BS EN 81-72:2015
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BSI Standards Publication

Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts

Part 72: Firefighters lifts

National foreword

This British Standard is the UK implementation of EN 81-72:2015. It supersedes BS EN 81-72:2003 which is withdrawn.

This standard forms part of a series of standards concerning the safe design of passenger and goods passenger lifts. As such, it is intended to be read in conjunction with the other standards in the series in order to be fully understood.

Since the first publication of the base standard EN 81-1, published as BS 5655-1 in 1979, there have been subsequent versions, leading to the latest publication of BS EN 81-20:2014. BS EN 81-20:2014 supersedes BS EN 81-1:1998+A3:2009 and BS EN 81-2:1998+A3:2009.

Due to the timescales needed for manufacturers to adapt their products to the new requirements in BS EN 81-20:2014 and the timescales for new building construction, a transition period is needed for the introduction of new standards. Therefore, BS EN 81-1:1998+A3:2009 and BS EN 81-2:1998+A3:2009 are to continue to be available for use, in parallel to BS EN 81-20:2014, until 31 August 2017, at which time they will be withdrawn.

Since this leaves two possible routes for designing the lift on which BS EN 81-72 is applied, there is a need for two versions of BS EN 81-72; one which can be used in conjunction with BS EN 81-1:1998+A3:2009 or BS EN 81-2:1998+A3:2009 and one for use with BS EN 81-20:2014.

On this basis, BS EN 81-72:2015 is intended to be used in conjunction with lifts in conformity with BS EN 81-20:2014. BS EN 81-72:2003 will continue to remain available until August 2017 when it will be withdrawn, coincident with the withdrawal of BS EN 81-1:1998+A3:2009 and BS EN 81-2:1998+A3:2009.

Concerning the contents of this standard, the usual practice in the UK has implications for the following aspects subject to negotiation:

- Assumption h) in the Introduction includes the rescue of persons from within the lift car. Subclause 5.4 of the standard includes requirements both for rescue from outside and for self-rescue from inside the lift car. The usual practice in the UK is for assistance for trapped firefighters to come from outside the lift car.
- Assumption k) in the Introduction relates to the possible provision of a firefighters car key switch. The usual practice in the UK is not to fit a firefighters car key switch. Provision of such a key switch would be subject to agreement with the fire and rescue service as part of negotiation.

The UK participation in its preparation was entrusted to Technical Committee MHE/4, Lifts, hoists and escalators.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

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English Version

Safety rules for the construction and installation of lifts - Particular applications for passenger and goods passenger lifts - Part 72: Firefighters lifts

Règles de sécurité pour la construction et l'installation des élévateurs - Applications particulières pour les ascenseurs et ascenseurs de charge - Partie 72 : Ascenseurs pompiers

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Besondere Anwendungen für Personen- und Lastenaufzüge - Teil 72: Feuerwehraufzüge

This European Standard was approved by CEN on 14 February 2015.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Contents

Page

Foreword

This document (EN 81-72:2015) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2015 and conflicting national standards shall be withdrawn at the latest by August 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 81-72:2003.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directives 95/16/EC amended by 2006/42/EC and 2014/33/EU, see informative Annexes ZA and ZB, which are integral parts of this document.

EN 81-72:2015 is a full revision of the standard which reflects developments since the publication of EN 81-72:2003 and experience gained from its application. Consequently, most clauses have some changes. The main changes can be identified thus:

— "Safe area" is used in place of "lobby" to be consistent with CEN/TS 81-76. The two terms are interchangeable.

— Revision of the elements dealing with building design and the inclusion of a new informative annex on the building interface. Items to be considered in the use of pressurization of lift wells have been added including the noise level at the fire communication points.

— Deletion of the requirement for a firefighters lift to serve every floor of the building. The floors to be served are assumed to be determined as part of the design of the building for fire.

— New requirements for protection of electrical equipment against water; in the lift well and the roof and walls of the lift car.

— New measures to prevent water ingress into the lift well which are strongly preferred over measures to control the level of water in the lift pit alone. The measures considered are described in a new annex on water management.

— Revision of clauses dealing with the rescue of trapped firefighters with rationalized requirements for movable ladders and reduced maximum distance between consecutive landings. The use of fixed ladders and rope ladders has been removed.

— New requirements for the interface between firefighters lift switches and the control system.

— New requirements for dual entry lift cars where not all the safe areas to be used in firefighting operations are on the same side i.e. more than one car door could be used during firefighting operations.

— Revision of requirements for the control system including new requirements for when a firefighters key switch is used in the lift car (subject to negotiation). Revised requirements, in phase 2, for car doors to close under constant pressure from door close or car call buttons and for opening.

— Inclusion of a new informative annex on maintenance requirements.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This standard is a type C standard as stated in EN ISO 12100:2010.

Firefighters lifts are used to bring the firefighters and their equipment to the required floors.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered is indicated in the scope of this standard.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards for lifts that have been designed and built according to the provisions of this type C standard.

The following assumptions were made in writing this standard.

Negotiations have been made between the owner, customer, building designers, fire authorities or other relevant bodies and installer concerning:

a) the intended use of the lift;

b) environmental conditions;

c) civil engineering problems;

d) interfaces between the lift and the building management system (BMS) or fire detection system;

e) the firefighting strategy;

f) smoke management e.g. pressurizing system impact to the lift system such as sway of travelling cables and operation of landing doors;

g) water management, and where applicable, the highest permissible water level in the pit e.g. 0,5 m;

h) other aspects related to the place of the installation and the rescue of persons from within the car;

i) power supply including regenerative power during secondary power supply operation;

j) size of safe area(s);

k) the need for an additional firefighters car key switch and availability of the key.

Developers and architects will need to take account of National Building Regulations in providing a suitable fire resistant structure of the building, safe areas, fire detection and extinguisher systems. Examples are shown in Annex B and Annex F.

1 Scope

1.1 This European Standard specifies the additional or deviating requirements to EN 81-20 for new passenger and goods passenger lifts, which may be used for firefighting and evacuation purposes under firefighters control.

1.2 This European Standard applies, when the following conditions are fulfilled:

— the lift well and the lift environment are designed to restrict the ingress of fire, heat and smoke to the lift well, machinery spaces and safe areas;

— the building design limits the flow of water into the lift well;

— the firefighters lift is not used as an escape route;

— the lift well and the lift environment are fire protected for at least to the same level as the building structure;

— the power supply is secure and reliable;

— the electrical cable(s) providing power to the lift is fire protected to the same fire protection level as given to the lift well structure;

— a suitable maintenance and verification plan is implemented.

1.3 This European Standard does not cover:

— the use of lifts with partially enclosed wells for use as firefighters lifts;

— lifts installed in new or existing buildings, which are not included in fire resisting building structure;

— important modification to existing lifts.

1.4 This European Standard does not define:

— the number of firefighters lifts and the floors to be served during firefighting operations;

— size of safe area(s);

— the use of other than the highest deck of a multi deck lift for firefighting operations.

1.5 This European Standard deals with the significant hazards, hazardous situations and events relevant to firefighters lifts (as listed in Clause 4) when they are used as intended and under the conditions as foreseen by the installer.

1.6 The following significant hazards are not dealt with in this standard and are assumed to be addressed by the building designer:

— not having enough or correctly located firefighters lifts to move the firefighters up the building;

— a fire in the firefighters lift well, safe area, machinery space or car;

— the absence of building floor identification signs at any floor;

— water management is not operating correctly.

2 Normative references

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

EN 81-20:2014, *Safety rules for the construction and installation of lifts — Lifts for the transport of persons and goods — Part 20: Passenger and goods passenger lifts*

EN 81-70, *Safety rules for the construction and installations of lifts — Particular applications for passenger and good passengers lifts — Part 70: Accessibility to lifts for persons including persons with disability*

EN 81-71, *Safety rules for the construction and installation of lifts — Particular applications to passenger lifts and goods passenger lifts — Part 71: Vandal resistant lifts*

EN 131-1, *Ladders — Part 1: Terms, types, functional sizes*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

ISO 4190-1, *Lift (Elevator) installation — Part 1: Class I, II, III and VI lifts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and EN 81-20:2014 and the following apply.

3.1
control system
system of the lift which responds to input signals and generates output signals causing the equipment under control to operate in the desired manner

3.2
evacuation
organized and controlled movement of persons in a building from a dangerous place to a safe place

3.3
fire
combustion of material producing flame, heat and smoke

3.4
fire compartment
sub-division of a building or buildings e.g. by walls, doors and/or floors for the purpose of limiting the spread of fire and hot gases within the premises

3.5
firefighters lift
lift which has protection, controls and signals which enable it to be used under the exclusive control of the firefighters

3.6
fire protection
measures to prevent the outbreak of fire and fire spread in all cases to safeguard escape routes and create effective firefighting including the determination of the fire resistance, fire load and behaviour of building materials and structures during a fire

3.7
firefighters lift switch
switch located at the fire service access level, outside of the well and optionally in the car, used to initiate firefighters service

3.8
fire service access level
entry level in the building intended to be used by firefighters to gain access to the firefighters lift

3.9
safe area
(refuge area, fire protected lobby)
area, provided with a safe route to the lift and safe exit e.g. stairs, that will remain safe for persons for the duration of firefighting operations and is both separated from a fire by suitable fire resisting construction and kept clear of smoke, in some countries known as a refuge or lobby

3.10
dual entry car
car with two car doors

3.11
Building Management System
BMS
system capable of making intelligent decisions based on information sent to it

3.12
lift environment
fire protected environment providing protected access from the usage area of the building to the firefighters lift

4 List of significant hazards

4.1 This clause contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment as significant for this type of lift and which require action to eliminate or reduce risk.

4.2 Significant hazards dealt with in this standard are shown in Tables 1 and 2 below:

Table 1 — List of significant hazards and hazardous situations - Environment

Significant Hazards and Hazardous situations - Environment		Information in this standard
1	Fire / heat / smoke may spread in to a lift well / machinery space / safe area	1.2 / 5.1
2	Exposed or obstructed lift equipment	1.2 / 1.4 / 5.1
3	Lift not useable long enough for firefighters	1.2 / 1.4 / 5.1 / 5.7
4	> 2 min delay of firefighting operations	Introduction / 1.2 / 5.1 / 5.7
5	Flow of water into the lift well	Introduction / 1.2 / 1.6 / 5.1.2 / 5.3 / 5.11.1 / Annex E
6	Entrapment on safe area due to a lift failure	1.2 / 1.4
7	Unsafe Environment for firefighters	1.2 / 1.4
8	Structure collapse before the firefighters have finished with the lift	1.4
9	Not having enough or correctly located firefighters lift to move the firefighters and their equipment through the building.	1.6

Table 2 — List of significant hazards and hazardous situations – Firefighters lift

No	Hazards as listed in EN ISO 12100:2010, Annex B	Requirements and clauses in this standard
8	General hazards for lifts	5.1 / 5.2.1 / 5.8.3 / 5.8.4 / 5.9.1
1	Trapping hazard	5.2.2 / 5.4 / 5.6 / 5.7 / 5.8 / 5.9 / 5.10 / 5.11 / 5.12
8	> 2 min delay of firefighting operations	5.2.3 / 5.2.4 / 5.6 / 5.8 / 5.9 / 5.10 / 5.11 / 5.12.3 / 6 / 7
10	Combination of hazards	5.8.7 / 5.8.8 / 5.8.9
9	Failure or malfunction of the lift	5.3 / 5.4 / 5.7 / 5.8.5 / 5.11.1 / 5.11.2 / 5.12.3
8	Human error, human behaviour	5.12
8	Inadequate design, location or identification of manual controls	5.8.1 / 5.8.2 / 5.11.3
8	Inadequate marking	5.11.4
9	Failure of the power supply	5.9.1 / 5.9.2 / 5.10

5 Safety requirements and/or protective measures

5.1 Environment/Building requirements

5.1.1 The firefighters lift is located in a well with a safe area in front of every landing door which is used for firefighting operations. In front of every landing door a safe area, a fire shutter or a fire door shall be provided.

NOTE The purpose of safe areas is to protect the lift well, firefighters and those who may be waiting to be evacuated against fire, heat and smoke and in addition to allow the self rescue as described in 5.4. The minimum dimensions of each safe area are given by national regulations.

5.1.2 It is the responsibility of national/local regulations to determine the required levels of fire resistance, and other building requirements that shall be addressed for a safe firefighters lift:

— protection of the areas in front of the landing doors;

— separation of the well;

— fire resistance of the landing doors;

— fire resistance of the lift well and machinery space walls;

— fire resistance of fire shutters and fire doors;

— connection between lift safe areas and staircase;

— water management; see Annex E;

— power supply;

— communication connection;

— smoke control e.g. air pressurization system or ventilation;

— number and size of firefighters lifts.

5.1.3 The level of fire resistance of the lift well shall also apply to any of the following: the walls and doors of safe areas, fire doors, fire shutters, doors to machinery spaces, pulley and machine rooms. If there are other lifts in the same well, then the entire common well shall fulfil the fire resistance requirements of firefighters lift wells. See Annex B. It is not necessary that other lifts shall remain in operation but it shall be ensured that a malfunction of another lift does not have any adverse influence of the function of the firefighters lift.

5.1.4 Any lift landing door which is not intended to be used by firefighters and which does not have a safe area shall be protected by a fire shutter or a fire door classified in line with the lift well structure and national regulations (see Figure B.3).

5.1.5 The firefighters lift shall have a secondary power supply available.

5.1.6 The firefighters lift electrical power supply cable(s) shall be fire protected.

5.1.7 The source of the secondary power supply and automatic switch gear shall be located in a fire protected area.

5.1.8 In the case of an air pressurized well, the following points shall be considered by those designing the pressurization system:

— air speed into the well is minimized to avoid excessive swaying of travelling cable or compensation means;

— when the lift is in phase 2 (see 5.8.8) noise levels from the pressurization system are less than 80 dB(A) at positions 0,5 m from the microphones in the car, at the fire service access level and at the emergency and test panel;

— the pressurization shall not affect the opening and closing of the car and landing doors.

It is assumed that air pressurizing of the well does not cause any negative impacts on normal operation or safe maintenance activities of the lifts.

5.2 Fundamental firefighters lift requirements

5.2.1 The firefighters lift shall be designed in conformity with EN 81-20 and provided with additional protection, controls and signals.

5.2.2 The size of the firefighters lift shall be in accordance with national regulations and preferably be selected from ISO 4190-1. At no time shall the size be less than 1 100 mm wide by 1 400 mm deep with a rated load of 630 kg. See also Introduction.

The clear entrance width to the car shall be a minimum of 800 mm.

5.2.3 Where the intended use of the firefighters lift is to include evacuation, to accommodate such items as a stretcher or bed, then the minimum rated load shall be 1 000 kg and the minimum dimensions of the car 1 100 mm wide by 2 100 mm deep. See also Introduction.

NOTE For firefighters lifts national regulations may impose greater dimensions and rated loads.

5.2.4 The firefighters lift shall be able to reach the highest landing to be served in firefighting operations from the fire service access level within 60 s, from after the closing of the lift doors. However, for lifts with higher travel than 200 m, this time to reach the highest landing may be increased by 1 s for each 3 m additional travel height.

NOTE Experience has shown that a rated speed greater than 4,5 m/s may cause problems due to technical complexity e.g. size of secondary power supply, turbulence from the pressurized environment and spoilers on the car roof.

5.2.5 The lift shall be designed to operate correctly during firefighting operations for a period equal to that required for the structure, e.g. 2 h, according to the following conditions:

a) electrical/electronic devices on landings, other than at the fire service access level, shall be designed to function correctly in an ambient temperature range of 0 °C to 65 °C or be made non-operational. A malfunction of devices (landing indicators and push buttons) shall not prevent operation of the lift under fire fighting conditions;

b) all other electrical/electronic components of the firefighters lift shall be designed to function correctly in an ambient temperature range of 0 °C to + 40 °C;

c) the correct functioning of the lift control shall be ensured in smoke filled wells and/or machinery spaces;

d) any ambient temperature sensor shall not stop, or prevent the start, of the firefighters lift.

5.2.6 For a dual entry car, no more than one car door shall be open at any time during firefighting operations.

5.2.7 When the distance between consecutive landing doorsills exceeds 7 m, intermediate emergency doors shall be provided, such that the distance between sills is not more than 7 m. Additional consideration shall be made to the maximum length of the ladder as defined in 5.4.2.4.

NOTE The floor distance may be greater when appropriate calculations with a 6 m long ladder are provided. See 5.4.2.4.

5.2.8 Any lift, which is not required to stay in operation in the event of fire, sharing the same well as a firefighters lift should be provided with a fire recall system according to EN 81-73.

5.2.9 The firefighters lift well and machinery spaces shall not contain sprinklers.

5.3 Protection of electrical equipment against water (see Annex D)

5.3.1 Electrical equipment within the firefighters lift well below the highest landing level located within 1,0 m of any wall containing a landing door and on the car roof and around outer sides of the car walls shall be protected against dripping and spraying water coming from an upper landing with enclosures classified to at least IPX3 according to EN 60529. See Annex D.

Electrical equipment within the firefighters lift well below the highest landing level located more than 1,0 m away from a wall containing a landing door shall be protected against dripping water coming from an upper landing with enclosures classified to at least IPX1 according to EN 60529. See Annex D.

5.3.2 Any electrical equipment which is located less than 1,0 m above the lift pit floor shall be protected to IP67. The socket outlet and lowest lamp of the lighting of the well shall be located at least 0,5 m above the highest permissible water level in the pit. See Annex D.

NOTE The highest permissible water level in the pit is set by negotiation and assumed to be no greater than 0,5 m.

5.3.3 Electrical equipment in machinery spaces outside of the well shall be protected from malfunction caused by water.

5.3.4 Permanent means, such as measures such as defined in E.2, are strongly preferred and should be provided to effectively prevent water ingress into the lift well. Where such adequate measures are not provided, measures such as in E.3 shall:

— ensure that the water level in the pit will not rise above the level of the fully compressed car buffer; and

— prevent the water level in the pit from reaching equipment which could create a malfunction of the firefighters lift. See 1.2.

5.3.5 The car roof shall be designed to prevent accumulating water and facilitate controlled draining from the roof. Electrical equipment within the car roof and outer walls shall be classified to at least IPX3 according to EN 60529.

5.4 Rescue of trapped firefighters in the car

5.4.1 Emergency trap door

5.4.1.1 An emergency trap door shall be fitted to the car roof with minimum clear opening dimensions of 0,5 m x 0,7 m with the exception, for a 630 kg lift, of 0,4 m x 0,5 m. Clear opening dimensions shall be measured with the ladder in the rescue position as defined in 5.4.2.3.

5.4.1.2 The emergency trap door shall conform to EN 81-20:2014, 5.4.6 except for its size. See 5.4.1.1.

Access to the inside of the car through the emergency trap door shall not be obstructed by any permanent fixture or lighting. Where a suspended ceiling is fitted, it shall be easily openable or removable without the use of special tools. The handling force of any part of the suspended ceiling respectively for the emergency trap door shall be less than 250 N. The release point(s) shall be clearly identified from inside the car and also from outside the car when the emergency trap door is opened for rescue.

Measures shall be taken against the risk of uncontrolled falling of the suspended ceiling after its release. Opening of any suspended ceiling shall be possible with firefighters inside the car.

NOTE 1 The unlocking key, which fits the unlocking triangle as defined in EN 81-20:2014, 5.3.9.3 is not considered to be a special tool.

NOTE 2 It may be beneficial to contact the local fire and rescue services to clarify the self rescue procedures to be adopted.

NOTE 3 A hinged ceiling, while being opened, not coming lower than 1,6 m from the car floor is considered to leave enough space for firefighters.

5.4.1.3 If the emergency trap door is open it shall not reset its electrical switch if reclosed without making resetting a positive action. Whenever the emergency trap door is opened it shall block further operation of the lift.

5.4.2 Ladders

5.4.2.1 Ladders shall be in accordance with EN 131-1 and stored in such location to avoid a tripping hazard during normal maintenance operations and they can be safely deployed.

5.4.2.2 An electrical safety device(s) in conformity with EN 81-20:2014, 5.11.2 shall be provided to prevent the lift from operating if the ladder is not in its stored position.

5.4.2.3 Where a moveable ladder is provided for rescue procedures between the car and the car roof, its length shall be at least 1 m longer than the height of the car and shall be on the shorter side of the emergency trap door opening.

5.4.2.4 The length of a moveable ladder for rescue procedures between the car roof and the landing shall be such as to enable the firefighter to release the landing door lock mechanism of the next floor from the car, in order to enable a firefighter to get off the roof of the car. The maximum length of moveable ladders is 6 m. The ladder shall not rest against landing doors and shall be supported from suitable points on the car roof. The landing door(s) shall be possible to be opened by one hand.

5.4.3 Rescue from outside the car

Means of rescue such as:

a) portable ladders;

b) safety rope systems, where safe fixing points for the rescue means are provided in the vicinity of each landing;

may be used.

NOTE However, all such means come under the responsibility of the Local Authorities and not the lift manufacturer.

The means shall allow the car roof to be safely reached whatever the distance of the car roof is from the nearest accessible landing sill.

A ladder shall be provided to allow descending into the car from the car roof. This ladder shall comply with 5.4.2 and be deployed from car roof, and may be the same ladder as used for rescue from inside the car.

5.4.4 Self-rescue from inside the car

Access shall be provided to enable the full opening of the emergency trap door from inside the car.

A ladder or stepping points shall be provided to allow ascending onto the car roof and be positioned on the shorter side of the emergency trap door opening.

Where a ladder is provided for ascending onto the car roof, it shall comply with 5.4.2 and be deployed from inside the car.

Where stepping points are provided, a maximum step rise shall be 0,4 m, a stepping point shall be capable of supporting a load of 1 500 N and the free distance between any stepping points and the vertical wall shall be at least 0,15 m.

A ladder according to 5.4.2 shall be provided to allow ascending from the car roof to the next landing above.

A simple diagram or symbol shall be provided inside the well at each landing entrance, close to the lock, clearly showing how to unlock the landing door.

5.4.5 For each position where the lift can be blocked throughout the full travel of the lift, the rescue procedures defined in 5.4.3 and 5.4.4 shall be possible.

See Annex H for examples of Rescue Concept, see also 1.3.

5.5 Hydraulic lifts used as firefighters lift

Separate piping between machinery space and well shall be fire protected to the same fire protection level as given to the lift well structure.

5.6 Car doors and landing doors

Automatically operated horizontal sliding, (coupled) car and landing doors shall be used.

5.7 Lift machine and associated equipment

5.7.1 Any compartment containing the lift machine and its associated equipment shall be provided with at least the same degree of fire protection as is given to the lift well.

5.7.2 Wherever any machinery space is located outside of the well and outside of a fire compartment, it shall be protected with at least the same fire resistance as the fire compartment(s). Any connection (e.g. electrical cables, hydraulic pipes etc.) between fire compartments shall be likewise protected.

The locations of the lift main switch, emergency and testing panel or machine room should be included in a label at the fire service access level. See I.8.

5.8 Control Systems

5.8.1 A firefighters lift switch shall be located in the safe area intended to be used at the fire service access level. The switch shall be located within 2 m horizontally from the firefighters lift, at a height between 1,4 m and 2,0 m above floor level. The switch shall be marked with a firefighters lift pictogram in accordance with Annex G and it shall be clearly indicated to which lift it is associated.

5.8.2 Operation of the firefighters lift switch shall be by means of the unlocking key, which fits the unlocking triangle as defined in EN 81-20:2014, 5.3.9.3. Other keys may be used to operate the firefighters lift switch only when a car key switch is used (see Introduction). The operating positions of the switch shall be bi-stable and clearly marked ‘1’ and ‘0’. There shall be clear visual indication on which position the switch is. In position ‘1’ firefighting operations is initiated.

An additional external control or input may be used only to automatically return the firefighters lift to the fire service access level and keep the firefighters lift at that level with open doors. The firefighters lift switch shall still be operated to the ‘1’ position to complete the Phase 1 operation.

This service has two phases; for the function of Phase 1 see 5.8.7 and for Phase 2 see 5.8.8.

5.8.3 On operation of the firefighters lift switch, all lift safety devices (electrical and mechanical) shall remain operative apart from the door reversal devices mentioned under Phases 1 (5.8.7 h)) and 2 (5.8.8 f)).

5.8.4 The firefighters lift switch shall not override any electric safety device, the inspection operation (see EN 81-20:2014, 5.12.1.5) or the emergency electrical operation (see EN 81-20:2014, 5.12.1.6).

5.8.5 When on firefighting operations the function of the lift shall not be affected by an electrical malfunction of the landing call control or other parts of the lift control system located outside of the lift well and machinery spaces.

No electrical fault on any other lift located in the same group as the firefighters lift shall affect the operation of the firefighters lift.

5.8.6 Interface requirements between the firefighters lift switches and the lift control system

Interruption of an interface connection between the firefighters lift switch and the lift control system shall initiate phase 1 whilst the lift is in normal operation.

Interruption of an interface connection between the firefighters lift switch and the lift control system shall not change the mode of operation of the lift whilst in the fire service mode.

Interruption of an interface connection between the car key switch and the lift control system shall change the mode of operation equal to car key switch position '1'.

5.8.7 Phase 1: Priority recall for the firefighters lift

This phase can be manually or automatically initiated.

This initiation shall ensure the following:

a) the well and machinery spaces shall be automatically illuminated upon initiation of the firefighters lift switch;

b) all landing controls and the car controls in the firefighters lift shall be rendered inoperative and all existing registered calls cancelled;

c) the door open and emergency alarm buttons shall remain operative;

d) the firefighters lift shall function independently from all other lifts;

e) the fire service communication system as described in 5.12 shall be made operative;

f) a visual signal shown in Figure G.1 and located in the car operating panel shall be activated. The visual signal shall remain activated until the lift is restored to normal operation;

g) an audible signal shall sound on the car and in relevant machinery spaces immediately when Phase 1 is initiated and the lift is under inspection operation, emergency electrical operation or any maintenance control. The sound level of the audible warning shall be adjustable between 35 dB(A) and 65 dB(A), set at 55 dB(A). The audible signal shall be cancelled when the firefighters lift is removed from inspection operation, emergency electrical operation or any maintenance control and the firefighters lift shall automatically continue Phase 1 operation;

NOTE Maintenance control includes, but are not limited, to the opening by the use of a key of any door providing access to the pit, return to normal operation of the lift from pit inspection station, protection for maintenance operations or landing and car door bypass device.

h) the lift shall operate in the following way:

   1) a lift parked at a landing, shall close the doors and travel nonstop to the fire service access level. An audible signal shall sound in the car until the doors are closed. At the latest when the actual door dwell time exceeds 15 s, all heat and smoke sensitive door protection devices shall be made inactive and the doors shall attempt to close under reduced power;

2) a lift travelling away from the fire service access level shall make a normal stop and reverse its direction at the nearest possible landing without opening the doors and return to the fire service access level;

3) a lift travelling towards the fire service access level shall continue its travel non-stop to the fire service access level. If the lift has already started stopping at a level, it is acceptable to make a normal stop and without opening doors to continue to fire service access level;

i) on arriving at the fire service access level the firefighters lift shall be retained there with the car and landing doors kept in the open position.

5.8.8 Phase 2: Use of the lift under firefighters control

After the firefighters lift has parked at the fire service access level with the doors open, control will be entirely from the firefighters car controls and the following shall be ensured:

a) where Phase 1 has been initiated by an external signal the firefighters lift shall not go to phase 2 operation until the firefighters lift switch at the landing has been operated;

b) it shall not be possible to register more than one car call simultaneously;

c) at any time it shall be possible to register a new call from within the car. The previous call shall be cancelled. The car shall travel in the shortest time to the newly registered floor;

d) constant pressure on a car call button or on the door close button shall cause the door to close. If the button is released before the door is fully closed, the doors shall automatically reopen. When the door is fully closed, the car call can be registered and the car shall start to travel to the destination landing;

e) if the car is stationary at a landing, it shall only be possible to control the opening of the doors by the application of constant pressure on the door open button. If the door open button is released before the doors are within 50 mm of fully open, the doors shall automatically re-close;

f) all heat and smoke sensitive door protection devices shall be made inactive but the car door reversal devices and the door open button shall remain operative as in Phase 1;

g) the firefighters lift shall be returned to the fire service access level by switching the firefighters lift switch at the fire service access level from "1" to "0" and hold for a minimum 5 s before returning to position "1". This does not apply where a car key switch is provided in the car as described in 5.8.8 h) and the door is open;

h) where a car key switch is provided (see Introduction), it shall be marked with a pictogram and the `0‘ and `1‘ positions shall be clearly indicated. Any type of key, except triangle key, can be used but it shall only be removable in the `0‘ position.

The operation of the key switch shall be as follows:

1) when the lift is under firefighters control from the switch at the fire service access level, the car key switch in the car shall be switched to the `1‘ position in order to initiate phase 2;

2) when the lift is at another floor and not at the fire service access level and the car key switch in the car is turned to the `0‘ position, further car movement is prevented and the doors shall continue to operate only as specified in e);

i) the registered car call shall be visually displayed on the car operating panel;

j) the position of the car shall be shown when power is available, both in the car and at the fire service access level;

k) the lift shall remain at its destination landing until a new car call is registered;

l) the fire service communication system as defined in 5.12 shall remain operative during Phase 2;

m) when the firefighters switches are returned to the '0' position the firefighters lift control system shall only revert to normal operation when the lift has been returned to the fire service access level.

5.8.9 Dual entry car

5.8.9.1 Where a firefighters lift has a dual entry car and all the firefighters lift safe areas are located on the same side as that of the fire service access level, the following additional requirements shall apply:

a) In the case of one car operating panel:

   1) the car operating panel shall have 2 door open buttons, which are easily identifiable as to which door they are associated;

   2) the door open button for the fire service access level side shall be illuminated in Phase 2 and the other door open button shall be made inoperative in Phase 2 and doors not located at the same side of the fire service access level shall not be able to open.

b) In the case of more than one car operating panels:

   1) the car operating panel adjacent to the fire service access level side (see Annex B) is for firefighters use in Phase 2 and shall be marked with the firefighters lift pictogram (see Annex G);

   2) other car operating panels shall be made inoperative in Phase 2;

   3) if the firefighters car operating panel includes more than one door open button, the door open button corresponding to the fire service access level side shall be illuminated in Phase 2 and the other door open button made inoperative in phase 2;

   4) doors not on the same side as the fire service access level shall not be able to open.

NOTE EN 81-70 does not apply to this car operating panel when it can be used by the firefighters only, except when using keypad.

5.8.9.2 Where a firefighters lift has dual entry car and all firefighters lift safe areas are not located on the same side as that of the fire service access level, the following additional requirements shall apply:

a) only one car door shall be open at a time and only on the side of the firefighters lift safe area at that level;

b) in the case of one car operating panel:

   1) the car operating panel shall have 2 door open buttons, which are easily identifiable as to which door they are associated;

   2) in Phase 2 when the lift is standing at a level or the lift is in motion with a car call registered, the available side(s) of the safe area at the destination landing shall be indicated by illuminating the corresponding door open button(s) and other door open buttons shall be made inoperative.

c) in the case of more than one car operating panels:

   1) only one of the car operating panels shall be for firefighters use in Phase 2 and shall be marked with the firefighters lift pictogram (see Annex G);the car operating panel for firefighters use shall serve all intended floors and have two door open buttons;

2) when the lift is standing at the floor level, the available safe area side(s) on that level shall be indicated by illuminating the corresponding door open button(s) in Phase 2 and other door open buttons shall be made inoperative;

3) when the lift is in motion and a car call registered, available side(s) of the safe area at the destination landing shall be indicated by illuminating the corresponding door open button(s) in Phase 2;

4) other operating panels shall be made inoperative in Phase 2.

NOTE EN 81-70 does not apply to this car operating panel when it can be used by the firefighters only, except when using keypad.

5.9 Power supplies for firefighters lifts

5.9.1 The power supply system of the lift, lighting and fire service communication system shall consist of primary and secondary (emergency, standby or alternative) power supplies. The level of fire protection shall be in line with national regulations or requirements and at least equal to that given to the lift well. See 1.2 and Annex C.

5.9.2 The secondary power supply shall be sufficient to run the firefighters lift at the rated load and rated speed for a period equal to the fire resistance structure. The car and well lighting shall be also supplied by secondary power supply. See Introduction.

5.10 Changeover and interruption of electrical supplies

When the power supply is re-established the lift shall become available for service within 1 min. If the lift needs to move to establish its position, it shall not move more than one floor and towards the fire service access level and indicate its position.

5.11 Car and landing controls

5.11.1 The car and landing controls and associated control system shall not register false signals from the effects of heat, smoke, water or moisture.

The fire service access level shall have a car position indicator.

5.11.2 The car controls, position indicator inside the car, position indicator at the fire service access level and the firefighters lift switch shall be protected to at least IPX3 according to EN 60529.

The landing control panels and landing indicators on other levels than fire service access level shall be protected to at least IPX3 according to EN 60529 unless they are electrically disconnected on initiation of the firefighters lift switch.

5.11.3 Whilst on Phase 2 control, operation of the firefighters lift shall be by means of a full set of push buttons or keypad in the car. The keypad shall comply with EN 81-70 size requirements and be of the push-button type. There shall be visible feedback to the buttons to see that a call has been accepted. Other operating systems shall be rendered inoperative. In the case of dual entry car, buttons shall be arranged according to 5.8.9.

5.11.4 In addition to the normal floor level markings in the car, there shall be a clear indication of the fire service access level on or adjacent to the car call button for the fire service access level, using the pictogram shown in Annex G.

5.12 Fire service communication system

5.12.1 A firefighters lift shall have an intercom system or similar device for interactive two way speech communication, whilst the firefighters lift is in Phases 1 and 2, between the firefighters lift car and:

a) the fire service access level. The communication between the car and the fire service access level shall be permanently active during Phases 1 and 2 without pressing a control button;

b) the firefighters lift machine room or in the case of machine roomless lifts at the emergency and test panel(s). The microphone shall only be made active by pressing a control button on the intercom unit;

c) other location for communication as an option e.g. central command point. See Introduction. Microphones for other locations shall only be made active by pressing a control button on the intercom unit.

5.12.2 The communication equipment within the lift car and at the fire service access level shall be a built-in microphone and speaker, and not a telephone handset.

5.12.3 The wiring for the communication system shall be installed within the lift well.

5.13 Vandal prone areas

Where a firefighters lift is installed in a vandal prone area/building, then the requirements of EN 81-71 shall also apply until firefighters mode is activated.

Any alarm filtering function should be rendered inoperative once the fire recall or the firefighters lift switch is activated.

6 Verification of the safety requirements and/or protective measures

Safety requirements and measures of Clauses 5 and 7 of this standard shall be verified according to the Table 3. Verification of firefighting operations functionality shall be part of maintenance instructions.

Table 3 — Verification table

Subclause	Visual inspection [a]	Compliance with the lift design [b]	Measurement [c]	Design document check [d]	Functional Test [e]
5.2.1	See EN 81-20				
5.2.2	x		X	X	
5.2.3	X		x	x	
5.2.4			x		
5.2.5				x	
5.2.6					x
5.2.7	X				
5.2.8					X

Subclause	Visual inspection [a]	Compliance with the lift design [b]	Measurement [c]	Design document check [d]	Functional Test [e]
5.2.9	X				
5.3.1	x		x		
5.3.2	x		x		
5.3.3	x			x	
5.3.4	x	x	x		
5.3.5	x	x	x		
5.4	x	x	x	x	
5.5	x				
5.6	x				
5.7		x		x	
5.8.1	x	x	x	x	
5.8.2	x	x		x	
5.8.3		x			x
5.8.4		x			x
5.8.5		x		x	
5.8.6					x
5.8.7		x			x
5.8.8 a), b), c), d), e), f)	x	x	x		x
5.8.8 g		x	x		x
5.8.8 h	x	x			x
5.8.8 i), j), k), l), m)		x			x
5.8.9	x	x			x
5.9.1				x	
5.9.2				x	x [f]
5.10		x			x
5.11.1				x	
5.11.2	x			x	
5.11.3	x	x		x	x
5.11.4	x				
5.12		x			x
5.13	See EN 81-71				

Subclause	Visual inspection [a]	Compliance with the lift design [b]	Measurement [c]	Design document check [d]	Functional Test [e]
7	x				
NOTE Where the Installer uses a type examined product the test and inspections will be as defined in the product documentation.					
[a] The results of the visual inspections is only to show that something is present (e.g. a marking, a control panel, an instruction handbook) , that the marking required satisfies the requirement and that the content of the documents delivered to the owner is in accordance with the requirements. [b] The results of the compliance with the lift design is to prove that the lift is built according to the design and that the components/devices comply with the design documents. [c] The result of the measurement is to show that the stated measurable parameters have been met. [d] The result of the design document check is to prove that the design requirements of the standard have been matched " on paper" in the design documentation (e.g. layout, specification). [e] The result of the functional test is to show that the lift works as intended, including the safety devices. [f] The result of the functional test is to show that the lift works as intended, including the safety devices, well lightning and communication system.					

7 Information for use

The following information shall be provided in the owner's documentation unless otherwise defined:

7.1 A firefighters lift, unlike a normal lift, shall be designed to operate so long as is practicable when there is a fire in parts of the building. The lift may be used as a passenger lift when there is not a fire.

7.2 The lift installer shall provide instructions to the owner, which includes details according to Table 4 below:

Table 4 — Information for use

Clause	Information
5.1	Environment/Building requirements (e.g. operating temperatures, significant hazards not addressed)
5.4	Rescue of trapped firefighters in the lift car (e.g. rescue concepts. For examples see 7.3 and 7.4)
5.7.2	Need for signage at the fire service access level with the location of machinery, emergency and test panel, and the lift main switch.
5.8	Control systems (e.g. description of functions and how to use the lift) including, where a car key switch has been provided (see Introduction), the operation of the lift in phase 2 according to this key switch.
5.9	Power supplies for firefighters lifts (e.g. owner's task to organize maintenance and periodic testing)
5.10	Changeover of electrical supplies (e.g. owner's task to organize maintenance and periodic testing)
5.12	Fire service communication system (e.g. periodic testing required by owner)
Annex J	Maintenance requirements

7.3 External rescue procedure

a) The firefighter opens the landing door above the stopped car and enters onto the car roof. In order to prevent electrical operation of the lift the firefighter keeps the landing door opened, by hand or – preferably- by means of the ladder which is used to descend to the car roof. At the car roof he will push the stopping device;

b) the firefighter on the car roof opens the emergency trap door without key, pulls out the ladder stored on the car and places it into the car;

c) the trapped person(s) climbs up the ladder;

d) the firefighter and the trapped person escape through the open landing door, if necessary by using the ladder.

7.4 Self rescue procedure

a) The trapped firefighter opens the suspended ceiling and unlocks the emergency trap door from inside the car using the unlocking key. Unlocking of the emergency trap door prevents the movement of the lift and allows the emergency trap door to be opened;

b) the trapped firefighter climbs to the car roof, using either purpose made stepping points provided in the car or a ladder stored in a cabinet in the car. The car remains stopped until the emergency trap door is closed and relocked with deliberate action;

c) the trapped firefighter uses (if necessary) the ladder to reach and release the landing door lock from the well and escapes. Instructions shall be provided on the car roof for safe handling and positioning of the ladder as well as the use of the stopping device.

Annex A
(informative)

Fire fighting concept for buildings

A.1 General

This concept does not cover the means of escape using other means, such as emergency staircases, etc.

NOTE The following is only an example to illustrate the risks and different concepts which can be used in different countries.

A.2 Introduction

The building construction, smoke detection, alarm systems, fire extinguishing installation, hydrants, etc. are subject to National Building Regulations.

Generally, the Fire Service meaning of the term ‘high rise’ applies to those buildings with floors above the reach of the Fire Service Equipment.

Fires in high rise buildings are not new. Possibly, the first such fire recorded happened in 1908 when the 12 storey ‘Parker’ building in New York was involved in fire on all floors. In 1911, 148 people were killed by fire at the 10 floor ‘Shirt Waister’ factory. In 1916, as a result of these and other similar fires, New York City Council revised its building codes to provide such features as protected staircases, fire mains, lifts and sprinklers.

The increasing development of the high rise era has presented architects and fire services with two well defined issues, the first being to design buildings which will resist fire and smoke spread and provide a high degree of safety for the occupants. The other to incorporate into these same buildings fixed fire fighting facilities and rescue arrangements that are both effective and practical.

A.3 Background

When the Fire Service is called to a fire, a rapid response is expected of it. Considerable financial resources have been committed to providing a fast, efficient service which is fundamental to ensuring an effective fire fighting and rescue. However, the time taken to reach the entrance of a building can be but a fraction of the time it takes to travel through the building to reach the fire and start fire fighting or rescue operations.

Fire Service personnel faced with the task of fire fighting on a floor high above the ground need to be able to reach the fire quickly and safely, taking with them their equipment. Physical safety and lives, their own and the occupants of the building, as well as the preservation of the building and its contents, can well be put at risk by delay. On reaching the fire, firefighters should have sufficient energy left for the arduous and prolonged task of fire fighting.

The emergency services are therefore dependent on the foresight of designers in providing them with the necessary facilities to operate effectively within the building once they have arrived. This means that in high rise premises the provision of a firefighters lift is essential. A firefighters lift needs to be readily available and of suitable design for the use of firefighters and remain in use for as long as possible during firefighting operations. It is recognized that it is neither technically nor economically viable to design and provide a lift

which is ensured never to fail. However, designers and installers need to be aware that the Fire Service is operationally highly reliant on the use of the lift.

In a fire the hazards for passengers who can become trapped in the lift car should it fail are so great that lifts (other than lifts specifically intended for evacuation use) should not be used as a means of escape. The building evacuation plans should be based on the use of the stairs.

The design principle of providing fire protection to lift wells, staircases, fire protected lobbies and lift machine rooms is a long established practice which needs to be considered as an essential and integral part of the provision of a firefighters lift.

A.4 Fire service operations

(See Figures A.1 and A.2.)

It is normal Fire Service practice on arrival at the Fire Service access level to take control of the firefighters lift. Having secured the use of the firefighters lift, firefighters use it to transport their equipment to a floor below that of the fire to form a bridge-head (forward control point). This approach avoids both Fire Service personnel and the lift car being directly exposed to the risk of injury or damage before the fire situation can be assessed and fire fighting started.

The officer in charge of the forward control point is responsible for executing a plan of attack. Fire fighting operations will be launched from a protected area which is free from smoke. Crews committed from the forward control point to attack the fire should always attempt to take uncharged hose lines to the fire floor and connect to the water supply at that level. This procedure will help to ensure the stair risers remains free from hose lines and smoke. Only if the fire fighting conditions on the fire floor become untenable should a hose be connected to the riser outlet on a lower floor.

The firefighters lift will continue to be used to transport equipment and personnel throughout the incident.

Fire fighting is by its very nature usually involves using substantial quantities of water and it is therefore essential that the building design minimizes ingress of water into the lift well (see Annex E) and that the lift installation is designed to provide protection to electrical equipment from this danger.

The recall of the firefighters lift can be automatic if it is linked to a fire alarm system as defined in EN 81-73. However, in this event the firefighters lift will park at the fire service access level until the firefighters lift switch is operated.

A.5 Firefighters lift

A firefighters lift, unlike a normal lift, should be designed to operate so long as is practicable when there is a fire in parts of the building. The lift may be used as a passenger lift when there is not a fire.

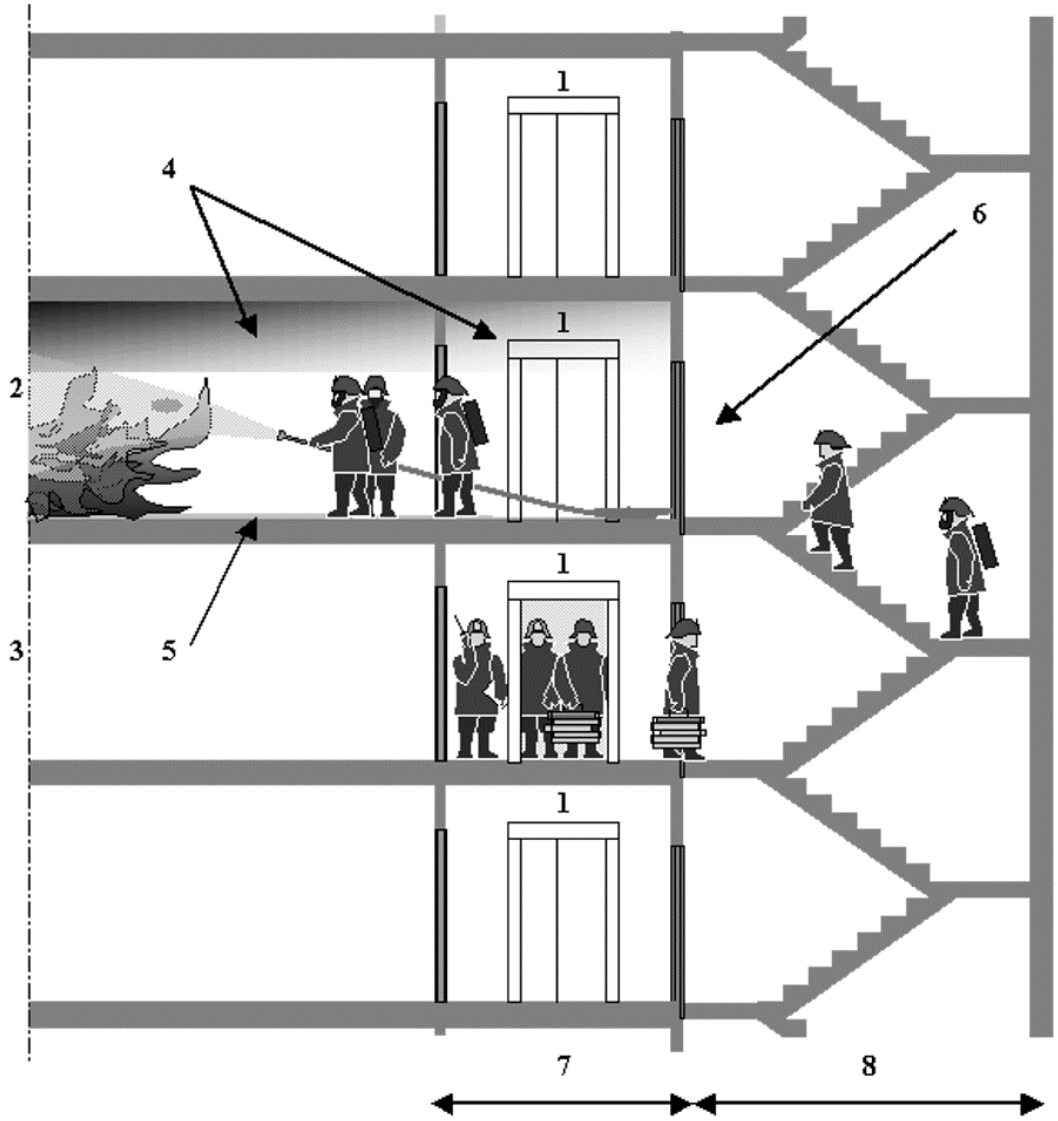
Reliability of power supplies and circuitry is essential to the operation of the firefighters lift.

A.6 Fire service rescue

(See Annex H.)

There is no certainty that the efforts of the Fire Service will be successful and consideration should be given to the developing fire having an effect on the operation of the lift. It is very likely that the Fire Service will continue to use the lift with deteriorating conditions within the building. It is therefore possible that, even with all the safety elements which have been provided, the lift may fail to operate with people now trapped inside

the car. In these circumstances, it is highly likely that access to the lift recovery system will not be available. It is therefore essential that the lift car be provided with access so that trapped firefighters can rescue themselves or be rescued by others. There can be several ways to achieve this.



Key

1 firefighter's lift
2 fire level
3 bridge-head
4 hot gases
5 water on floor
6 fire resistant doors
7 safe area
8 stairway (Escape route)

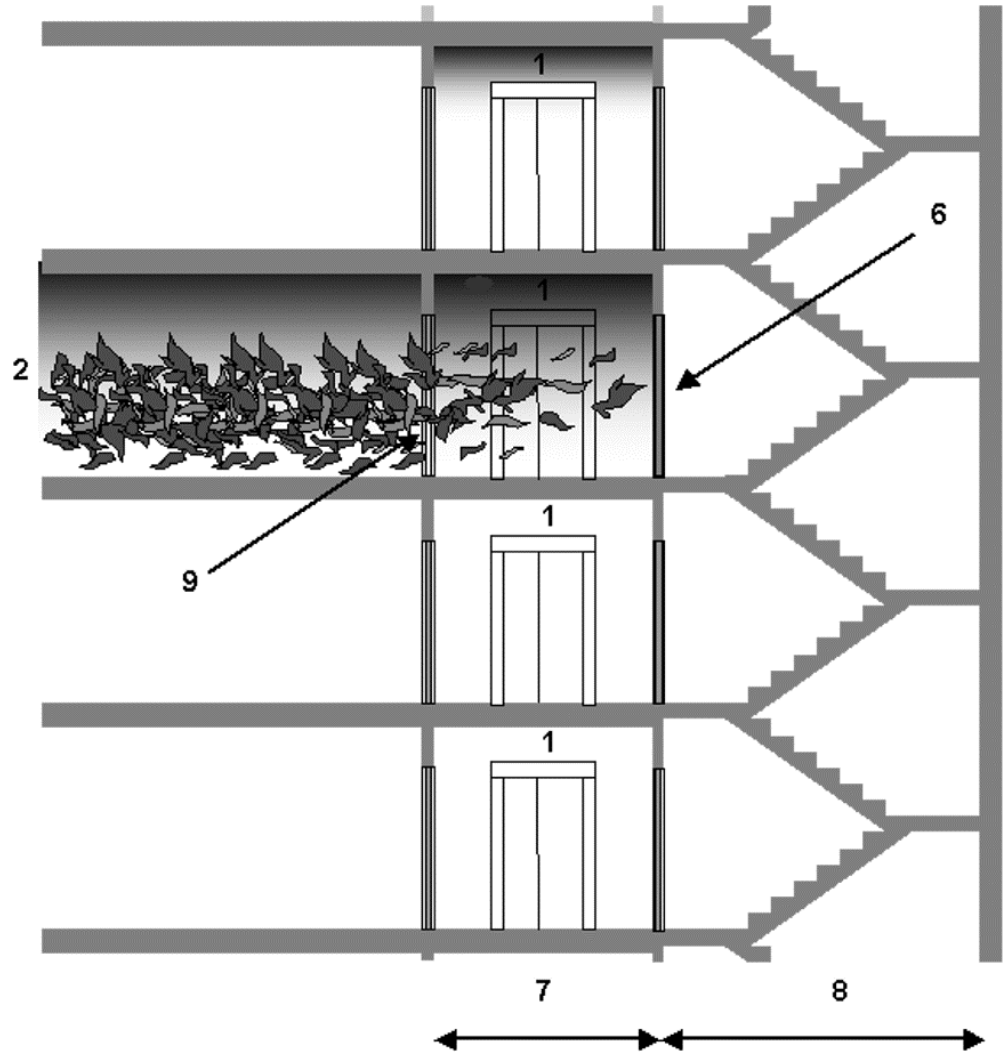
Figure A.1 — Fire adjacent to the safe area

NOTE 1 This is only an example and different concepts can be used in different countries:

— the fire is attacked from the safe area;

— a bridge-head is established in the safe area at a lower level

— stairway is protected with e.g. air pressurizing.



Key

1 firefighter's lift

2 fire level

6 fire resistant door

7 safe area

8 stairway (Escape route)

9 destroyed fire resistant door or wall

In this case, the fire has spread too far, and the operation of the firefighter's lift can no longer be guaranteed for fire fighting or rescuing purposes.

Figure A.2 — A major fire in the safe area

NOTE 2 This is only an example and different concepts can be used in different countries:

— the fire has eventually broken into the safe area after time;

— the risk is not addressed in this standard.

Annex B
(informative)

Basic layouts for firefighters lift

The arrangements and fire resistance of doors and walls should be in accordance to national fire regulations.

The requirements for fire resistance and equipment are defined in the national fire regulations by the building's:

— escape routes;

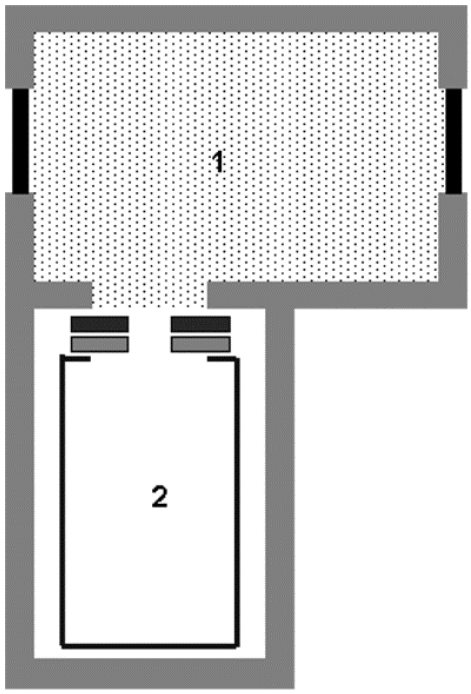
— number of storeys;

— fire load;

— automatic extinguisher installation;

— etc.

The following diagrams are only illustrative and other building configurations are possible.

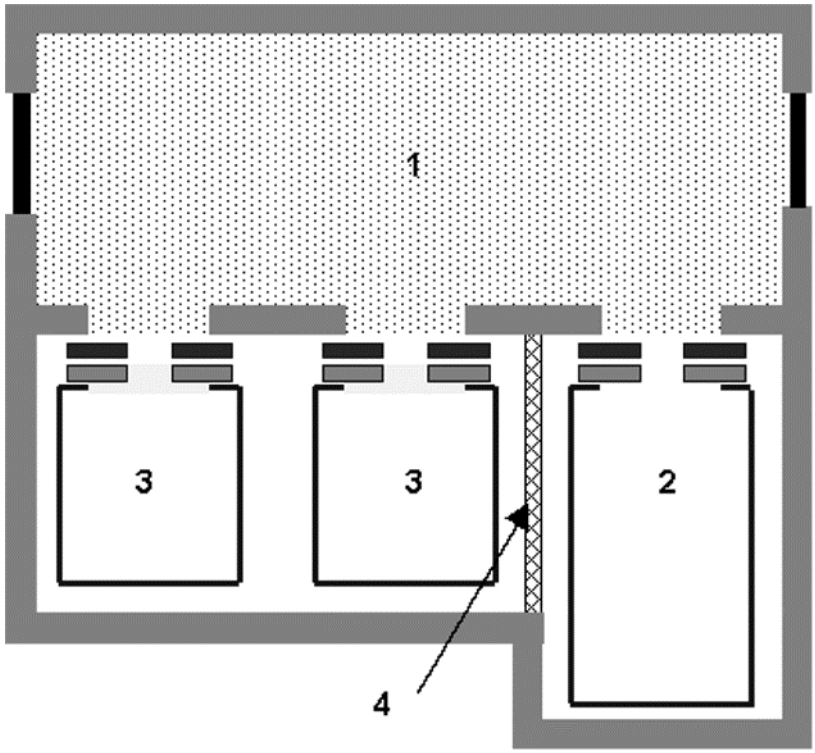


Key

1 safe area

2 firefighter's lift

Figure B.1 — Basic layout of a single firefighters lift and safe area



Key

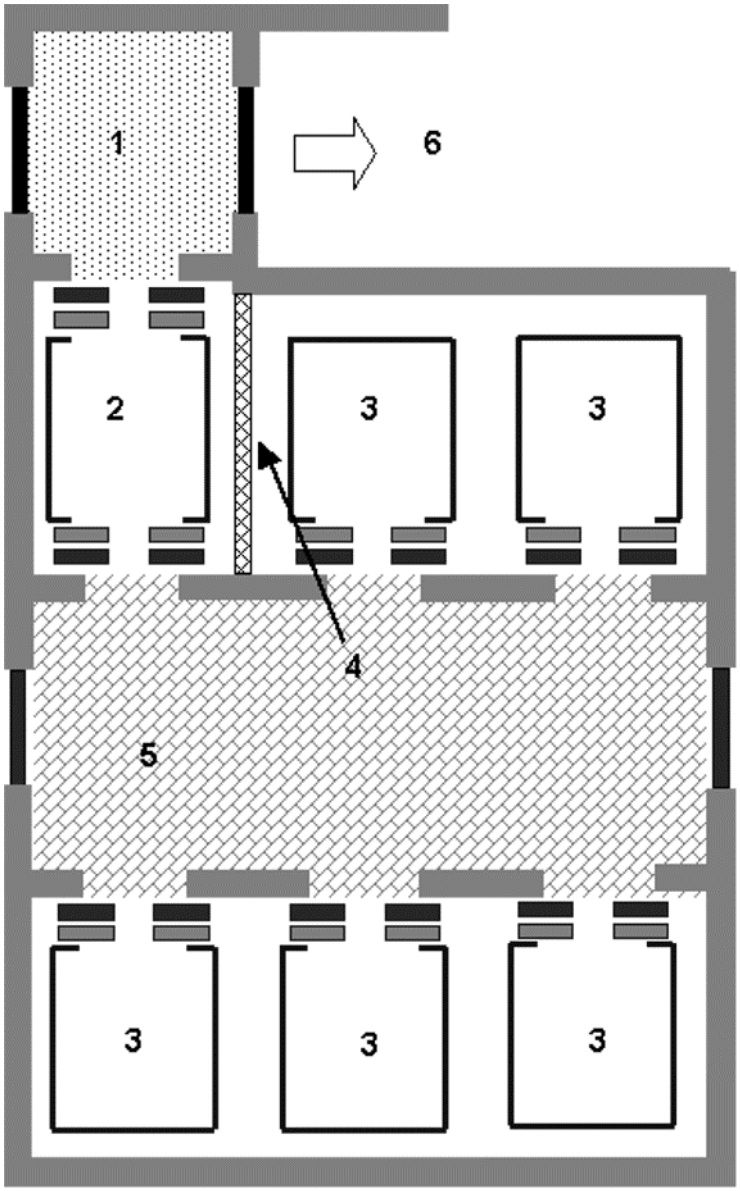
1 safe area

2 firefighters lift

3 normal lift

4 intermediate fire wall, if required by national building regulations

Figure B.2 — Basic layout of a firefighters lift in a multiple well and safe area



Key

1 safe area
2 firefighters lift
3 normal lift
4 intermediate fire wall, if required by national building regulations
5 safe area
6 to escape route

Figure B.3 — Basic layout of a dual entry car in a multiple well and safe areas

Annex C
(informative)

Power supplies for firefighters lifts — Secondary Power supplies

To ensure that operation of the firefighters lift is maintained for as long as possible a secondary supply should be provided. The secondary supply allows continued operation of the firefighters lift in the event of failure of the primary supply; whether by fire in the building or for some other reason. The secondary supply may be by the provision of a separate supply from a separate substation; however, this is usually quite difficult to obtain and might require special approvals. It is more usual to use a generator as the secondary supply as this does not rely on special approvals from the electricity supply company.

The secondary supply should have sufficient capacity to operate the firefighters' lift for a suitable period; typically 2 h. The change over from primary to secondary power should be automatic on loss of the primary supply and an indication should be provided adjacent to the fire service access level landing door to indicate to firefighters when the secondary supply is being used. The use of a generator results in delay after the failure of the primary supply which is due to detecting the loss of the primary supply, starting the engine and then running the alternator up to synchronous speed to changeover.

The sizing of the secondary supply should take into account the other loads which it is to feed in addition to the lifts. Where lifts other than the firefighters lift(s) are to be supplied from the secondary supply e.g. to enable these to be recovered to the fire service access level, measures such as sequenced starting and speed reduction could be considered to manage the overall demand. Care needs to be taken when selecting a generator as the initial load acceptance on change-over may be much less (e.g. in the region of 60 %) than the full-load rating. If the lift(s) regenerates energy onto its supply, this should be declared to the building designer since generators are typically limited in their ability to absorb such energy. The generator should be sized either to accept the regenerated power or alternative measures agreed to absorb this energy.

Whatever the source of the secondary supply, the level of independence between the primary and secondary supplies (to avoid the risk of common mode failures) is a matter for the building designer taking into account national regulations and an assessment of factors such as the design of the building and reliability of the electrical supplies. It should be noted that the historical reliability of the electrical supply might not necessarily be a reliable guide to the future as the level of spare capacity (generation and distribution) is typically reduced as baseline generating capacity is retired.

Negotiation of these points is required (see Introduction).

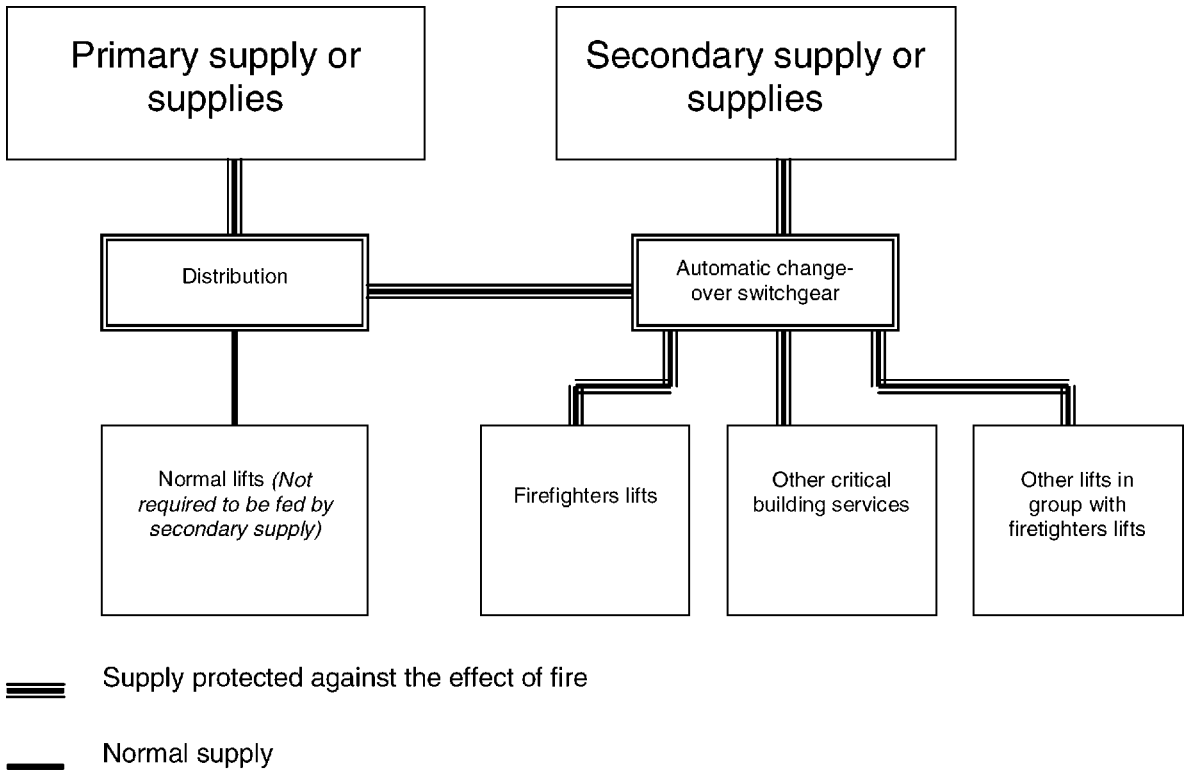
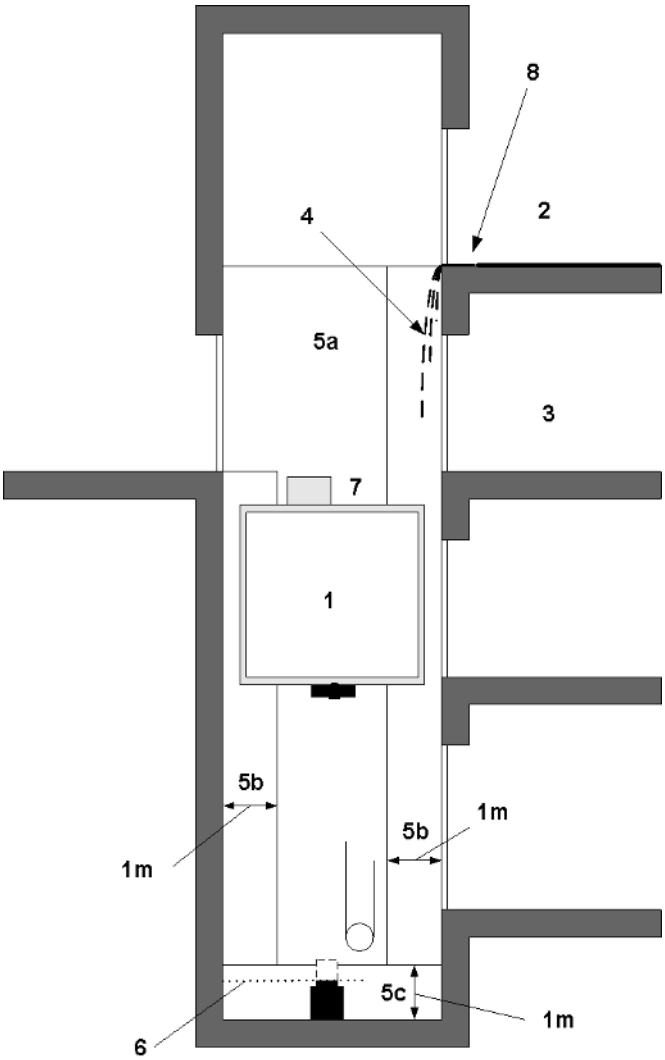


Figure C.1 — Example of power supplies for firefighters lifts

Annex D
(normative)

Water protection in the lift well



Key

1 firefighters lift car
2 fire level
3 bridge-head
4 leakage from fire level floor
5a IPx1 protected area in the well
5b IPx3 protected area in the well
5c IP67 protected area in the well
6 maximum permissible water level in pit
7 IPx3 protected lift car roof and outer walls
8 measures to prevent water from entering the lift well

Figure D.1 — Protection of electrical equipment against water

Annex E
(informative)

Water management

E.1 General

Firefighting operations inevitably involve some spillage of water and it is important that, as far as possible, water is prevented from entering the lift well as it may affect lift operation. Experience has shown that prevention of significant quantities of water from entering the lift well is very much more effective than measures to mitigate the ingress of water into the lift well. Furthermore, measures to prevent water from entering the lift well are easily incorporated as part of the building design. Consequently, the measures to prevent water from entering the lift well are given much greater priority in this standard than measures to mitigate water in the lift well. Nevertheless, the presence of water in the lift well is foreseeable so much of 5.3 specifies requirements to protect electrical equipment against water. Consideration should also be given to the mechanical effects of water in the lift well especially where machinery is located below the highest landing and to water accumulating in the lift pit.

E.2 Measures to address the ingress of water into the lift well

Arrangements to minimize water ingress into the firefighters lift well should be appropriate to the building. Suitable methods include:

— the provision of drainage channels in front of every lift landing entrance and drainpipes; and/or

— raising or ramping of the floor in front of every lift landing entrance so that any water entering the safe area will not enter the lift well but will drain away down the stairs and/or into a smoke shaft and/or drains or scuppers to the outside of the building.

These provisions apply to every lift landing door of the firefighters lift well (whether to a safe area or otherwise) and to all landings of lifts which share a common well with a firefighters lift.

E.3 Measures to address the accumulation of water in the lift pit

If measures, such as those in E.2 above, are not made to prevent the ingress of water into the lift well, provision should be made to control the level of any water which finds its way into the lift well. The maximum water level allowed should be established with the lift supplier otherwise a maximum level of 0,5 m should be used. Drainage solutions should avoid having pumps or other non-lift equipment in the lift well.

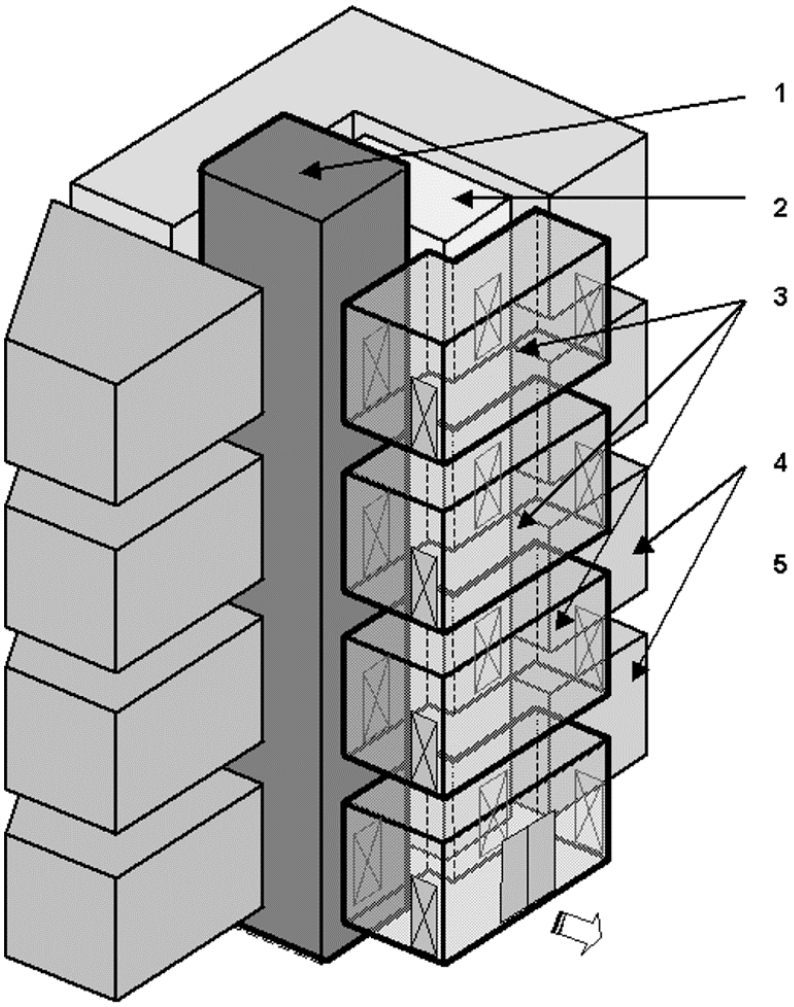
Suitable methods to address the accumulation of water in the lift pit are:

— drains which prevent the water level in the lift pit from reaching either of the levels defined in 5.3.4; and/or

— the use of permanently installed drainage pumps, outside the lift well, to remove water from the lift pit. Maintenance of the pumps should be able to be done from outside the lift well. As part of the building design, consideration should be given to the required capacity of pumps and for ensuring their continued availability in the event of a fire e.g. fed from a secondary supply in event of a primary supply failure.

Annex F
(informative)

Concepts of fire compartments



Key

1 lift well, forming a single and separate fire compartment through all floors

2 staircase (escape route), forming a single and separate fire compartment through all floors

3 fire protected areas, each forming a separate fire compartment on each floor

4 usage areas, containing one or more separate fire compartments on each floor

5 machinery space is not shown here. It can be situated in different places, but belongs normally to the same fire compartment as the lift well

Figure F.1 — Concept of fire compartments

The usage areas will be connected to the firefighters lift only through a safe area, forming a separate fire compartment.

The lift well can contain other lifts than the firefighters lift in the same fire compartment.

Annex G
(normative)

Pictogram for a firefighters lift

Illustration in white

Background in red.

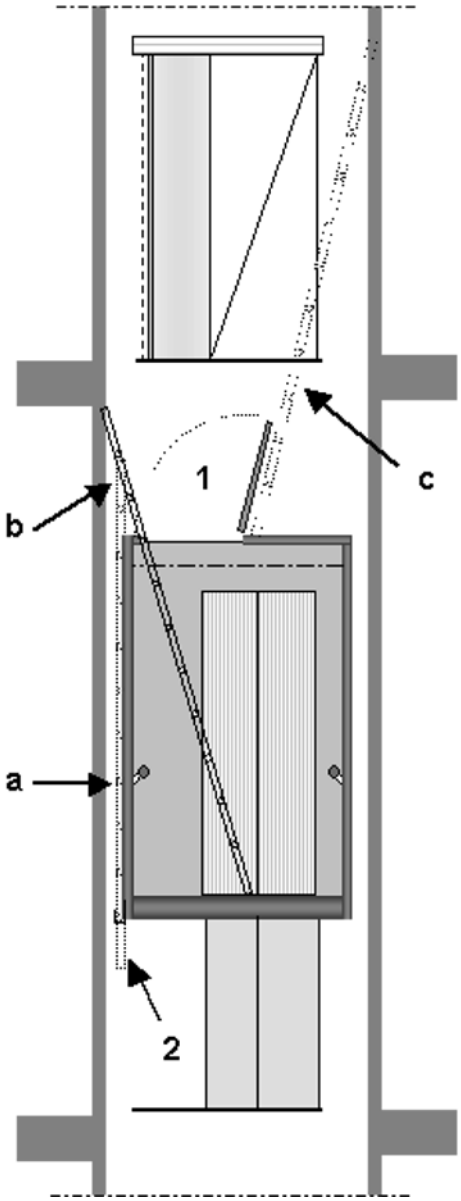
— 20 mm x 20 mm for a symbol on the car operating panel for firefighting operations;

— a minimum of 100 mm x 100 mm on a landing.

Figure G.1 — Pictogram for a firefighters lift

Annex H
(informative)

Examples of rescue concept for firefighters



External rescue procedure

The firefighter opens the landing door above the stopped car, enters onto the car roof and pushes the stopping device.

The firefighter on the car roof opens the emergency trap door, pull out the ladder stored on the car (position “a”), and place it into the car (position “b”).

The trapped person climbs the ladder.

The firefighter and the trapped person escape through the open landing door, if necessary by using the ladder (position “c”).

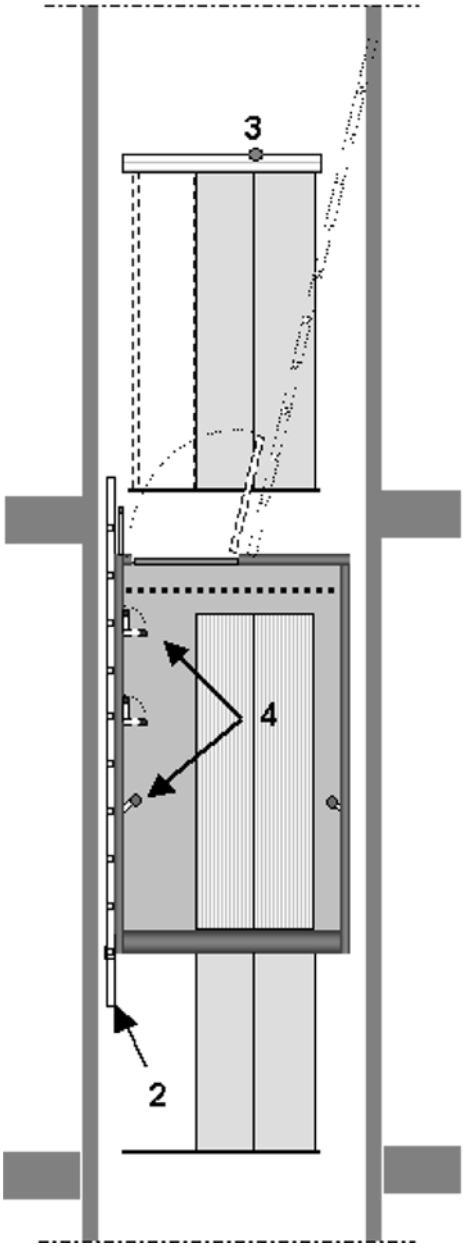
Key

1 emergency trap door

2 portable ladder stored on the car

Figure H.1 — Rescue from outside the car, using a portable ladder stored on the car

This concept can be used only when the maximum distance between the sills of the landing doors is compatible to the length of the ladder.



Self rescue procedure

The trapped firefighter opens the emergency trap door.

The trapped firefighter climbs to the car roof, using stepping points in the car, enters onto the car roof and pushes the stopping device.

The trapped firefighter uses (if necessary) the portable ladder stored on the car to release the landing door lock from the inside of the well, and escapes.

Key

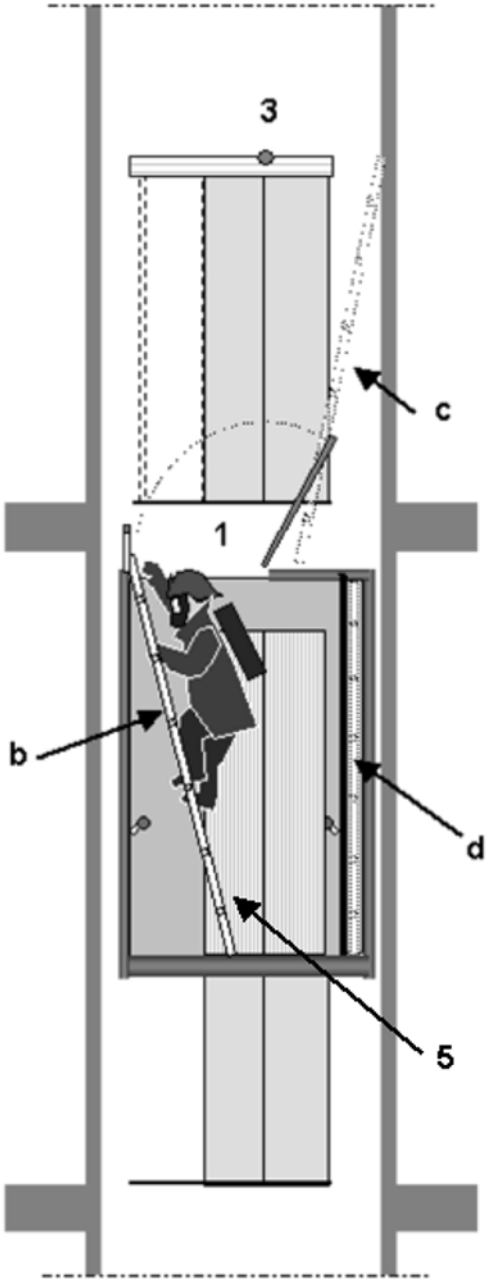
2 portable ladder stored on the car

3 landing door lock

4 stepping points

Figure H.2 — Self rescue using a portable ladder stored on the car

This concept can be used only when the maximum distance between the sills of the landing doors is compatible to the length of the ladder.



Self rescue procedure

The trapped firefighter opens the cabinet door and removes the ladder stored in the cabinet (position “d”).

The trapped firefighter opens the emergency trap door.

The trapped firefighter climbs to the car roof, using the ladder (position “b”), enters onto the car roof and pushes the stopping device.

The trapped firefighter uses (if necessary) the ladder (position “c”) to release the landing door lock from the inside, and escapes.

Key

1 emergency trap door

3 landing door lock

5 portable ladder stored in a cabinet in the car

Figure H.3 — Self rescue using a portable ladder stored in a cabinet inside the car

Annex I
(informative)

Building interface

I.1 General

This annex is provided for guidance where National regulations do not provide guidance on the design of buildings with firefighters lifts. Where National regulations do provide guidance they should be followed.

The following items are not part of the lift design and so should be addressed by the building design:

— specification of whether firefighters' lifts are required and, if so, their number, location, size and rated speed;

— protection of the area in front of the landing door and the connection between the safe area and protected staircase;

— separation of the well;

— specification of the level of fire resistance of the landing doors;

— water management – see Annex E;

— power supply – see Annex C;

— smoke control e.g. air pressurization system;

— lift identification.

I.2 Approval of fire Authorities

The following building aspects should be agreed with the Fire Authorities before finalization of the design of the firefighter lift:

— which floors to be served by the firefighter lift;

— in case of dual entry car: landing doors which need to remain closed during firefighting operations;

— Fire Service Access Level and the position of the Firefighter lift switch;

— rescue means and method as mentioned in 5.4. Special attention should be paid to lifts where intermediate floor distance is larger than 6 m, and where intermediate emergency doors may be required.

It is recommended that these items are agreed upon by means of a written consent from the Fire Authorities, preferably accompanied with a schematic plan of the firefighters lift and all its landings.

Additional demands and requests from the Fire Authorities should remain within the scope of this standard and may not impose any conflict with the requirements of the Lifts Directive.

I.3 Provision of firefighters lifts

National regulations define the number, location, size and rated speed of firefighters lifts. These considerations are based on National requirements and the fire fighting concept used (see Annex A).

The firefighters lift(s) should be positioned to enable a firefighter to reach any area of a floor within maximum length of firefighting hose e.g. 50 m. This dimension will determine the location and number of lifts required. The route to and from a firefighters lift at the main fire service access level should be via a fire protected route leading to outside of the building.

National regulations should set the smallest size of car to be consistent with the firefighting concept used (in order to transport the firefighters and equipment). Where National regulations do not set a minimum size, the car should be at least 1 100 mm wide and 1 400 mm deep with doors of at least 800 mm clear opening width.

Where required, larger lifts may be needed to accommodate beds or stretchers, multiple wheel chairs etc. or for larger firefighting teams and equipment. In such circumstance, standard sizes should be chosen from the range contained in ISO 4190-1.

Firefighters lifts should serve all floors as defined by the building design and as required by National regulations. Particular attention should be given to situations where the lift well passes through storeys with no landing entrances so that the maximum distance between landing entrances opening into safe areas is not excessive i.e. compatible with the intended methods for rescuing passengers and firefighters from a blocked lift car.

I.4 Protection of the area in front of landing doors

For safe operation of the firefighters lift and firefighting operations it is vital that a safe area is located outside of each lift door at all floors served by the lift. This area is required to protect the lift from the effect of fire which is essential if the lift is to remain in reliable service during firefighting operations.

Such areas should be large enough to enable firefighters and their equipment to be assembled without opening any door leading out of the safe area. If this safe area is on an escape route for building occupant, it should be large enough to enable those escaping to do so without interference by or to firefighting operations.

It cannot be assumed that the firefighters will always be able to use the lift to evacuate the safe area if the need arises therefore it is essential that there is a set of stairs leading from the safe area via a fire protected route to a place of relative safety.

I.5 Separation of the lift well

The lift well needs to be separated from the building to form a single vertical fire compartment.

The structure of such compartments should be fire resistant in accordance with EN 1634-1. This fire resistance should be both in terms of insulation and integrity for a period considered adequate to allow a fire to be tackled and brought under control by fire fighters, typically 2 h.

The safe area outside each lift landing door should form its own fire compartment. See Annex F.

Machinery spaces and, in particular the emergency panel, need to be accessible from this single vertical fire compartment either directly or through a fire protected route.

I.6 Fire resistance of shutters and fire door

Where a car is provided with more than one set of doors, then in some circumstances there is a possibility that more than one set of doors can be open - either deliberately or by error (fault condition). Then there is a high risk of creating a fire bridge that can potentially allow fire to spread through the car from one landing to another landing. This is a highly dangerous situation that needs to be prevented.

During fire fighting operation either the front or rear doors on any particular floor will have been chosen for the firefighter to exit the lift. The remaining lift door that is not intended to open during firefighting operations needs to be provided with an automatic fire shutter that will close at the latest on operation of the firefighters lift switch. It is necessary that this shutter when closed provides the same level of insulation and integrity as that provided by the lift well structure.

I.7 Smoke control

There are a number of methods available for smoke control. Whatever method of smoke control is used, negotiation is required to ensure that there are no interactions which affect the use of the firefighters lift. In particular, the use of pressurization to control smoke has a number of issues which are subject to negotiation (see Introduction):

— in firefighting shafts where smoke ingress is to be controlled by a pressurization system, pressure differentials across the landing doors should either be avoided (lift well and safe areas are at the same pressure) or should be subject to negotiation (see Introduction) to ensure that the landing doors are capable of opening/closing against the maximum pressure differential to be used;

— the air used to pressurize the well can be at ambient temperature so appropriate temperature limits should be agreed.

I.8 Lift identification

In situations where the fire service may not be familiar with the provision of firefighters lifts in a building, on attending site, they face the challenge of identifying the locations of the lifts and, in particular, the location of the machinery and provisions to move the lift in the event of a malfunction or loss of electrical supply. Consideration should be given to instructions and signage to enable firefighters to obtain this information quickly once on site, typically on the fire service access level.

Annex J
(informative)

Maintenance requirements

In order to ensure the safe and reliable operation of the firefighters lift it is essential that proper planned maintenance is carried out on a regular basis; typically monthly.

Maintenance of such firefighters equipment requires a joint effort by the person responsible (RP) for the day to day operation of the building and the lift maintenance contractor.

The RP should organize regular checks of the lift to ensure it operates in accordance with the instructions provided by the installer. These would normally include:

— operation of the firefighters lift switch (typically weekly) to check the lift returns to the fire service access level, parks with its doors open, and that the lift does not respond to landing calls;

— if the lift is connected to a building management systems of fire detection system, check to ensure that the lift responds to the instruction from the BMS or detection system;

— simulation of a failure of the primary power supply (typically monthly) to check changeover to the secondary supply and operation from the secondary supply. If the secondary supply is from a generator, it should energize the lift(s) for at least 1 h;

— a full test of the firefighters lift operation (typically annually and arranged by the RP with the lift maintenance contractor) from the firefighters lift switch and BMS/ detection system, operation from the secondary power supply to check the full firefighting facilities including communication systems. This should check to ensure the lift can be driven to any required floor and that on arrival at a floor it only opens its door when instructed to do so and then stays at the floor with its doors open;

— checks of building related issues including measures to prevent water ingress into the lift well and/ or measures to address water ingress into the lift well and the operation of any pumps used to control the level of water in the lift pit.

The lift maintenance contractor should make the annual test as requested by the RP and record the correct operation of all aspects of the firefighters lift(s) including communication systems.

The lift maintenance contractor should also:

— advise the RP of any need to change components or parts of the lift to ensure the availability and reliability of the lift in the event of fire;

— advise the RP of any change in standards relating to lifts in service; particularly to lifts for operation in the event of fire.

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 95/16/EC amended by 2006/42/EC.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard, except 5.1 and 5.9, confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Annex ZB
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide one means of conforming to Essential Requirements of the New Approach Directive 2014/33/EU.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative clauses of this standard, except 5.1 and 5.9, confers, within the limits of the scope of this standard, a presumption of conformity with the relevant Essential Requirements of that Directive and associated EFTA regulations.

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

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[1] EN 81-73, *Safety rules for the construction and installation of lifts — Particular applications for passenger and goods passenger lifts — Part 73: Behaviour of lifts in the event of fire*

[2] EN 1634-1, *Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware — Part 1: Fire resistance test for door and shutter assemblies and openable windows*

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