SLOVENSKI STANDARD
SIST EN 81-2:1999+A3:2010

01-marec-2010

Varnostna pravila za konstruiranje in vgradnjo dvigal - 2. del: Hidravliļ na osebna in tovorna dvigala

Safety rules for the construction and installation of lifts - Part 2: Hydraulic lifts

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Teil 2: Hydraulisch betriebene Personen- und Lastenaufzüge

Règles de sécurité pour la construction et l'installation des ascenseurs - Partie 2: Ascenseurs hydrauliques

Ta slovenski standard je istoveten z: **EN 81-2:1998+A3:2009**

ICS:

91.140.90 Dvigala. Tekoļ e stopnice Lifts. Escalators

SIST EN 81-2:1999+A3:2010 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 81-2:1998+A3

December 2009

ICS 91.140.90

Supersedes EN 81-2:1998

English Version

Safety rules for the construction and installation of lifts - Part 2: Hydraulic lifts

Règles de sécurité pour la construction et l'installation des ascenseurs - Partie 2: Ascenseurs hydrauliques

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Teil 2: Hydraulisch betriebene Personen- und Lastenaufzüge

This European Standard was approved by CEN on 21 February 1998 and includes Corrigendum 1 issued by CEN on 22 September 1999, Amendment 1 approved by CEN on 13 May 2005, Amendment 2 approved by CEN on 22 April 2004 and Amendment 3 approved by CEN on 13 August 2009.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, 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 United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 81-2:1998+A3:2009: E

Contents

Page

Foreword

This document (EN 81-2:1998+A3:2009) 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 June 2010, and conflicting national standards shall be withdrawn at the latest by June 2011.

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 European Standard was approved by CEN on21 February 1998 and includes Corrigendum 1 issued by CEN on 22 September 1999, Amendment 1 approved by CEN on 13 May 2005, Amendment 2 approved by CEN on 22 April 2004 and Amendment 3 approved by CEN on 13 August 2009.

This European Standard supersedes [A3] EN 81-2:1998 [A3].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1], [A2] [A2] and [A3] [A3].

The modifications of the related CEN Corrigendum have been implemented at the appropriate places in the text and are indicated by the tags [AC] [AC].

This European Standard 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 standard.

This is the second edition of the standard. It is an amendment of the edition 1987 and shall be given the status of a harmonised standard. The amendment is mainly based on the following points :

- elimination of national deviations ;

- incorporation of essential health and safety requirements from the relevant EU Directives ;

- elimination of obvious errors ;

- incorporation of proposals resulting from interpretation requests dealing with the improvement relative to the progress in technology ;

- improvement of the references to other standards according to the progress in that field.

After the CEN Enquiry on prEN81-2:1994 the EU Directive on Lifts (95/16/EC) was adopted. The requirements resulting from the essential health and safety requirements of this Directive being not taken into consideration in the draft have been summarised in the Addendum prA1:1996 to prEN81-2:1994 and submitted to the members of CEN/TC 10 for approval. Having received the approval this Addendum has been incorporated into this standard taking into account the comments received from TC members.

This standard does not correspond in all points to the present internal rules of CEN regarding the format of safety standards. However, the format of this standard has been accepted by the interested parties and is therefore regarded as the better way of implementation of the essential health and safety requirements than a formalistic re-draft. This mainly because of the coming into force of the EU Directive 95/16/EC on 97-07-01.

With the next revision of the standard, being already intended, this shortcomings will be removed.

A3 Amendment 3 is needed on one hand because of the revision of the machinery directive, amendment of the lifts directive, and on the other hand because of improvements in the state of the art.

New ESR's in the revised machinery directive give new requirements for the fixation of protective guards. The amendment is addressing these new requirements.

Furthermore the borderline between the scope of the machinery directive and the lifts directive has changed. As a result of this the scope of EN 81-2 (and EN 81-1) is revised by means of this amendment.

Additionally this amendment is giving more severe requirements for (1) measures against the risk of stumbling during loading and unloading, and for (2) measures against the risks due to uncontrolled movements. These requirements are not linked to the revision of the machinery directive, but are a result of improved state of the art. By means of this amendment, an improved conformity to the relevant ESR's in the Lifts Directive and Machinery Directive is achieved. A3

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, 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 United Kingdom.

Introduction

0.1 General

0.1.1 The object of this standard is to define safety rules related to passenger- and goods/passenger-lifts with a view to safeguarding persons and objects against the risk of accidents associated with the user-, maintenance- and emergency operation of lifts [1)]

0.1.2 A study has been made of the various aspects of incidents possible with lifts in the following areas :

0.1.2.1 Risks possible due to :

a) shearing ;

b) crushing ;

c) falling ;

d) impact ;

e) trapping ;

f) fire ;

g) electric shock ;

h) failure of material due to :

1) mechanical damage ;

2) wear ;

3) corrosion.

0.1.2.2 Persons to be safeguarded :

a) users ;

b) maintenance and inspection personnel ;

c) persons outside the lift well, the machine room and pulley room (if any).

[1)] Within CEN/TC 10 an interpretation committee has been established to answer questions about the spirit in which the experts have drafted the various clauses of this standard. The issued interpretations are available from National Standards Bodies.

0.1.2.3 Objects to be safeguarded :

a) loads in car ;

b) components of the lift installation ;

c) building in which the lift is installed.

0.2 Principles

In drawing up this standard the following have been used.

0.2.1 This standard does not repeat all the general technical rules applicable to every electrical, mechanical, or building construction including the protection of building elements against fire.

It has, however, seemed necessary to establish certain requirements of good construction, either because they are peculiar to lift manufacture or because in the case of lift utilization the requirements may be more stringent than elsewhere.

0.2.2 This standard does not only address the essential safety requirements of the Lift Directive, but additionally states minimum rules for the installation of lifts into buildings/constructions. There may be in some countries regulations for the construction of buildings etc. which cannot be ignored.

Typical clauses affected by this are those defining minimum values for the height of the machine and pulley rooms and for their access doors dimensions.

0.2.3 When the weight, size and/or shape of components prevent them from being moved by hand, they are :

a) either fitted with attachments for lifting gear, or

b) designed so that they can be fitted with such attachments (e.g. by means of threaded holes), or

c) shaped in such a way that standard lifting gear can easily be attached.

0.2.4 As far as possible the standard sets out only the requirements that materials and equipment have to meet in the interests of safe operation of lifts.

0.2.5 Negotiations have been made between the customer and the supplier about :

a) the intended use of the lift ;

b) environmental conditions ;

c) civil engineering problems ;

d) other aspects related to the place of installation.

〈A1〉

0.2.6 Risk analysis, terminology and technical solutions have been considered taking into account the methods of the EN 61508-series of standards. This led to a necessary classification of safety functions applied to PESSRAL. 〈A1〉

0.3 Assumptions

Possible risks have been considered of each component that may be incorporated in a complete lift installation.

Rules have been drawn up accordingly.

0.3.1 Components are :

a) designed in accordance with usual engineering practice and calculation codes, taking into account all failure modes ;

b) of sound mechanical and electrical construction ;

c) made of materials with adequate strength and of suitable quality ;

d) be free of defects.

Harmful materials, such as asbestos are not used.

0.3.2 Components are kept in good repair and working order, so that the required dimensions remain fulfilled despite wear.

0.3.3 Components will be selected and installed so that foreseeable environmental influences and special working conditions do not affect the safe operation of the lift.

0.3.4 By design of the load bearing elements, a safe operation of the lift is assured for loads ranging from 0 % to 100 % of the rated load.

0.3.5 A1 The requirements of this European Standard regarding electrical safety devices are such that the possibility of a failure of an electric safety device (see 14.1.2.1.1 b)) complying with all the requirements of this European Standard needs not to be taken into consideration. A1

0.3.6 Users have to be safeguarded against their own negligence and unwitting carelessness when using the lift in the intended way.

0.3.7 A user may, in certain cases, make one imprudent act. The possibility of two simultaneous acts of imprudence and/or the abuse of instructions for use is not considered.

0.3.8 If in the course of maintenance work a safety device, normally not accessible to the users, is deliberately neutralised, safe operation of the lift is no longer assured, but compensatory measures will be taken to ensure users safety in conformity with maintenance instructions.

It is assumed that maintenance personnel is instructed and works according to the instructions.

0.3.9 For horizontal forces, the following have been used :

a) static force : 300 N ;

b) force resulting from impact : 1000 N ;

reflecting the values that one person can exert.

0.3.10 With the exception of the items listed below, a mechanical device built according to good practice and the requirements of the standard will not deteriorate to a point of creating hazard without the possibility of detection.

The following mechanical failures are considered :

a) breakage of the suspension ;

b) breakage and slackening of all linkage by auxiliary ropes, chains and belts ;

c) rupture in the hydraulic system (jack excluded) ;

d) small leakage in the hydraulic system (jack included).

0.3.11 The possibility of the devices against free fall or descent with excessive speed not setting, should the car free fall from the lowest landing, before the car strikes the buffer(s) is considered acceptable.

0.3.12 Provided that none of the failure mentioned in **0.3.10** occurs the speed of the car in down direction with any load (up to the rated load) is assumed not to exceed the rated speed downwards by more than 8 %.

0.3.13 The organisation within the building, where the lift is installed, is such that it can respond effectively to emergency calls without undue delay (see **0.2.5**).

0.3.14 Means of access are provided for the hoisting of heavy equipment (see **0.2.5**).

0.3.15 [A2] To ensure the correct functioning of the equipment in the machinery space(s), i.e. taking into account the heat dissipated by the equipment, the ambient temperature in the machinery space(s) is assumed to be maintained between + 5 °C and + 40 °C. [A2]

0.3.16 In the case of lifts provided with a restrictor/one-way restrictor as precaution against descent with excessive speed an impact speed of the car on the buffer (s) or the pawl device equal to rated speed downwards v_d + 0,3 m/s shall be taken into account.

0.3.17 In the case of goods passenger lifts having a car whose available area in relationship to the rated load is greater than defined in **table 1.1,** a complete filling of the car with persons shall not create a dangerous situation.

[A2]

0.3.18 Access ways to the working areas are adequately lit (see **0.2.5**).

0.3.19 Minimum passageways required by building regulations are not obstructed by the open door/trap of the lift and/or any protection means for working areas outside of the well, where fitted according to the maintenance instructions (see **0.2.5**).

0.3.20 Where more than one person is working at the same time on a lift, an adequate means of communication between these persons is ensured. [A2]

[A3]

0.3.21 The fixing system of guards, used specifically to provide protection against mechanival, electrical or any other hazards by means of a physical barrier, which have to be removed during regular maintenance and inspection, remains attached to the guard or to the equipment, when the guard is removed. [A3]

1 Scope

1.1 This standard specifies the safety rules for the construction and installation of permanently installed new hydraulic lifts serving defined landing levels, having a car designed for the transportation of persons or persons and goods, suspended by jacks, ropes or chains and moving between guide rails inclined not more than 15° to the vertical.

1.2 In addition to the requirements of this standard supplementary requirements shall be considered in special cases (potentially explosive atmosphere, extreme climate conditions, seismic conditions, transporting dangerous goods, etc.).

1.3 This standard does not cover :

a) lifts with drives other than those stated in **1.1** ;

b) installation of hydraulic lifts in existing buildings [2)] to the extent that space does not permit ;

c) important modifications (see **annex E**) to a lift installed before this standard is brought into application ;

d) lifting appliances, such as paternosters, mine lifts, theatrical lifts, appliances with automatic caging, skips, lifts and hoists for building and public works sites, ships' hoists, platforms for exploration or drilling at sea, construction and maintenance appliances ;

e) installations where the inclination of the guide rails to the vertical exceeds 15° ;

f) safety during transport, installation, repairs, and dismantling of lifts ;

g) hydraulic lifts with a rated speed exceeding 1 m/s.

A3

h) lifts with rated speed ≤ 0,15 m/s. A3

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

Noise and vibrations are not dealt with in this standard because these are not relevant to the safe use of the lift.

1.4 This standard does not specify the additional requirements necessary for the use of lifts in case of fire.

2) Existing building is a building which is used or was already used before the order for the lift was placed. A building whose internal structure is completely renewed is considered as a new building.

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.

CEN/CENELEC standards

EN 294	1992	Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs
EN 1050		Safety of machinery - Principles for risk assessment
EN 10025		Hot rolled products of non alloy structural steels - Technical delivery conditions
EN 50214		Flexible cables for lifts
EN 60068-2-6		Environmental testing - Part 2 : Tests - Test Fc : Vibration (sinusoidal)
EN 60068-2-27		Basic environmental testing procedures - Part 2 : Tests - Test Ea and guidance : Shock
EN 60068-2-29		Basic environmental testing procedures - Part 2 : Tests- Test Eb and guidance : Bump
EN 60249-2-2		Base materials for printed circuits - Part 2 : Specifications - Specification N° 2 : Phenolic cellulose paper copper-clad laminated sheet, economic quality
EN 60249-2-3		Base materials for printed circuits - Part 2 : Specifications - Specification N° 3 : Epoxyde cellule paper copper-clad laminated sheet of defined flammability (vertical burning test)
EN 60742		Isolating transformers and safety isolating transformers - Requirements
EN 60947-4-1		Low-voltage switchgear and controlgear - Part 4 : Contactors and motor-starters - Section 1 : Electromechanical contactors and motor-starters
EN 60947-5-1		Low-voltage switchgear and controlgear - Part 5 : Control circuit devices and switching elements - Section 1 : Electromechanical control circuit devices
EN 60950		Safety of information technology equipment, including electrical business equipment
EN 62326-1		Printed boards - Part 1 : Generic specification
[A1] EN 61508-1:2001		Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements (IEC 61508-1:1998 + Corrigendum 1999)

EN 61508-2:2001		Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems (IEC 61508-2:2000)
EN 61508-3:2001		Functional safety of electrical/electronic/programmable electronic safety related systems - Part 3: Software requirements (IEC 61508-3:1998 + Corrigendum 1999)
EN 61508-4:2001		Functional safety of electrical/electronic/programmable electronic safety related systems - Part 4: Definitions and abbreviations (IEC 61508-4:1998 + Corrigendum 1999)
EN 61508-5:2001		Functional safety of electrical/electronic/programmable electronic safety related systems - Part 5: Examples of methods for the determination of safety integrity levels (IEC 61508-5 1998 + Corrigendum 1999)
EN 61508-7:2001		Functional safety of electrical/electronic/programmable electronic safety related systems - Part7: Overview of techniques and measures (IEC 61508-7:2000) 〈A1〉
EN 12015	1998	Electromagnetic compatibility - Product family standard for lifts, escalators and passenger conveyors - Emission
EN 12016	1998	Electromagnetic compatibility - Product family standard for lifts, escalators and passenger conveyors – Immunity
prEN 81-8	1997	Fire resistance tests of lift landing doors - Method of test and evaluation

IEC standards

IEC 60664-1	Insulation co-ordination for equipment within low-voltage systems - Part 1 : Principles, requirements and tests
IEC 60747-5	Semiconductor devices – Discrete devices and integrated circuits – Part 5 : Optoelectronic devices

CENELEC Harmonization Documents

HD 21.1 S3	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1 : General requirements
HD 21.3 S3	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 3 : Non-sheathed cables for fixed wiring
HD 21.4 S2	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 4 : Sheathed cables for fixed wiring