DD CEN/TS 81-76:2011

BSI Standards Publication

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

— Part 76: Evacuation of disabled persons using lifts

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National foreword

This British Standard is the UK implementation of CEN/TS 81-76:2011.

At present many European countries have no specific standard covering the evacuation from buildings of persons with impaired mobility using lifts.

This Technical Specification is published at this time to make persons aware of the typical technical requirements and operation constraints of such products in order to promote discussion concerning the final content of any future EN standard on the topic. It is not intended to supersede the content of BS 9999:2008.

At this time the requirements in the United Kingdom for such lifts can be found within BS 9999:2008, *Code of practice for fire safety in the design, management and use of buildings*, particularly Annex G. Further requirements such as the provision of secondary power supplies, protected lobbies, communication systems, etc., associated with the use of such lifts will be found in other sections of BS 9999:2008.

More general guidance on the design of buildings to facilitate use by disabled people can be found in BS 8300:2009, Design of buildings and their approaches to meet the needs of disabled people – Code of practice.

Since CEN TS 81-76 was developed by a European working group, elements contained within it may contradict, or be in excess of, the requirements of BS 9999:2008 and/or BS 8300:2009. Equally, features associated with UK Building Regulations may not be fully described within TS 81-76.

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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Compliance with a British Standard cannot confer immunity from legal obligations.

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Règles de sécurité pour la construction et l'installation des élévateurs - Applications particulières pour les ascenseurs et ascenseurs de charge - Partie 76: Utilisation des ascenseurs pour l'évacuation des personnes handicapées en cas d'urgence

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Besondere Anwendungen für Personen- und Lastenaufzüge - Teil 76: Personenaufzüge für die Evakuierung von Personen mit Behinderungen

This Technical Specification (CEN/TS) was approved by CEN on 14 May 2011 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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Foreword

This document (CEN/TS 81-76:2011) has been prepared by Technical Committee /TC 10 “Lifts, Escalators and moving walks”, the secretariat of which is held by AFNOR.

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.

CEN/CENELEC has embarked on a programme of work to produce a series of related machinery and lift safety standards as part of European standardisation.

This document is part of the EN 81 series of standards: “Safety rules for the construction and installation of lifts”. This is the first edition of this Technical Specification.

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

0 Introduction

0.1 Background to this Technical Specification

At present, there are no European and few national regulations for lifts, which include specifications related to the evacuation from buildings of persons with impaired mobility using lifts.

This has the consequence that persons with a disability may experience difficulty and delay whilst waiting for assistance to evacuate.

This document has been developed as a first step towards defining requirements for a European Standard for evacuation of lifts. It is believed that since recommendations have been put in place to provide disabled access to buildings, by using lifts complying with EN 81-70, a standardised evacuations lift design would be a useful step to providing safe evacuation.

In Europe today, the European Lift Directive defines strict safety requirements that must be met by all new lifts going into service. In support of the Lift Directive a number of harmonised standards have been developed namely, EN 81-1 and EN 81-2 which address the fundamental safety requirements of any new lift design. EN 81-73 describes how any lift that is not intended to be used during a fire should be removed from service in an organised manner. Fire fighting lifts designed to EN 81-72 may also be suitable for the evacuation of disabled persons with prior agreement of the fire service. However, some of the features provided by EN 81-72 may not be essential for evacuation use.

0.2 General situation in Europe concerning evacuation

a) Implementation of fire regulations in buildings are not harmonized and usually differ:

   1. from country to country;
   2. from city to city;
   3. depending on the building type.

b) Evacuation and fire fighting concepts as well as fire management can also differ. There are however some points of commonality:

   1. in a building, horizontal and vertical circulation corridors and stairs are dimensioned in number and in width so as to allow for building evacuation within defined a time in accordance with the applicable local or national regulation;
   2. lifts are rarely considered as a means of escape;
   3. the normal rule is, "in case of emergency do not use lifts";
   4. this rule is usually communicated by different means to all building occupants:
      - signs;
      - audible messages;
      - training;
      - written evacuation plan and procedures.

c) In some particular cases and under particular conditions in some countries, specific lifts can be used for transportation of the disabled in case of emergencies.

d) In office buildings and buildings where the public may enter, such as hotels etc., personnel are often appointed responsible for evacuation of the building or particular levels. These may be called "evacuation assistants" or "fire wardens". The term evacuation assistant is used throughout this document.

Their task is to:

1. verify in case of an evacuation alert that all areas have been effectively evacuated;

2. help disabled persons and particularly people with impaired mobility to evacuate.

0.3 Basic principle of evacuation of the disabled taken into account in this document

The principle that stairs are the recognised main means of escape from the building remains unchanged.

The purpose of this document is not to reconsider this principle, but to study under which conditions lifts could be used to supplement stairs with reasonable safety, in order to assist the evacuation of persons with impaired mobility.

Lifts for evacuation should be lifts normally used for daily vertical transportation but include special functions used in cases of evacuation. This is deliberate to ensure the lifts are regularly used thus increasing the probability that when required for an evacuation, they will be working.

This Technical Specification also highlights certain building features that shall be provided in order to ensure the safety and security of the lifts, lift users and those waiting for the lift.

This document describes only a basic "evacuation lift" in order to provide a reasonable and practical solution suitable for implementation in some buildings.

This Technical Specification is not suitable for all building types such as buildings without a person responsible to manage the building and its evacuation, who are not located in the buildings, or residential buildings with multiple owners sharing common escape routes and no one individual responsible in the building. These cases require different solutions than described in this document.

0.4 Aims of the document

This Technical Specification deals with:

a) the reduction of risk to persons in the lift car that may be exposed to fire and smoke;

b) the reduction of the risk of persons being trapped in a lift car during an evacuation;

c) the reduction of evacuation time for persons unable to use the stairs.

0.5 Use of this Technical Specification

The purpose of this Technical Specification is to show how a lift(s) can be designed in order to be used for evacuation and to list the requirements not directly part of the lift itself, but which have to be satisfied in order to make its use practical and safe. See Annex A, B and C.

This Technical Specification can be used as a guideline for:

a) national authorities to determine its own programme of implementation;

b) owners to follow their responsibilities according to existing regulations;

c) a basis for future National, International or European standards on this subject;

d) assistance to standards making committees that work on building evacuation concepts.

0.6 Relationship between this standard and others in the EN 81-70 series

It is important to understand the relationship between this standard and others in the EN 81-70 series.

EN 81 parts 1 and 2 define the basic safety requirements essential to any lift design. EN 81-70 provides additional requirements that make a lift more easily accessible to all users including those with disabilities.

EN 81-72 defines requirements for a lift suitable for use by fire fighters. At the discretion of the fire service and local legislation, it may be acceptable to use such a lift prior to arrival of the fire service for the evacuation of persons with a disability. This is not acceptable in all countries or desirable in all cases. Local legislation should determine what is acceptable in their jurisdiction.

EN 81-73 defines how a lift can be safely removed from service if local legislation or rules or building management requires that lifts are not used during an emergency. E.g., fire. See also Annex A.

Management can determine on the day if the building is to be evacuated and if they wish to use the evacuation lift. If they do, they can bring the lift back into evacuation service by use of a switch. This is not considered a contradiction with EN 81-73.

1 Scope

1.1 Use of the lift

This Technical Specification gives rules for the intended use of the lift by persons with disabilities in order to assist the evacuation of a building. To achieve this objective, the selected lift(s) should be incorporated within an overall building design that includes all the usual stairs and escape routes without any reduction in their quantity or capacity.

It specifies the special provisions and safety rules to assist persons with a disability to safely evacuate a building using lifts in relative safety with the help of suitably trained evacuation assistants.

This specification does not define the number and size of lift required, or the size of door openings that shall be determined on a case-by-case basis by the building designer in line with applicable national regulations.

1.2 Application of this Technical Specification

This Technical Specification can be applied to permanently installed new:

a) electric lifts, with traction or positive drive (as defined in EN 81-1);

b) hydraulic lifts (as defined in EN 81-2).

1.3 Requirements of this Technical Specification

This Technical Specification defines requirements to allow safe lift use where:

a) the building has not sustained structural damage e.g. from explosion, flood, lightening strike, earthquake, storm etc.

b) the well and car are safe for persons to use. e.g. free from smoke, etc.

c) a fire resisting structure for the lift provides suitable protection;

d) some form of fire detection is provided at least at the lift and safe areas;

e) power supplies are secure and reliable, the provision of a secondary supply is not essential but the cable providing power to the lift shall be fire protected to the same fire protection level as given to the lift well structure;

f) a building secondary supply is not called for by national rules or provided, the lift shall have a provision to allow the lift to be recovered electrically to an adjacent safe area (floor);

g) responsibility for safe evacuation rests with and is in the control of trained persons located at the building premises.

1.4 Assumptions

The following assumptions are made:

a) The building is provided with a means to protect the lift from the effects of fire and smoke e.g. safe area directly outside lift door, fire resistant structure etc.

b) In addition to the requirements stipulated in this document, the lift shall also meet the requirements of EN 81-1 or EN 81-2 as applicable, and EN 81-70 and EN 81-73 as applicable.

c) There is an individual person available in the building who is responsible for managing any evacuation in addition to the person assigned to assist the disabled person and/or drive the lift. This should be included in the evacuation plan.

d) The lift will not be used for general evacuation as it is assumed those without a disability will use the stairs.

e) The lift is for normal use. In the case of an emergency, it becomes a tool only for the evacuation of persons with disabilities and is not considered a general escape route.

f) A means of communication is available to people on each landing to enable them to speak with those in charge of the evacuation.

g) Those with a disability will be evacuated with the help of specially trained persons with the physical ability to assist those persons who require assistance.

h) Any alarm or fire detection system is operating as intended.

i) The lift size is appropriate for the intended purpose e.g., evacuation of wheelchairs, beds, stretchers, walking aids etc.

j) A safe area (see definition in 3.14) is provided at each level adjacent to the lift for persons to wait in safety.

k) The building is designed to minimise the risk of flooding into the lift or lift well. To this end, sprinkler discharge, burst pipes, fire hose etc. should not be located to discharge towards the lift and any water close to the lift should be directed away from it by sloping floors etc.

l) The lift is in normal service and is operating correctly.

m) The lift is maintained and the evacuation operation is tested at suitable regular intervals.

n) Negotiations have been made between the owner/customer and installer concerning:

   1) the intended use of the lift;

   2) the building evacuation strategy;

3) the design of the lift to fulfil the requirements of the evacuation strategy e.g. attendant control with visual signals and verbal announcements, automatic doors etc.

4) environmental conditions;

5) civil engineering problems;

6) any other aspects related to the place of installation;

7) interface requirements and responsibilities for detection systems and any building management systems etc.

NOTE Developers and architects will need to take account of national building regulations.

1.5 Consideration of type of disability

Since not all people with disabilities need a lift in order to evacuate a building this Technical Specification deal principally with the use of lift(s) for evacuation of people with impaired mobility (see definition in 3.10).

1.6 Combinations of disabilities

After detailed study, it has been determined that not all combinations of disability can be addressed just by lift design, especially cases of severe mental disability. However, the use of trained evacuation assistants to help those with a disability to use the lift permits persons with multiple or severe disabilities to also evacuate from the building when required.

1.7 Type of evacuation being considered

This document considers only the evacuation using the lift for persons with impaired mobility assisted by a specially trained person (assisted evacuation).

As soon as the rescue service, i.e. firefighters, arrive on site, they will determine the most appropriate way to continue the evacuation if necessary. See Annex A.

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.

EN 54-1:2011, *Fire detection and fire alarm systems — Part 1: Introduction.*

EN 81-1:1998+A3:2009, *Safety rules for the construction and installation of lifts — Part 1: Electric lifts*.

EN 81-2:1998+A3:2009 *Safety rules for the construction and installation of lifts — Part 2: Hydraulic lifts*.

EN 81-70:2003, *Safety rules for the construction and installations of lifts — Particular applications for passenger and good passenger lifts — Part 70: Accessibility to lifts for persons including persons with disability*.

EN 81-70:2003/A1:2004, *Safety rules for the construction and installations of lifts — Particular applications for passenger and good passenger lifts — Part 70: Accessibility to lifts for persons including persons with disability*.

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

EN 81-73:2005, *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*.

EN 1838, *Lighting applications — Emergency lighting*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 54-1:1996 and EN 81 series of standards shall apply other than the following terms and definitions.

3.1
building management
those persons or the organisation responsible for ensuring the day-to-day safe and efficient running of the building and responsible for ensuring the building is safely evacuated in an emergency in line with the evacuation strategy

3.2
BMS
Building Management System. A system capable of making intelligent decisions based on information sent to it.

3.3
building evacuation strategy
plan that has been documented and put in place to ensure the safe evacuation of the building

3.4
disability
disability includes any condition, physical or mental that creates difficulty for persons using stairs (impaired mobility) or follow simple signs or instructions without assistance

3.5
emergency
condition requiring the evacuation of all or part of a building where persons are instructed to use the emergency stairs

3.6
emergency and test panel
panel meeting the requirements of 6.6 of EN 81-1 and EN 81-2

3.7
evacuation assistant
person appointed by building management to assist in the evacuation process and drive the lift when required

3.8
evacuation lift
lift designed to be operated by trained persons and used for the evacuation of persons with disability in cases of emergency, under the direction of building management, trained evacuation assistant or rescue services

3.9
evacuation lift switch
a manual device located at the main evacuation exit floor, outside of the well or in the car that is intended to be used to switch the lift to evacuation service and give priority service to the evacuation assistant

3.10
impaired mobility
difficulties in using stairs because of physical or mental impairment.

This definition includes:

— wheelchair users;

— disabled people who are able to walk but who may depend on prostheses (artificial limbs), sticks, crutches or walking aids;

— heavily pregnant, obese people, elderly people;

— persons with a mental impairment who are unable to follow simple signs or instructions;

— persons with limited or no sight who are unable to see or read instructions directing them to a place of safety outside of the building;

— ambulant disabled (persons using walking stick, crutches, walking frame, rollator etc.);

— persons in the building with injuries or medical conditions e.g. sports injuries or other conditions;

— persons injured as part of the emergency;

— person who enter the building with assistance from another person.

It includes all persons needing to be physically assisted or carried by another occupant or by trained personnel through the staircases in case of evacuation.

3.11
MEEF
Main Evacuation Exit Floor. A floor determined by the building designer where the final emergency MEEF for persons with disabilities is situated. This may or may not be the main floor of the building

3.12
refuge area
see safe area in 3.14

3.13
responsible person
person appointed by those responsible (owner or occupier) for the safe working of the building on a day-to-day basis and for its evacuation in an emergency

3.14
safe area
area provided with a safe route to the lift and a safe storey exit e.g. stairs that will remain safe for persons for the duration of an evacuation that is both separated from a fire by suitable fire resisting construction, and kept clear of smoke and maintained at a reasonable temperature for persons in some countries known as a refuge or lobby

3.15
suspend service signal
signal emanating from a BMS, fire detector or any other device provided to inform the lift that continued use may be hazardous

4 List of significant hazards

4.1 General

This clause contains 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 reduce or eliminate risk.

4.2 Significant hazards

Significant hazards dealt with in this Technical Specification are shown in Tables 1 and 2 below:

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

Significant hazards and hazardous situations - Environment		Requirements and clauses in this standard
1	Flooding inside building	1.4 k)
2	Fire outside of the well of the lift	5.2, 5.4.1, 5.4.1.3, B.3, B.4
3	Insufficient number or size of lift(s) for evacuation	B.2
4	Smoke or high temperature in the safe area (No safe space for waiting for evacuation)	5.2, 5.4.1, 5.4.1.3, B.2.1, B.2.8
5	Difficulty in finding the safe area	B.2.5
6	Entrapment (Disabled "forgotten" in the safe area)	B.2.6
7	Asphyxiation (Smoke or high temperature in the lift shaft during evacuation)	5.2, 5.4.1, 5.4.1.3, B.2.1, B.2.8, B.2.9

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

	Significant hazards and hazardous situations Evacuation lift	Requirements and clauses in this standard
1	Entrapment	1.2, 5.6.2, B.5
2	Human error	5.5.1.1, 5.5.3
3	Inadequate design, location or identification of manuals controls	1.4 2), 5.4.1.3
4	Unclear information	B.2.5, B.7

4.3 Hazards not addressed

The following significant hazards are not dealt with in this Technical Specification (for further information see Introduction):

a) insufficient or incorrectly located evacuation lifts;

b) entrapment in waiting area (safe area) due to absence of lift service or adjacent stairs;

c) a fire in the evacuation lift well, safe area, machinery space or lift car;

d) structural collapse before the evacuation has been completed using lifts.

5 Requirements for the use of a lift for evacuation of persons with impaired mobility

5.1 Lift size and speed

In order to be used for evacuation of the disabled, the lift size shall not be less than defined by National legislation or where legislation does not exist, then EN 81-70 type 2.

NOTE 1 Persons may be injured during the emergency and may no longer be able to use stairs that they used on entry to the building. This means that consideration should be given to the possibility of a lift being required to accommodate a stretcher.

NOTE 2 For the purpose of evacuation the speed of the lift or lifts intended for the evacuation is less critical than may be thought. The maximum speed is determined by ensuring that if all lifts set aside for evacuation are used, the combination of speed and load will move all persons requiring evacuation in the required evacuation time. This time shall not exceed the time for which the lift structure and any safe area is intended to remain tenable.

The lift(s) or group of lifts shall serve all floors which according to the evacuation plan require service.

5.2 Fundamental "evacuation lift" requirements

5.2.1 The lift shall be built to comply with EN 81-1 or EN 81-2 as applicable and EN 81-70 and EN 81-73 as applicable.

5.2.2 Upon receiving a signal, the lift shall operate as follows:

a) all landing controls and car controls including the “door re-open button” shall be rendered inoperative;

b) all existing registered calls shall be cancelled;

c) the lift shall follow the automatic command initiated by the received signal in the following way:

- a lift with automatic power operated doors, when parked at a landing, shall close the doors and travel non-stop to the MEEF;
- a lift with manually operated or non-automatic power operated doors, if parked at a landing with open doors, shall remain immobilised at that landing. If the doors are closed, the lift shall travel non-stop to the MEEF;
- a lift travelling away from the MEEF shall make a normal stop and reverse its direction at the nearest possible landing without opening the doors and return to the MEEF;
- a lift travelling towards the MEEF shall continue its travel non-stop to the MEEF;
- ,in the event of becoming blocked due to the operation of a safety device, a lift shall remain immobilised.

d) the automatic dispatch to the lowest landing as defined in EN 81-2:1998, 14.2.1.5 b) shall be rendered inoperative;

e) the breakdown of a lift in a group of interconnected lifts shall not affect the return of other lifts to the designated landing;

f) on arriving at the designated landing, lifts with power operated doors shall park there with the car and landing doors open and removed from service.;

g) for lifts with manually operated doors, when the car(s) arrives at the designated landing, its door(s) shall be unlocked;

h) to indicate that the lift can be used, any no entry sign shall be turned off in order to return it to the main floor when fire is first detected. It shall be possible for a trained evacuation assistant responsible for the evacuation to bring the lift into service on evacuation control by the use of an evacuation lift switch located adjacent to the lift at the MEEF or in the car. See 5.3.1.1.

5.2.3 The lift shall be designed to operate correctly according to the following conditions:

a) the electrical/electronic landing control devices and indicators required for rescue purposes shall continue to function, so that a person can detect where the car is located for rescue purposes e.g. where the car is blocked when operating in an ambient temperature of 0 °C to 65 °C, for a period equal to that required for the structure of the building e.g.1 h

b) all other electrical/electronic components of the lift, not in the fire protected lobby shall be designed to function correctly in an ambient temperature range of 0 °C to 40 °C.

5.3 Control systems

5.3.1 Building Input signal

The lift should receive clear signals from some source to enable it to know what it is required to do. These signals are not defined here as they are not part of the lift but should be provided and emanate from whatever provisions (fire detection system of building management system etc.) is provided. See B.2.8, B.2.9, B.2.10, 3.3 and 4.

If the signal emanates from a device other than a key switch it should be a stable signal e.g. if the signal goes positive to initiate the service it shall stay positive.

5.3.1.1 Lift Input signal (evacuation lift switch)

An evacuation lift switch e.g. key operated shall be:

a) bi-stable in operation having three positions

   1) in position 1 it is marked OFF;

   2) in position 2 it is marked LIFT RECALL;

   3) in position 3 it is marked EVACUATION or EVACUATION SERVICE and;

b) appropriately marked for its purpose and, located adjacent to the lift at the main evacuation exit floor, usually the main lobby;

c) when accessible to all, protected from misuse or damage e.g. by being placed behind a locked cover or located within a secure manned area, preferably adjacent to the main evacuation exit floor;

d) able to overrule EN 81-73 function and initiate CEN/TS 81-76 function when turned to position 3 (opening the doors if closed) and when turned off return to EN 81-73 function if BMS or building alarm system is still active.

NOTE The decision as to whether an automatic fire detection system or manual recall device is selected is the subject of negotiation at the design/planning stage of the building in accordance with national regulations.

5.4 Output signal(s) (Interfaces)

Where required, contacts providing output signals (e.g. lift status to a BMS) shall be provided by the lift installer. CEN/TS 81-76 evacuation signal shall illuminate lift signs on landings and activate the car and landing evacuation communication system etc.

NOTE The type of output signal(s) if needed will be determined in negotiation with the building owner (see 1.4 n).

5.4.1 Interface requirements between the fire alarm system and the lift control system

Interruption of an interface connection between the fire alarm system and the lift control system shall not change the mode of operation of the lift whilst the evacuation key switch is in the evacuation mode.

NOTE The type of interface should be at the choice of the lift installer in negotiation with the building owner (see EN 81-1:1998, 0.2.5 and EN 81-2:1998, 0.2.5).

Examples of interfaces which may be used are shown below.

5.4.1.1 Discrete interface

Any discrete interface shall be by normally open-contact (voltage free) which are open in the evacuation mode.

A contact providing a voltage free signal to the lift control system shall be provided by the supplier of the automatic fire detection system.

5.4.1.2 Serial interface

Where used, a serial interface shall be fail safe and designed for the transmission of information in the form of serial signals, in accordance with a standardised software/hardware protocol (e.g. EIA-422-A or ITU-T V.11).

5.4.1.3 Suspended service signal

If at any time before, during or after an evacuation signal is received, a suspended service signal is received, the lift shall operated as follows:

The lift shall complete any journey in progress and when stopped it shall reverse direction and return to the main evacuation exit floor without stopping. On arrival at the main evacuation exit floor it shall open its doors, then close its doors and remain out of service. The evacuation sign in the car and on landings shall display ‘SERVICE SUSPENDED’. The lift shall be returned to EN 81-73 operation.

It shall not be possible to return the lift to normal service until any relevant detector has been cancelled and the lift evacuation switch turned to the OFF position. It shall also not be possible to return the lift to evacuation service until any relevant detector has been cancelled and the lift evacuation switch turned to the OFF position and then back to the evacuation service position.

5.4.1.4 If at any time during the evacuation service any safe area becomes unsafe, evacuation service shall be suspended as in 5.4.1.3.

NOTE The condition of a safe area maybe reported by an evacuation assistant on a floor or detected by some sensor device if automatic condition monitoring of safe areas is carried out.

5.5 Landing equipment

5.5.1 Landing signals

5.5.1.1 Identification of the evacuation lift

Above or adjacent to each landing door located between 1.8 m and 2.5 m from the floor an illuminating sign shall be installed.

The sign shall be at least 60 x 30mm. The sign shall have a green background and use black and white as indicated in Figure 1.

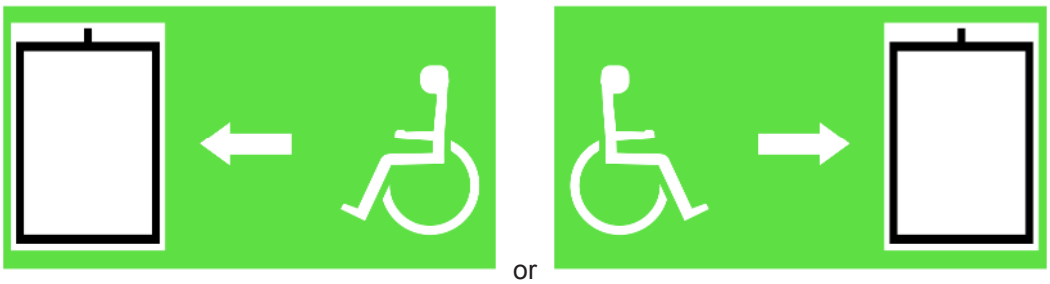


Figure 1 — "Disabled evacuation" sign

5.5.1.2 Disabled evacuation sign

The sign Figure 1 should be illuminated when the lift is on evacuation service or shall display the words SERVICE SUSPENDED when applicable, see 5.4.1.3.

5.5.2 Controls

Whilst on evacuation control, operation of the evacuation lift shall be by means of a full set of push buttons in the car e.g. behind a hidden panel, which can be opened.

Other operating systems shall be rendered inoperative.

5.5.3 Car signals

In the car, there shall be a position indicator and an illuminating sign. The sign shall be located within or above the car operating panel, either combined with or separate from the car position indicator. The centreline of the device shall be positioned between 1,60 m and 1,80 m from the car floor. The height of the sign shall be between 30 mm and 60 mm.

The sign shall be the same sign defined in 5.5.1.1 and Figure 1.

5.6 Car communication system

5.6.1 An evacuation lift shall have an intercommunication system for interactive two way speech communication, whilst the lift is in evacuation mode. This shall allow communication between the evacuation lift car, the evacuation exit floor and any machine room or emergency and rescue panel.

5.6.2 The communication equipment within the lift car and at the MEEF shall be a built-in microphone and speaker, and not a telephone handset.

5.6.3 The wiring for the communication system shall be installed within the lift well and or machine room if provided. If in the case of a hydraulic lift the machine room is remote, the wiring shall be run via a fire protected route with the same value of protection as that given to the structure of the lift well.

NOTE As this supply is for the lift it is permissible to run the cable via the lift well to obtain the required level of fire protection.

5.6.4 If the main evacuation exit floor is at the same level as the firefighter,, the communication system can be the same as the communication system required in 5.12 of the EN 81-72. If the MEEF is not the same, it shall be provided with an intercom as an addition to the communication system described in EN 81-72.

5.7 Behaviour of the lift on the receipt of an evacuation signal

5.7.1 Services provided

5.7.1.1 Return of the lift to MEEF.

If a return signal is sent to the lift control, it will initiate the automatic return of the lift to the designated floor and will hold the lift "service suspended" with doors open/closed at this level (EN 81-73 operation), in order to allow passengers to leave the car and then allow the responsible person to switch the lift to evacuation mode, see.5.7.2.2.

NOTE EN 81-73 does not prevent lifts that are removed from service being put back into service if required during an emergency.

As soon as the responsible person decides to use the "evacuation lift" in order to evacuate people with disabilities, a signal from operation of the "evacuation lift switch" (see 5.4.1.3) is sent to the lift control panel and the lift will function as defined in 5.7.2.1.

5.7.2 Operation of the lift in evacuation mode

Evacuation under the control of an "evacuation assistant" who controls the lift as a lift driver.

5.7.2.1 Evacuation under control by an evacuation assistant

a) On receiving the signal:

   1) If the lift is at the evacuation floor due to EN 81-73 operation, to start evacuation mode, the evacuation switch described in 5.3.1.1 shall be operated.

   2) Alternatively, if the lift is not at the MEEF operation of the evacuation switch described in 5.3.1.1 will invoke the EN 81-73 operation to recall the lift. Having arrived at the evacuation floor the following shall occur:

      — if closed, the landing doors shall open;

      — at all levels the signs defined in 5.5.1.1 will illuminate and any illuminated sign barring access to the lift shall be turned off;

      — in the car, the sign defined in 5.5.3 is switched on;

      — landing calls are immobilised;

      — the communication system defined in 5.6 is activated.

b) When at the MEEF, the lift will:

   1) keep the door open to wait for the next instruction from the evacuation assistant;

   2) on entering a car call the lift will operate as described in c) 3) below.

c) During the operation of the lift in "evacuation mode":

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

   2) whilst the car is in motion, it shall be possible to register a new call from within the car. The previous call shall be cancelled. The car shall travel directly to the new registered floor;

3) registration of a car call shall cause the lift car to travel to, and stop and open its doors at the selected floor;

4) when the doors open, they shall remain open until a new call is registered on the car control panel; any door close button shall be made inoperative. If the doors are closing and the doors open button is operated, any registered call shall be cancelled;

5) door reversal devices that may be affected by smoke or heat shall be rendered inoperative, the other car door reversal devices and the door open button, shall remain operative;

6) the registered car call shall be visually displayed on the car control panel;

7) the position of the car shall be shown when either normal or emergency power is available, both in the car and at the MEEF;

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

9) the communication system as defined in 5.6 shall remain operative for at least 1 h during any evacuation or any loss of power.

5.7.2.2 End of the "evacuation service"

The evacuation service shall be stopped at any time:

a) When the "evacuation switch" is switched to the off position, and the lift is at the MEEF, the lift will then revert to the mode of operation the lift was last on before evacuation mode, usually EN 81-73 operation.

b) If a suspended service signal is received from a fire detector or BMS or key switch, the lift shall return to the MEEF as described in 5.4.1.3.

6 Verification of safety measures and/or protective devices

Safety requirements and/or protective measures of Clause 5 shall be verified according to Table 3 below.

Table 3 — Verification Table

Sub clause	Visual inspection[a]	Compliance with the lift design[b]	Design document check[c]	Functional Test[d]
5.1	X	X		
5.2	X	X		
5.3.1	X			X
5.4			X	
5.4.1			X	X
5.4.1.1	X			X
5.4.1.2	X			X
5.4.1.3	X			X
5.5.1	X			X
5.5.2	X			X
5.6	X			~~X~~
5.6.1	X			X

5.6.2	X			X
5.6.3	X			X
5.6.4	X			X
7			X	

[a] The results of the "visual inspection" are only to show that something is present (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" are to prove that the lift is built according to the design and that the components/devices comply with the design documents.

[c] The results of the "design document check" are to prove that the design requirements of the standard have been matched “on paper” in the design documentation (layout, specification).

[d] The results of the "functional test" are to show that the lift works as intended, including the safety devices.

7 Information for use

Instructions shall be passed to the building owner in the instruction handbook (owner documentation) describing the operation of the lift in evacuation mode and the need to maintain and to periodically test that the lift and any alarm system or other system used to initiate evacuation service are in working order. It should also be pointed out the importance of proper maintenance being conducted on a suitable regular basis and the need for the maintenance company to test the operation of the evacuation system and its communication system at least every 12 months or in line with national fire requirements if they demand tests that are more frequent.

Annex A
(informative)

Concept of this evacuation lift

A.1 General

If national legislation permits, passenger goods lifts could be used for evacuation, although this is not desirable due to the risk of goods being left in the car.

A lift to be used for the evacuation of disabled people should be an evacuation lift and should be operated under the direction and control of management and specially trained persons. It is important that only disabled people with impaired mobility rely on the lift in case of evacuation and essential that the lift car is driven only to those levels where a disabled person is in need of assistance.

To make such a system effective, a number of "evacuation assistants" should be designated and they should be capable of carrying out the necessary duties quickly and efficiently at all times during which the building is occupied.

Typically, it would require a senior evacuation assistant responsible for instructing an evacuation assistant to drive the lift and evacuation assistants responsible for a floor or series of floors.

Depending on the building evacuation strategy envisaged by the building designer, the lift described in this standard that is operated under the control of an "evacuation assistant" may or may not be suitable. It needs to be determined by the building designer if this type of lift is suitable for the actual strategy to be employed. It is the responsibility of the lift contractor and those who develop the evacuation strategy to discuss and ensure such a lift will achieve the required aims.

The preparation for evacuation of disabled people should begin at the first alert or fire alarm. This could save time if a general evacuation is not to be given or if the situation becomes serious.

In premises where there is a two-stage warning system, this may be on the sounding of the "alert" or "first-stage" alarm. Apart from two storey buildings, some form of communications system should be provided to enable the rapid and unambiguous identification of those storeys with disabled people requiring evacuation, and the relaying of this information to the person in charge of the evacuation.

The person in charge shall decide if the lift is to be used and pass the information to those in control of the lift (senior evacuating assistant), who should determine priorities and instruct the lift driver accordingly.

In determining if the lift is going to be used, consideration should be given to the severity and type of emergency, the location of the lift in relation to any fire and the likely number of persons to be evacuated.

If an evacuation lift fails to arrive at a landing or access to it at any level is obstructed by the fire, it will be necessary to use a stairway. It may only be necessary to descend to the storey below any fire to await rescue in a safe area. It is therefore necessary to determine the best method of negotiating stairs and some practice may be necessary.

As soon as the fire service arrives, they may take management of the evacuation but this should not be assumed as the evacuation of the building is normally the responsibility of the building operator.

If the evacuation mode is initiated automatically, a responsible person should have provision to override the signal if required.

The duties to be undertaken by the "evacuation assistant" at each level, immediately on receipt of an alert signal should include the following:

a) ensure that any disabled people in the storey for which that person is responsible move to the nearest safe area to await the lift;

b) help in the evacuation of disabled people to reach the safe area and the lift;

c) inform those in charge of the lift (senior evacuation assistant) of the urgency of the situation on their floor;

d) notify those in charge when everyone on their floor has been evacuated.

It should be appreciated, however, that the actual fire conditions may necessitate changes in the planned sequence of evacuation and those responsible for evacuation plans need a flexible plan capable of managing different situations, i.e. a plan ‘A’ and plan ‘B’.

A.2 Design of the lift

After negotiations to ascertain what the evacuation strategy will be and assuming the strategy fits with the type of lift described in this document, the lift should be designed to comply with EN 81-1 or 2 as applicable to ensure a basic safe design.

The EN 81-73 requirements should be added to ensure that when an alarm is first detected or raised in a building, relevant lifts including the evacuation lift, are returned to the main floor and removed from normal service.

Depending on the emergency in the building, management responsible for the building may determine that an evacuation is not required or lifts are not to be used for some reason.

If the people responsible for evacuation (building management) decide that an evacuation should take place, they should tell the evacuation assistants to start work and to put the lift into evacuation service. This will allow it to be operated to evacuate those needing assistance.

In some buildings, evacuation lifts and firefighting lifts may be installed side by side in common wells. Where this is done, the evacuation lift should have the same level of protection as stated in EN 81-72 clause 5.

Annex B
(informative)

Essential building requirements

B.1 General

In order to allow the lift to be used in safety for evacuation, several building design issues have to be satisfied by the building designer (see 1.4 k)).

Although building requirements are outside of the scope of the lift specifications, these different topics are listed here as guidance and some possible solutions are offered. Because the national regulations for fire are not yet harmonized, it will be necessary for some topics to be proposed as solutions at the national fire authorities level. These fire authorities should determine the most appropriate solutions depending on the national regulation in force.

B.2 Number of lifts dedicated to evacuation

In a building with several lifts, the number of lifts dedicated for evacuation has to be determined in accordance with the number of persons with a disability needing to evacuate using lifts and taking into account the building use, building evacuation strategy and any national guidance on estimated population.

The number of lifts required will depend on the number of persons to evacuate and the time permitted to complete the evacuation. In the absence of more detailed information, it can be assumed that approximately 10 percent of the population have some form of disability and of these, 3% may be unable to use stairs.

B.2.1 Safe area

A safe area is a designated temporary or permanent place where people with impaired mobility can wait in safety for a defined period of time whilst the evacuation process is under way.

It is not a place to leave people for the duration of the alarm, but is to be designed for its additional protection from fire, meaning that it will remain tenable and safe for humans to wait.

The provision of a safe area will permit a staged evacuation to be implemented if required.

In this situation, a safe area is an area that is both separated from the fire by fire-resisting construction, kept clear of smoke and has access via a safe route to the lift and a floor exit.

Examples of satisfactory safe areas include:

— an enclosure such as a compartment, protected lobby, protected corridor or protected stairway;

— any other arrangements which satisfy the general principles outlined above and which provide at least an equal measure of safety.

The period the safe area is to remain tenable should be in accordance with national regulations. In the absence of such regulations, it should be tenable for a period of at least 30 minutes.

B.2.2 Safe area size

The size of the safe area should be determined in accordance with the number of disabled persons (mainly wheel chair users) being accepted in the building and accommodate any persons who may need to pass through the area during their evacuation.

B.2.3 Enclosure

The fire resistance of the safe area and lift well and of its door(s) shall be specified according to local regulation. It shall at least be designed to ensure smoke and fire does not enter the area or place the integrity of the enclosure at risk of failure.

In the event of smoke, fire or excessive temperature (see 5.4.1.3), in the safe area, a detection system shall be provided to detect the condition and it shall send a signal to the lift to prevent it being driven to that floor. Afterwards, the lift should be removed from service at the main evacuation exit floor.

B.2.4 Doors of the safe area

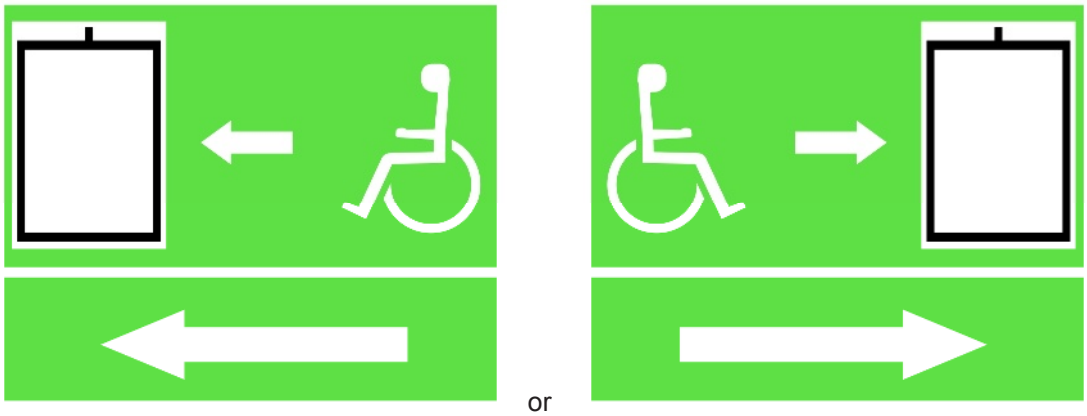
It is especially important to ensure that locks, doors and other devices allowing access to the safe area are all able to be operated easily by evacuating disabled persons.

B.2.5 Signs and signals

In all horizontal circulation areas, building signs should clearly indicate the location of the safe area for the evacuation lift.

Direction to the evacuation lift should be easily identified by a suitable pictogram, see example Figure B.1.

The size of the pictogram shall be in accordance with national regulations and at least 200 x 150 mm or if local or national regulations require illumination of the sign it shall be in accordance with EN 1838.



or

Illustration in white
Background in green

NOTE In the safe area instructions should be displayed stating:

"Safe area. In case of evacuation, the use of the evacuation lift is restricted to persons with disabilities".

Figure B.1 — Pictogram "Evacuation lift LOCATION AND DIRECTION"

B.2.6 Communications

Serious consideration should be given to the provision of an emergency communication system as described in the evacuation plan, separate from the lift communication system provided in each safe area to permit persons to communicate to those in charge of the evacuation in the event of a lift being unavailable. Separation of the communication system is vital to ensure a failure in the lift communication system does not result in a total loss of communication.

NOTE This building communication system is NOT normally supplied as part of the lift contract but as part of the building works.

B.2.7 Emergency lighting

Any safe area should be equipped with emergency lighting in accordance with national building regulations.

B.2.8 Smoke protection of the shaft and safe area

In order to be able use the lift for safe evacuation, measures have to be taken to avoid smoke entering the lift car, lift shaft and safe areas.

The areas critical to satisfactory lift operation and rescue are the machinery space, lift car, lift well and areas directly outside the lift doors on landings. These areas shall be monitored for the presence of fire, smoke, high temperature and, if detected, a signal shall be sent to the lift to suspend the evacuation service as described in 5.4.1.3.

These measures could for example be one of the following, but any other solution is acceptable provided it keeps the area clear and safe:

a) Smoke evacuation:

   1) Natural smoke evacuation or mechanical smoke extraction in the shaft and in the safe areas;

b) Pressurisation:

   2) Pressurisation of the shaft and or the safe area.

The most appropriate measures have to be determined by the building designer.

B.2.9 Smoke management

B.2.10 Temperature

Temperature shall be controlled to a level that enables humans to use the lift in safety and to enable the lift to operate correctly.

B.2.11 Evacuation chair

Some safe areas in the building may need to be equipped with an evacuation means, such as using a chair as a backup plan in order to facilitate the evacuation of people with disabilities if the lift cannot be used.

The number and location of these evacuation devices should be determined in line with any national regulation.

B.3 Alert and/or fire detection system

Any alert and/or smoke detection system in accordance with local fire regulations shall be able to send an "evacuation" signal to the designated lift(s) (see 5.3.1).

B.4 Fire/smoke detection provisions

Any machine room, lift shaft, lobby and safe area directly outside the lift shall be monitored for the presence of fire and/or smoke. When one of the detection devices operates, it shall send a voltage free signal to the lift as described in 5.4.1.3. This detection system is not part of a lift's normal supply. Assuming a fire detection system is being installed generally throughout the building, it should form part of that system.

B.5 Hydraulic lifts

Hydraulic lifts may be used as evacuation lifts. However, in the event of the pipe work from any machinery space being remote from the well, any pipe work shall be fire protected and clearly labelled to indicate it contains oil and relates to the lift. This marking shall be placed along the pipe or its enclosure, approximately every 1 m.

B.6 Power supplies

The provision of power to the lift is essential to keep the lift operating for the anticipated time required to evacuate all non-ambulant persons and to ensure persons do not become trapped in the lift.

Where a backup supply is required, it shall be protected from the effects of fire to the same level of that provided to the lift structure and in line with national requirements.

The normal supply shall be connected in a manner to ensure that it is a maintained supply that will remain available even if sections of the building power are turned off.

B.7 Signals required for lift operation

The lift shall operate in accordance with 5.7 on receipt of an electrical evacuation signal.

The electrical signal shall be provided by an automatic fire detection and alarm system, a building management system or a manual device, operated by authorised persons. The alarm system is not considered as part of the lift installation, although the manual device can be provided after discussion with the lift supplier.

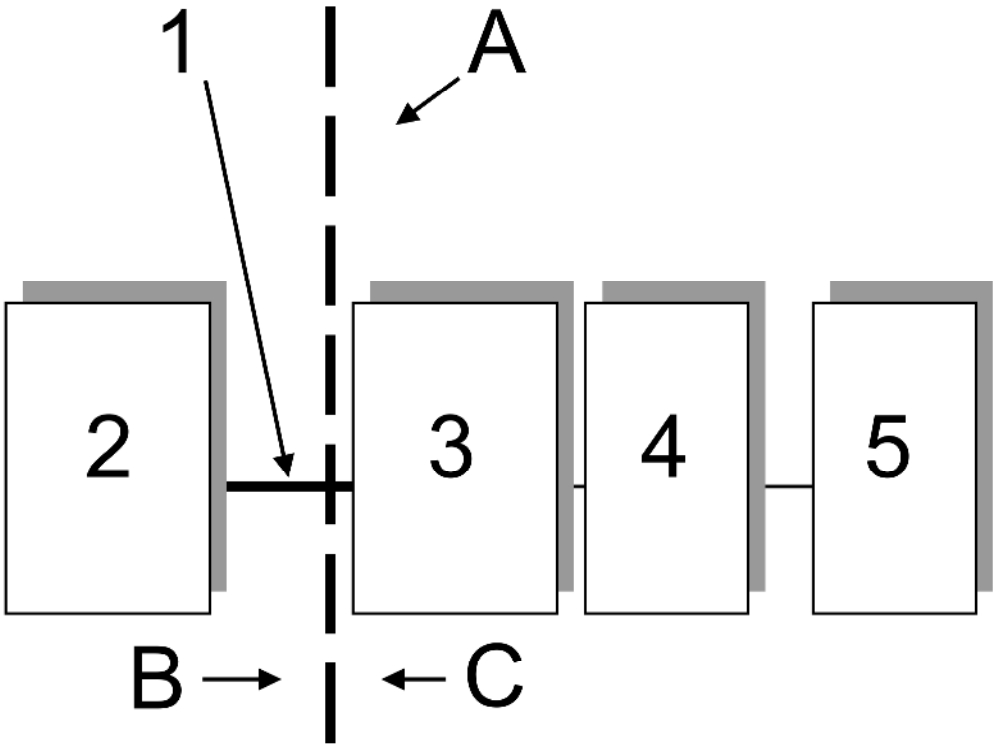
When a state of emergency is detected by building management or in some cases a fire detection system, if provided, it will initiate a signal to evacuate the building or a particular area of the building.

This "evacuation signal" may be a bell, and/or visual signal, and/or vocal message depending of the national regulation applicable and sophistication of the system installed. It should involve sending the signal described in 5.3.1 either manually or automatically so as to invoke evacuation service where required.

Annex C
(informative)

Provision of automatic fire detection and lift interfaces

Figure C.1 illustrates the interface between any automatic fire detection system and lift control(s).



Key

A Boundary

B Building

C Lift

1 Interface wiring not by lift installer (lift installer will provide terminals)

2 Output signal(s) from the fire detection system or manual recall

3 Lift Control Interface (via terminals)

4 Lift Control Systems

5 Lifts

Figure C.1 — Interfaces

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