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Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) – Dvigala za prevoz izključno tovora – 31. del: Dostopna tovorna dvigala

Safety rules for the construction and installation of lifts – Lifts for the transport of goods only – Part 31: Accessible goods only lifts

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Safety rules for the construction and installation of lifts - Lifts for the transport of goods only - Part 31: Accessible goods only lifts

Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Aufzüge für den Gütertransport - Teil 31: Betretbare Güteraufzüge

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Foreword

This document (prEN 81-31:2006) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

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.

Introduction

0.1 General

The object of this Standard is to give safety rules related to the construction and installation of accessible goods only lifts, with a view to safeguarding persons and objects against the risk of accidents associated with the use, maintenance- and emergency operation of accessible goods only lifts.

This document is a C-type standard as stated in EN ISO 12100.

The accessible goods only lift installation concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this document.

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

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.

0.2.2 This standard addresses the essential safety requirements of the Machinery Directive including those related to the well and machinery spaces, excluding any other requirement for the building.

There may be in some countries regulations for the construction of buildings etc., which cannot be ignored. (see **Annex ZA**).

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 Negotiations have been made, between the parties involved and decisions have been taken at least particularly about:

a) The intended use of the accessible goods only lift and its limits;

b) Environmental conditions, including surrounding lighting;

c) Compliance of the civil engineering with the requirements of this standard for those parts of the installation, which belong to the building and are not provided by the manufacturer;

d) The location of the accessible goods only lift to be such that users using the accessible goods only lift have means conveniently available to them, to access the different landing levels served, either a staircase or a means for the transportation of persons, within a reasonable distance.

0.3 Assumptions

Risks have been considered of each component that may be incorporated in a complete accessible goods only 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.

Harmful materials, such as asbestos, are not used.

0.3.2 The machine is kept in good repair and working order, so that the initial safety level is maintained.

0.3.3 The IP code of electrical components is selected in relation with the intended use where not specified in this standard.

0.3.4 By design of the load bearing elements, a safe operation of the goods only lift is assured for loads ranging from 0 % to 100 % of the rated load, including provisions for taking into account possible overloading.

0.3.5 The requirements of this standard regarding electric safety devices are such that the possibility of a failure of an electric safety device complying with all the requirements of the standard needs not to be taken into consideration.

0.3.6 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.

0.3.7 If in the course of maintenance work a safety device, normally not accessible to the user, is deliberately neutralised, safe operation of the accessible goods only lift is no longer assured, but compensatory measures will be taken to ensure safety of all persons in conformity with maintenance instructions according to EN 13015.

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

0.3.8 For horizontal forces, the following have been used:

a) Static force: minimum 300 N;

b) Force resulting from impact: minimum 1000 N;

reflecting the values that one person can exert.

Higher values need to be taken into account where powered or hand powered means for loading and unloading are intended to be used (see **0.2.4**).

0.3.9 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 as long as regular and periodical examinations, tests and maintenance are carried out according to the instruction manual delivered with the installation.

The following mechanical failures, where applicable, are considered in the requirements:

a) Breakage of the suspension;

b) Uncontrolled slipping of the ropes on the traction sheave;

c) Breakage and slackening of all linkage by auxiliary ropes, chains and belts;

d) Failure of one of the mechanical components of the electromechanical brake which take part in the application of the braking action on the drum or disk;

e) Failure of a component associated with the main drive elements and the traction sheave;

f) Rupture in the hydraulic system (jack excluded).

0.3.10 When the speed of the load carrying unit is linked to the electrical frequency of the mains up to the moment of application of the mechanical brake, the speed is assumed not to exceed 115 % of the rated speed or a corresponding fractional speed.

0.3.11 When the device according to **5.10** is provided, the organisation within the building, where the accessible goods only lift is installed, is such that it can respond effectively to emergency calls without undue delay (see **0.2.4**).

0.3.12 Means of access are provided for the hoisting of heavy equipment (see **0.2.4)**.

0.3.13 To ensure the correct functioning of the equipment in the machine spaces, the ambient temperature in these spaces is assumed to be maintained between + 5 °C and + 40 °C (see EN 60204-1). When the ambient condition limits risk to be exceeded, appropriate means are used to compensate the difference, such as heating or cooling (see **0.2.4**).

0.3.14 Accessible goods only lifts are used only by authorised and instructed users. This can be achieved by the way of key operated control buttons, key card operated control or similar devices or the accessible goods only lifts are installed in an area where only trained persons have access (see clause **0.2.4**).

1 Scope

1.1 This standard applies for new electric accessible goods only lifts with traction or positive drive and new hydraulic accessible goods only lifts, permanently installed in restricted areas and/or only used by authorised and instructed persons (users), serving fixed and permanent landing levels, having a load carrying unit made of a single load carrying area, designed for the transportation of goods only, moving along a fixed path (e.g. scissor lifts, lifts with guide rails, etc.) and inclined not more than 15° to the vertical, with rated speed not exceeding 1 m/s.

This standard deals with all significant hazards, hazardous situations and events with the exception of those listed in **1.3** below, relevant to accessible goods only lifts, when they are used as intended and under the conditions foreseen by the manufacturer (see **4**).

Two types of accessible goods only lifts are addressed:

a) Type A, where the intended use is bound to the following four simultaneous conditions:

   1) Maximum levels served: 4;

   2) Maximum rated speed: 0,30 m/s;

   3) Maximum travelling height: 12 m;

b) Type B, where one of the conditions mentioned above is not fulfilled.

1.2 This standard does not give the requirements to be met in special cases (potentially explosive atmosphere, extreme climate conditions, seismic conditions, transporting dangerous goods, etc.).

1.3 This standard is not applicable to:

a) Accessible goods only lifts

— with more than one machine

— where loading and unloading is automated or the load carrying unit floor is fitted with mobile devices (e.g. rollers) for loading and unloading purposes;

— intended to carry bulk loads (such as loose sand, gravel, etc.);

Lifting appliances, such as appliances with more than one load carrying unit, skips, goods only lifts for construction sites, for underground applications, goods only lifts on ships, theatre stage lifts,

b) Installations where the inclination of the fixed course of movement to the vertical exceeds 15°;

c) Safety during transport, installation, repairs and dismantling of goods only lifts;

d) The use of translucent material for the walls of the well and machinery spaces, for the load carrying unit and for the landing doors with the exception of their vision panels;

e) The use of Programmable Electronic Systems (PESSRAL).

However, this standard may usefully be taken as guidance where relevant.

1.4 This standard is not applicable to accessible goods only lifts which were manufactured before the date of its publication as EN.

1.5 Persons to be safeguarded:

a) Operators and users;

b) Maintenance personnel

c) Persons in the near vicinity, outside the accessible goods only lift well, the machine room/spaces and pulley room/spaces (if any).

1.6 Objects to be safeguarded: components of the accessible goods only lift installation.

1.7 Building parts to be safeguarded (see **0.2.4**): those parts of the building which are directly associated with the accessible goods only lift.

1.8 The significant hazards, hazardous situations and events dealt with by this standard are those listed in EN 1050, Annex A (see **4**) with the exception of:

— Noise;

— Vibrations;

— Fire

— EMC.

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 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*

EN 81-58:2003, *Safety rules for the construction and installation of lifts – Part 58: Fire resistance tests of lift landing doors - Method of test and evaluation*

EN 294:1992, *Safety of machinery - Safety distances to prevent danger zones being reached by the upper limbs*

EN 349, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 811, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*

EN 1005, Part 3:2001, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1050:1997, *Safety of machinery - Principles for risk assessment*

EN 10025, *Hot rolled products of non alloy structural steels -Technical delivery conditions*

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*

EN 12100-1, *Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology*

EN 12100-2, *Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles and specifications*

EN 13015:2002, *Maintenance for lifts and escalators – Rules for maintenance instructions*

EN 13501-1,:2002, *Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests*

EN 50214, *Flat polyvinyl chloride sheathed Flexible cables*

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 60112*, Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

EN 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1 : General requirements*

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 60664-1: 2003*, Insulation coordination for equipment within low-voltage systems -- Part 1: Principles, requirements and tests*

EN 60947-4-1, *Low-voltage switchgear and control gear - Part 4: Contactors and motor-starters - Section 1: Electromechanical contactors and motor-starters*

EN 60947-5-1, *Low-voltage switchgear and control gear - 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 61558-2-9:2003*, Safety of power transformers, power supply units and similar products -- Part 2-9: Particular requirements for transformers for class III handlamps for tungsten filament lamps*

EN 62326-1, *Printed boards – Part 1: Generic specification*

EN ISO 14122-3:2001*, Safety of machinery – Permanent means of access to machines*

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 S4*, Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation - 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*

HD 21.5 S3: 1994*, Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 5: Flexible cables (cords)*

HD 22.4 S3: 1995*,* Cables *of rated voltages up to and including 450/750 V and having cross-linked insulation - Part 4: Cords and flexible cables*

HD 384.5.54 S1*, Electrical installations of buildings - Part 5: Selection and erection of electrical equipment - Chapter 54: Earthing arrangements and protective conductors*

HD 384.6.61 S1*, Electrical installations of buildings - Part 6: Verification - Chapter 61: Initial verification*

ISO Standards

ISO 1219-1, *Fluid power systems and components -- Graphic symbols and circuit diagrams -- Part 1: Graphic symbols*

ISO 4309, *Cranes -- Wire ropes -- Care, maintenance, installation, examination and discard*

ISO 6403, *Hydraulic fluid power -- Valves controlling flow and pressure -- Test methods*

ISO 7465: 2002, *Passenger lifts and service lifts – Guide rails for lifts and counterweights – T type*

3 Terms, definitions, units and symbols

3.1 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 12100-1 apply as well as the following additional definitions.

3.1.1
accessible goods only lift *(monte charge accessible) (betrebarer Güteraufzug)*
permanently installed lifting equipment intended for the transport of goods only, serving fixed and permanent landing levels , comprising a load carrying unit accessible for loading and unloading, running along a fixed course, inclined not more than 15° to the vertical, for use only by authorised and instructed persons (users)

3.1.2
accessibility *(accessibilité) (Betretbarkeit)*
for the purpose of this standard, a goods only lift is regarded as accessible where one of the following conditions is satisfied:

d) Floor area of the load carrying unit is greater than 1,0 m^2;

e) Depth of the load carrying unit is greater than 1,0 m;

f) Height of the load carrying unit is greater than 1,2 m.

In case of a platform, it is considered accessible when the height of the landing doors is more than 1,20 m.

3.1.2
apron *(garde-pieds) (Schürze)*
smooth vertical part extending downwards from the sill of the landing or load carrying unit entrance

3.1.3
available load carrying unit area *(surface utile de la cabine) (Nutzfläche des Fahrkorbes)*
area of the load carrying unit measured at a height of 1 m above floor level, which is available for goods during operation of the lift

3.1.4
balancing weight *(masse d'équilibrage) (Ausgleichgewicht)*
mass which saves energy by balancing all or part of the mass of the load carrying unit and of other suspended equipment

3.1.5
buffer *(amortisseur)(Puffer)*
a resilient stop at the end of travel, which may comprise a means of braking using fluids or springs (or other similar means)

3.1.6
clamping device *(dispositif de blocage) (Klemmvorrichtung)*
a mechanical device which when activated stops the load carrying unit in downward motion and maintains it stationary at any point of the travel to limit the extent of creep