



# SLOVENSKI STANDARD

SIST EN 81-72:2004

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## Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) - Posebne aplikacije za osebna in osebno-tovorna dvigala - 72. del: Dvigala za gasilce

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

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

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

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### ICS:

91.140.90      Öçä a pãV^[ ^Áq ] } &^      Lifts. Escalators

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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

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Aufzügen - Besondere Anwendungen für Personen und  
Lastenaufzüge - Teil 72: Feuerwehraufzüge

This European Standard was approved by CEN on 21 November 2002.

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 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 Management Centre has the same status as the official versions.

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## Foreword

This document EN 81-72:2003 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of an identical text or by endorsement, at the latest by January 2004, and conflicting national standards shall be withdrawn at the latest by January 2004.

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 Directive(s), see informative annex ZA, which is an integral part of this document.

This standard is part of the EN 81 series of standards: “*Safety rules for the construction and installation of lifts*” and is complementary to the introduction of EN 81-1 and 2 and prEN 81-5, 6 and 7.

NOTE Regulations concerned with safety in the event of fire in buildings vary from country to country and have not to-date been standardised at either an international or European level.

Annexes D and F are normative. Annexes A, B, C, E and G are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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## Introduction

This European Standard is a Type C-type Standard as stated in EN 1070.

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

When provisions of this 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 whilst writing this standard:

- 0.1 the fire protected lobby and lift well are designed to restrict the ingress of smoke;
- 0.2 the building design limits the flow of water into the lift well;
- 0.3 firefighters lifts are not escape routes, such as staircases etc.;
- 0.4 a firefighters lift accesses at each level to a fire protected lobby. This standard covers only those requirements which relate to the lift installation. It does not prescribe requirements for the fire resisting structure of the building essential to provide the fire protected lobby;
- 0.5 negotiations have been made between the owner/customer and installer concerning:
  - a) the intended use of the lift;
  - b) environmental conditions;
  - c) civil engineering problems; and
  - d) other aspects related to the place of the installation and the rescue of persons from within the car.

NOTE Developers and Architects will need to take account of National Building Regulations in providing a suitable fire resistant structure of the building, fire protected lobbies, fire detection and extinguisher systems. Examples are shown in annex B and annex E.

## 1 Scope

1.1 This standard applies to firefighters lifts as defined in clause 3.5 equipped with a fire protected lobby.

1.2 This standard is not applicable to:

- double-deck lifts;
- lifts installed in existing buildings;
- important modification to existing lift installed before the publication of this standard;
- dual entry lifts, where the protected firefighters lift protected lobbies are not located on the same side as that of the fire service access level.

However, this standard may usefully be used as a basis.

1.3 This 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.

1.4 This document is applicable to new firefighters lifts in new buildings which are installed after the date of publication of this document by CEN.

1.5 This standard gives the additional or deviating requirements to EN 81-1 and 2 and prEN 81-5, 6 and 7 which shall be available for lifts which may be used for firefighting and evacuation purposes under firefighters control. In all other respects such lifts are designed in accordance with EN 81-1 and 2 and prEN 81-5, 6 and 7 where applicable.

1.6 This standard does not consider the use of lifts with partially enclosed wells for use as firefighters lifts.

1.7 This standard ceases to apply if the fire eventually breaks into a fire protected lobby (see annex A, Figure A.2).

NOTE A firefighting concept is given in annex A.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

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

prEN 81-5:1999, *Safety rules for the construction and installation of lifts and service lifts - Part 5: Screw lifts.*

prEN 81-6:1999, *Safety rules for the construction and installation of lifts and service lifts – Part 6: Guided chain lifts.*

prEN 81-7:1999, *Safety rules for the construction and installation of lifts and service lifts - Part 7: Rack and pinion lifts.*

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

prEN 81-71:2002, *Safety rules for the construction and installation of lifts – Part 71: Vandal resistant lifts.*

## EN 81-72:2003 (E)

prEN 81-73:2002, *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 131-1:1993, *Ladders – Terms, types, functional sizes.*

EN 1050:1996, *Safety of machinery – Principles for risk assessment.*

EN 1070:1998, *Safety of machinery – Terminology.*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989 + A1 1999).*

ISO 4190-1:1999, *Lift installation – Part 1: Class I, II, III and VI lifts.*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions stated in EN 1070:1998, EN 81-1:1998 and EN 81-2:1998 apply.

Additional definitions specifically needed for this document are added below:

#### 3.1

##### **control system**

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

#### 3.2

##### **evacuation**

evacuation is the organised and controlled movement of persons in a building from a dangerous area to a safe area. Evacuation can be from floor to floor and not necessarily to outside the building

#### 3.3

##### **evacuation level(s)**

the level(s) at which final exits of the building for the evacuation of people are located. This is not necessarily the fire service access level

#### 3.4

##### **fire compartment**

a fire compartment is a sub-division of a building by walls and/or floors for the purpose of limiting the spread of fire and hot gases within the premises

#### 3.5

##### **firefighters lift**

a lift installed primarily intended for passengers use which has additional protection, controls and signals which enable it to be used under the direct control of the fire service

#### 3.6

##### **fire protection**

fire protection covers measures to prevent the outbreak of fire and fire spread in all cases to safeguard escape routes and create the assumption of 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**

a switch located at the fire service access level, outside of the well, that is intended to be used to give priority service for firefighters

#### 3.8

##### **fire service access level**

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



## 3.9

**fire protected lobby**

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 the 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 / hot gazes may spread in to a lift well / machinery space	0.1 / 0.4 / 5.1
2	Exposed or obstructed lift equipment	0.1 / 0.4 / 5.1
3	Lift not useable long enough for fire fighter's	0.1 / 0.3 / 0.4 / 5.1 / 5.7
4	Firefighters > 2 min delay	0.1 / 0.3 / 0.5 / 5.1 / 5.7
5	Flow of water into the lift well	0.2
6	Entrapment on fire protected lobby due to a lift failure	0.3 / 0.4
7	Unsafe Environment for fire fighter's /people waiting to be rescued	0.3 / 0.4
8	Structure collapse before the firefighters have finished with the lift	0.4
9	Not having enough or correct located firefighters lift to move the firefighters through the building.	0.5

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

EN 1050	Significant Hazards and Hazardous situations according to EN1050 for the Fire fighters Lift, including the hazardous situation 1 of Table 1	Requirements and clauses in this standard
-	General hazards for lifts	5.1 / 5.2.1 / 5.8.3 / 5.8.4
1.5	trapping hazard	5.2.2 / 5.4 / 5.6 / 5.7 / 5.8 / 5.9 / 5.10 / 5.11 / 5.12
5.8.6	Firefighters > 2 min delay	5.2.3 / 5.2.4 / 5.6 / 5.8 / 5.10 / 5.11 / 5.12.3 / 6 / 7
9	Combination of hazards	5.8.7 / 5.8.8 / 5.8.9
10.1	Failure or malfunction of the controller	5.3 / 5.4 / 5.7 / 5.8.5 / 5.11.1 / 5.11.2 / 5.12.3
8.6	Human error, human behaviour	5.12
8.7	Inadequate design, location or identification of manual controls	5.8.1 / 5.8.2 / 5.11.3
-	Inadequate marking	5.11.4
13	Failure of the power supply	5.10

4.3 The following significant hazards are not dealt with in this standard (for information see Introduction):

- a) not having enough or correctly located firefighters lifts to move the firefighters up the building;
- b) entrapment in lobby due to absence of lift service;
- c) a fire in the firefighters lift well, fire protected lobby, machinery space or lift car;
- d) structure collapse before the firefighters have finished with the lifts;
- e) the absence of identification sign at any floor.

## 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 fire protected lobby in front of every landing door. The area of each fire protected lobby is given by the requirements for the transportation of stretchers and the location of the doors in each single case. See annex B and annex E.

NOTE The level of fire resistance of the wall and the doors of the environment are defined by National Regulations.

If there are other lifts in the same well, then the entire common well shall fulfill the fire resistance requirements of firefighters lift wells. This level of fire resistance shall also apply to the fire protected lobby doors and machine room. See annex B. Where there is no intermediate fire wall to separate the firefighters lift from other lifts in a common well then all lifts and their electrical equipment must have the same fire protection as the firefighters lift, to ensure the correct functioning of the firefighters lift.

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

- a) the electrical/electronic landing control devices and indicators shall continue to function, so that the firefighters can detect where the car is located for rescue purposes e.g. where the car is blocked when operating in an ambient temperature range of 0 °C to 65 °C, for a period equal to that required for the structure e.g. 2 h;
- b) all other electrical/electronic components of the firefighters lift, not in the fire protected lobby 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 machine rooms for a period equal to that required for the structure e.g. 2 h.

**5.1.3** Each landing entrance used for firefighting purposes has a fire protected lobby.

**5.1.4** Where the firefighters lift has a dual entrance car, any lift landing door(s) which are not intended to be used by firefighters shall be protected in such a way that they do not become exposed to a temperature exceeding 65 °C (see annex B, Figure B.3).

**5.1.5** It is a prerequisite that the source of the secondary power supply shall be located in a fire protected area.

**5.1.6** The firefighters lift primary and secondary electrical power supply cables shall be fire protected and separated from each other and other power supplies.

### 5.2 Fundamental firefighters lift requirements

**5.2.1** The firefighters lift shall be designed in conformity with EN 81-1 and 2 and prEN 81-5, 6 and 7 and provided with additional protection, controls and signals.

NOTE The firefighters lift is to be used under the direct control of the fire service, in the event of fire.

**5.2.2** A firefighters lift shall serve every floor of the building.

**5.2.3** The size of the firefighters lift shall 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 as described in ISO 4190-1, see also 0.5.

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

Where the intended use is to include evacuation, to accommodate such items as a stretcher or bed or designed as a dual entry firefighters lift, then the minimum rated load shall be 1 000 kg and the dimensions of the car 1 100 mm wide by 2 100 mm deep as defined in ISO 4190-1, see also 0.5.

NOTE For firefighters lifts National Regulation may impose greater car dimensions and rated loads following ISO 4190-1.

**5.2.4** The firefighters lift shall reach the furthest floor from the fire service access level within 60 s, see also 0.5 from after the closing of the lift doors.

### 5.3 Protection of electrical equipment against water

**5.3.1** Electrical equipment within the firefighters lift well and on the car, located within 1,0 m of any wall containing a landing door, shall be protected from dripping and splashing water or provided with enclosures classified to at least IPX3 according to EN 60529:1991 (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. Deviating from the requirements of 5.7.3.4 and 5.9 of EN 81-1:1998 and EN 81-2:1998, the socket outlet and lowest lamp of the lighting of the well shall also be located at least 0,5 m above the highest permissible water level in the pit.

**5.3.3** Equipment in machinery spaces outside of the well and in the lift pit shall be protected from malfunction caused by water.

**5.3.4** Suitable means shall be provided in the lift pit to ensure that water will not rise above the level of the fully compressed car buffer.

**5.3.5** Means shall be provided to prevent the water level in the pit from reaching equipment which could create a malfunction of the firefighters lift.

### 5.4 Rescue of trapped firefighters in the lift car

See annex G for examples of Rescue Concept, see also 0.5.

**5.4.1** An emergency trap door shall be provided in the roof of the car measuring a minimum of 0,5 m × 0,7 m with the exception of a 630 kg lift where the trap door shall be at least 0,4 m × 0,5 m.

**5.4.2** The emergency trap door shall conform to 8.12 of EN 81-1:1998 and EN 81-2:1998.

Access to the inside of the car through the trap door shall not be obstructed by a permanent fixture or lighting. Where a suspended ceiling is fitted, it shall be easily openable or removable without the use of special tools. The release point(s) shall be clearly identified from inside the car.

#### 5.4.3 Rescue from outside the car

Means of rescue such as:

- a) fixed ladders in accordance with 6.2.2 b), c) and e) of EN 81-1:1998 and EN 81-2:1998, located within 0,75 m from the sill of the landing entrance above;
- b) portable ladders;
- c) rope ladders;
- d) safety rope systems;

can be used.

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

Safe fixing points for the rescue means must be provided in the vicinity of each landing.

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

#### 5.4.4 Self rescue from inside the car

Access shall be provided to enable full opening the trap door from inside the lift car, for example by the provision of adequate stepping points within the car, with a maximum step rise of 0,4 m. Any stepping point shall be capable of supporting a load of 1 200 N.

Where ladders are used they shall be in accordance with EN 131 and located such that they can be safely deployed.

The free distance between any stepping points and the vertical wall shall be at least 0,1 m.

The combination of the ladder together with the size and location of the trap door shall allow a firefighter to pass through.

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** Where a rigid ladder is provided, it shall be attached to the outside of the car for rescue purposes. An electrical safety device in conformity with 14.1.2 of EN 81-1:1998 and EN 81-2:1998 shall be provided to ensure that the lift does not move if the ladder is removed from its storage place.

**5.4.6** Where ladder is provided, its storage location shall be chosen to avoid creating a tripping hazard during normal maintenance operations.

**5.4.7** Where a ladder is provided, its minimum length shall be such that when the lift car stays flush with the landing, the landing door lock of the next upper landing level can be reached. Where it is not possible for such a ladder to be installed on the car then a permanently installed ladder fixed to the well shall be used.

## **5.5 Kept free**

## **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. cables, hydraulic pipes etc.) between fire compartments shall be likewise protected.

## **5.8 Control Systems**

**5.8.1** A firefighters lift switch shall be located in the lobby intended to be used as the firefighters service access level. The switch shall be located within 2 m horizontally from the firefighters lift, at a height between 1,8 m and 2,1 m above floor level. It shall be marked with a firefighters lift pictogram in accordance with annex F.

**5.8.2** Operation of the firefighters lift switch shall be by means of the emergency unlocking triangle, as defined in annex B of EN 81-1:1998 and EN 81-2:1998. The operating positions of the switch shall be bi-stable and clearly marked '1' and '0'. In position '1' Firefighters service is initiated.

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

An additional external control or input may be used only to automatically return the firefighters lift to the fire service access level (see clause 0.5) and keep the firefighters lift at that level with open doors. The firefighters lift switch must still be operated to the '1' position to complete the Phase 1 operation.

**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 and 2 5.8.7 c) and 5.8.8 f).

**5.8.4** The firefighters lift switch shall not override the inspection control (EN 81-1:1998 and EN 81-2:1998, 14.2.1.3), the stop switches (EN 81-1:1998 and EN 81-2:1998, 14.2.2) or emergency electrical operation (EN 81-1:1998, 14.2.1.4).