) provision of easy and speedy entry to the interior of the building or site for fire-fighters and their equipment;
 - e) means of enabling fire-fighters, once they have entered a building, to reach any point within that building in the shortest possible time, including the provision of fire-fighting lifts if appropriate;
 - f) means of ensuring that once fire-fighters have arrived at a position within a building, they can remain there in relative safety whilst they carry out their rescue and fire-fighting roles;
 - g) provision for removing the products of combustion from the building both during and after fire;
 - h) provision for securing and storing of salvaged goods or artefacts on site;
 - i) provision of automatic fire suppression systems to restrict the growth of a fire;
 - j) provision of fire-resisting structural elements to prevent the premature collapse of the building or site;
 - k) provision of fire-resisting compartments and structures to limit the uncontrolled spread of fire;
 - l) provision of automatic fire-resisting barriers to reduce the fire compartment sizes;
 - m) provision of facilities to release, or extract, smoke and heat from the building or site;
 - n) provision of fire-fighting and fire-fighter access facilities within the building or site;
 - o) provision for fire service communications;
 - p) provision for removing spent fire-fighting extinguishing medium.

Building designers should ensure as far as possible that the life safety risk to fire-fighters is minimized, whilst still allowing them to:

- 1) successfully carry out the rescue of persons or animals;
- 2) locate and extinguish a fire with minimal damage; and
- 3) minimize any short-term or long-term catastrophic damage to the environment.

Sprinkler systems provide an effective means of controlling the outbreak of fire, although they cannot always suppress it. Where sprinkler systems are used, they should conform to BS 5306-2 or BS EN 12845. Other provisions such as compartment size, the use of automatic fire barriers and smoke control systems can all add to a building's fire strategy and management and can reduce the need for fire service involvement. Even if a sprinkler system or other type of containment system is installed, however, the fire service still need to be able to access any part of a building affected by fire.

5 Vehicle access

5.1 General

Every building should be provided with suitable access for fire-fighting purposes; roadways should be constructed to allow access for fire appliances, and entry points to buildings should be readily identifiable to the fire service.

Vehicle access should be provided to small buildings (i.e. buildings up to 2 000 m² with a top storey less than 11 m above ground level) to within 45 m of every point on the projected plan area or "footprint" of the building (see Figure 1) or to 15 % of the perimeter, whichever is the less onerous. Vehicle access to all other buildings that do not have fire mains should be provided in accordance with Table 1. Every building to which vehicle access is so provided should have a suitable door, not less than 750 mm wide, giving access to the interior of the building.

NOTE For buildings with fire mains, see 5.3.

Individual dwelling entrances should be not more than 45 m from the point of vehicle access.

Table 1 — Fire service vehicle access to buildings (excluding blocks of flats) not fitted with fire mains

Total floor area of building ^a m ²	Height to floor of top storey of building m	Type of appliance ^b	Position of access % of perimeter ^c
≤2 000	≤11	Pump	^d
	>11	Pump and high-reach	15 ^e
2 000 to 8 000	≤11	Pump	15
	>11	Pump and high-reach	50 ^e
8 000 to 16 000	≤11	Pump	50 ^e
	>11	Pump and high-reach	50 ^e
16 000 to 24 000	≤11	Pump	75 ^e
	>11	Pump and high-reach	75 ^e
>24 000	≤11	Pump	100 ^e
	>11	Pump and high-reach	100 ^e

NOTE 1 Consultation with the relevant approving authority is advised on all matters concerning fire access. For Scotland, access is dictated by hydrant position.

NOTE 2 In the case of storage buildings, height should be measured to mean roof level.

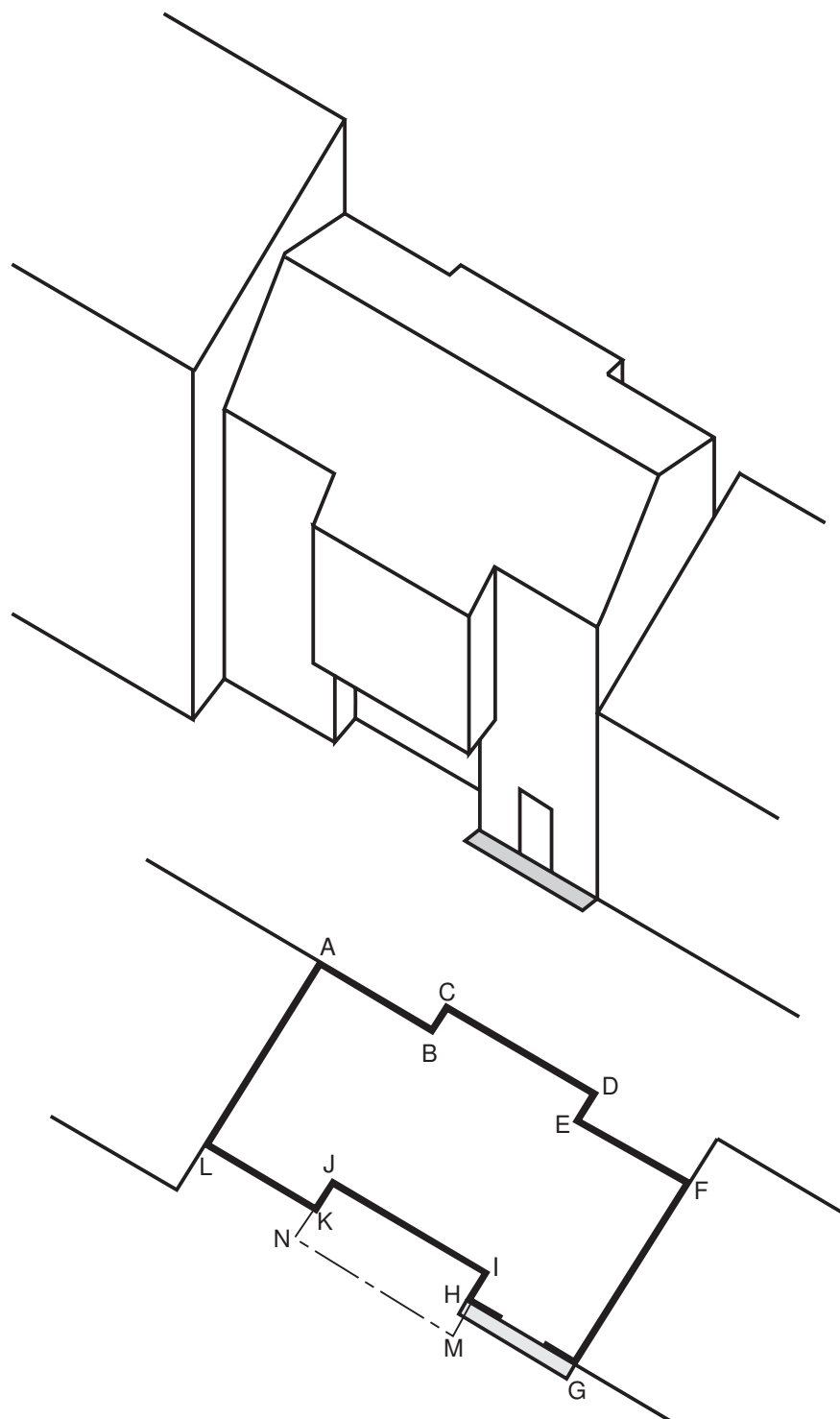
^a The total floor area is the aggregate of the floor areas of all the storeys in the building.

^b "Pump" = pumping appliance; "high-reach" = aerial appliance, e.g. turntable ladder or hydraulic platform.

^c "Perimeter" refers to the face of the total length of all exposed perimeter walls.

^d See 5.1.

^e Any perimeter wall (elevation) to which vehicle access is provided should have a door, not less than 750 mm wide, giving access to the interior of the building.



Plan of building AFGL where AL and FG are walls in common with other buildings.

The footprint of the building is the maximum aggregate plan perimeter found by the vertical projection of any overhanging storey onto a ground storey (i.e. ABCDEFGHNMKL).

The perimeter of the building for the purposes of Table 1 is the sum of lengths of the two external walls, taking account of the footprint, i.e. (A to B to C to D to E to F) + (G to H to M to N to K to L).

If the dimensions of the building were such that Table 1 requires vehicle access, the shaded area illustrates one possible example of 15 % of the perimeter.

NOTE There should be a door into the building in this length (see 5.1).

If the building does not have walls in common with other buildings, the lengths AL and FG would be included in the perimeter.

Figure 1 — Example of building footprint and perimeter

5.2 Access for high-reach appliances

Vehicle access to the exterior of a building is needed to enable high-reach appliances, e.g. turntable ladders and hydraulic platforms, and pumping appliances to supply water and equipment for fire-fighting and rescue activities.

The relevant approving authorities should be consulted to ascertain their recommendations relating to access roads and hard-standings, in terms of load-bearing capability, turning circles, widths, lengths, headroom, proximity to dry riser inlets, etc.

NOTE The size and mass of fire appliances is not standardized. The dimensions of access routes and hard-standings will vary according to the fire appliances that are used in a particular fire authority area (see Figure 2). The size and height of a building also has an effect on access facilities. An example of typical access route dimensions for high-reach appliances is shown in Table 2.

Turning facilities should be provided in any dead-end access route that is more than 20 m long. This can be by a hammer-head or turning circle (see Table 2).

Overhead obstructions, e.g. cables and branches, that would interfere with the operation of high-reach appliances, should be avoided in the zone shown in Figure 2 and Table 3.

Table 2 — Example of measurements for a typical vehicle access route

Appliance type	Min. width of road between kerbs m	Min. width of gateways m	Min. turning circle between kerbs m	Min. turning circle between walls m	Min. clearance height m	Min. carrying capacity tonnes
Pump	3.7	3.1	16.8	19.2	3.7	12.5
High-reach	3.7	3.1	26.0	29.0	4.0	17.0

NOTE Because the weight of high-reach appliances is distributed over a number of axles, it is considered that their infrequent use of a carriageway or route designed to 12.5 tonnes is not likely to cause damage. It would therefore be reasonable to design the road base to 12.5 tonnes, although structures such as bridges should have the full 17 tonnes capacity.

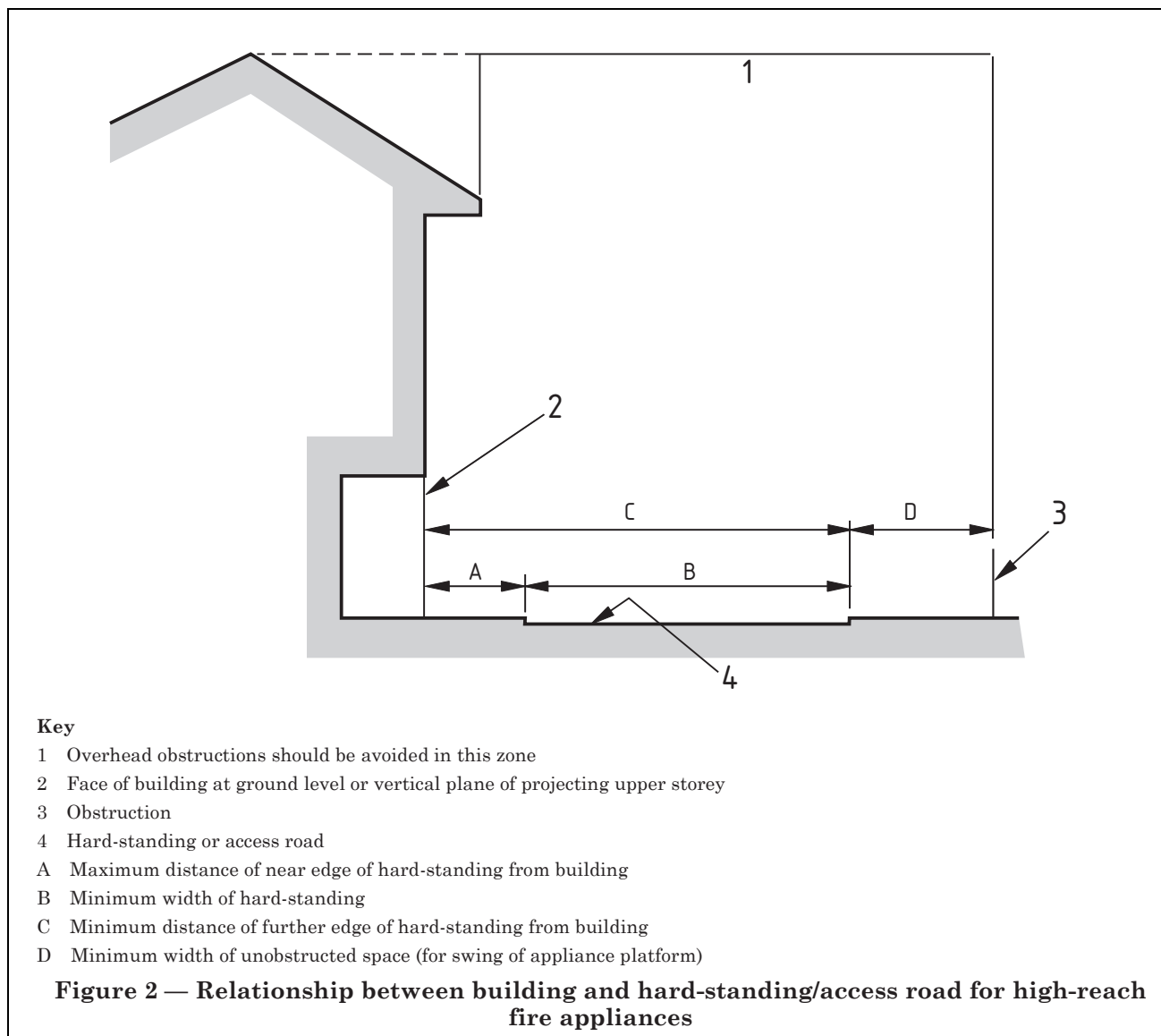


Table 3 — Dimensions of high-reach fire appliances

Dimensions in metres

Dimension (see Figure 2)	Type of appliance	
	Turntable ladder	Hydraulic platform
A	4.9	2.0
B	5.0	5.5
C	10.0	7.5
D	—	2.2
NOTE Hard-standing for high-reach appliances should be as level as possible and should not exceed a gradient of 1 in 12.		

5.3 Buildings (other than shopping complexes) fitted with fire mains

NOTE 1 For shopping complexes, see 5.4.

Fire mains enable fire-fighters within a building to connect their hoses to a water supply. In buildings fitted with fire mains, pumping appliances need access to the perimeter at points near the mains, where fire-fighters can enter the building to make a hose connection from the appliance to pump water into the main. Fire mains should be provided in all buildings with fire-fighting shafts.

Wet rising mains should be provided in buildings with a floor at more than 60 m above fire service vehicle access level. In lower buildings where fire mains are provided, either wet or dry mains are suitable. In the case of a building fitted with dry fire mains there should generally be access for a pumping appliance to within 18 m of each fire main inlet connection point and the inlet should be visible from the appliance (see Note 2).

NOTE 2 The sight criteria may be varied with the approval of the approving authority.

In the case of a multi-storey building fitted with a wet fire main system, the pumping appliance access should generally be:

- a) within 18 m of, and within sight of, a suitable entrance giving access to the main; and
- b) in sight of the inlet for the emergency replenishment of the suction tank for the main (see Note 2).

In the case of a single-storey building fitted with a wet fire main system, fire appliance access should be provided to within 45 m of each of a sufficient number of outlet valves such that no point in the building is more than 60 m from an outlet valve, measured along a route suitable for laying hose.

Access roadways should generally be positioned to allow pumping appliances to be positioned within 18 m of, and in sight of, any other inlet points (see Note 3).

NOTE 3 Discussion on pumping appliance access might be needed with the water authority on replenishment from the mains.

5.4 Shopping complexes

5.4.1 Single-storey shopping complexes

NOTE 1 The dimensional recommendations given in this subclause are generally applicable for single-storey complexes up to about 30 000 m² and/or having one dimension not greater than 190 m. Where the overall floor area of a complex is particularly extensive, it might be necessary to increase the recommended dimensions.

Single-storey shopping complexes pose fewer difficulties for fire-fighters than multi-storey complexes (see 5.4.2). For example, there is no need to transport personnel and equipment between storeys. However, a single-storey complex can cover an extensive area and therefore access roadways are still necessary to enable fire appliances to drive near to selected entry points to the complex.

The distance between the fire appliance and the fire should be kept to a minimum, to reduce the time taken for laying out hose. The provision of a wet fire main system can enable an increased distance between the fire appliance parking position and the wet main outlet valves. The route within the complex taken by fire-fighters to reach the outlet valve should be protected by fire-resisting construction.

If a wet fire main system is installed, it should conform to BS 5306-1 and fire appliance access should be provided to within 50 m of each of a sufficient number of outlet valves such that no point in the building is more than 60 m from an outlet valve, measured along a route suitable for laying hose (see Figure 3).

If a wet fire main system is not installed, fire appliance access should be provided within 18 m of each of a sufficient number of entry points so that no point in the building is more than 60 m from an entry point, measured along a route suitable for laying hose (see Figure 4).

NOTE 2 If the internal layout is not known at the planning stage, a direct line measurement of 40 m may be used for design purposes, provided that the building when occupied meets the 60 m criterion.

Turnaround facilities should be provided so that fire appliances do not have to reverse more than 20 m.

