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**Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) - Dvigala, namenjena samo za prevoz tovora - 31. del: Dostopna tovarna dvigala**

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

Règles de sécurité pour la construction et l'installation des élévateurs - Elévateurs pour le transport d'objets seulement - Partie 31: Monte charge accessibles

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 81-31**

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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**

Règles de sécurité pour la construction et l'installation des  
élévateurs - Elévateurs pour le transport d'objets seulement  
- Partie 31: Monte charge accessibles

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

This European Standard was approved by CEN on 13 February 2010.

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**EN 81-31:2010 (E)****Foreword**

This document (EN 81-31:2010) has been prepared by Technical Committee CEN/TC 10 “Lifts, escalators and moving walks”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010.

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

This document 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 a part of the EN 81 series of standards, which covers safety rules for the construction and installation of lifts. See CEN/TR 81-10.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, 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.

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## 0 Introduction

### 0.1 General

**0.1.1** The object of this European 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 type C standard as specified in EN ISO 12100-1.

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 to 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.

**0.1.2** The following are to be safeguarded:

a) persons such as:

- 1) operators and users;
- 2) maintenance personnel;
- 3) persons in the near vicinity, outside the accessible goods only lift well, the machine room/spaces and pulley room/spaces (if any);

b) objects such as components of the accessible goods only lift installation and load inside the load carrying unit;

c) building parts (see 0.2.5) such as those parts of the building which are directly associated with the accessible goods only lift.

### 0.2 Principles

**0.2.1** In drawing up this European Standard the following have been used:

**0.2.2** This European 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.

**0.2.3** This European 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 can 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.

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

- a) 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

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

**0.2.5** Negotiations have been made between the parties involved and decisions have been taken, 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 European Standard for those parts of the installation, which belong to the building and are not provided by the manufacturer.

**0.3 Assumptions**

**0.3.1** Risks have been considered for each component that may be incorporated in a complete accessible goods only lift installation.

Rules have been drawn up accordingly to mitigate such risks.

**0.3.2** 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.

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

**0.3.4** The IP code of electrical components is selected in relation with the intended use where not specified in this European Standard in accordance with EN 60529.

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

**0.3.6** The requirements of this European 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.

**0.3.7** 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 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.

**0.3.9** For horizontal forces, the following have been used:

- a) static force: minimum 300 N;
- b) force resulting from impact: minimum 1 000 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 0.2.5).

**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 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 takes 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).

**0.3.11** 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.

**0.3.12** When the device according to 5.2.14 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 0.2.5).

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

**0.3.14** To ensure the correct functioning of the equipment in the machinery spaces, the ambient temperature in these spaces is assumed to be maintained between + 5 °C and + 40 °C (see EN 60204-1). When the temperature exceeds these limits, appropriate means are used to compensate the difference, such as heating or cooling (see 0.2.5).

**0.3.15** 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 0.2.5).

**0.3.16** The fixing system of guards, which have to be removed during maintenance and inspection, remains attached to the guard or to the equipment, when the guard is removed.

**0.3.17** 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.

## 1 Scope

**1.1** This European Standard applies to 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) and inclined not more than 15° to the vertical, with rated speed not exceeding 1 m/s.

This European Standard covers accessible goods only lifts with rated load exceeding 300 kg and not intended to move persons.

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 Clause 4).

**1.2** For the purpose of this European Standard, a goods only lift is regarded as accessible where one of the following conditions is satisfied:

- a) floor area of the load carrying unit is greater than 1,0 m<sup>2</sup>;
- b) depth of the load carrying unit is greater than 1,0 m;
- c) height of the load carrying unit is greater than 1,20 m.

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

**1.3** Two types of accessible goods only lifts are addressed:

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

- 1) maximum rated speed: 0,30 m/s;
- 2) maximum travelling height: 12 m;

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

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

**1.5** This standard is not applicable to:

- a) accessible goods only lifts:
  - 1) with more than one machine;
  - 2) 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;
  - 3) intended to carry bulk loads (such as loose sand, gravel, etc.);
- b) lifting appliances, such as appliances with more than one load carrying unit, skips, goods only lifts for construction sites, for underground applications, mine winding gear, goods only lifts on seagoing vessels and mobile offshore units, machinery intended to move performers during artistic performances, goods only lifts specially designed and constructed for research purposes for temporary use in laboratories, goods only lifts specially designed and constructed for military or police purposes;
- c) installations where the inclination of the fixed course of movement to the vertical exceeds 15°;

- d) safety during transport, installation, repairs and dismantling of accessible goods only lifts;
- e) 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;
- f) the use of programmable electronic systems in safety related applications for lifts (PESSRAL).

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

**1.6** This European Standard is not applicable to accessible goods only lifts which were manufactured before the date of its publication as EN.

**1.7** The significant hazards, hazardous situations and events dealt with by this standard are those listed in EN ISO 14121-1:2007, Annex A (see Clause 4) with the exception of:

- noise;
- vibration;
- fire;
- any form of radiation except EMC.

## 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.

- <https://standards.iteh.ai/catalog/standards/sist/3439729-2-63-4/01-b927-5c939c0785ba/sist-en-81-31-2010>
- 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 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of human body*
- EN 1005-3, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*
- EN 12015, *Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Emission*
- EN 12016, *Electromagnetic compatibility — Product family standard for lifts, escalators and moving walks — Immunity*
- EN 12385-4, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications*
- EN 12385-5, *Steel wire ropes — Safety — Part 5: Stranded ropes for lifts*
- EN 13015, *Maintenance for lifts and escalators — Rules for maintenance instructions*
- EN 50214, *Flat polyvinyl chloride sheathed flexible cables*
- EN 60068-2-6:2008, *Environmental testing — Part 2-6: Tests — Tests Fc: Vibration (sinusoidal) (IEC 60068-2-6:2007)*
- EN 60068-2-14:2009, *Environmental testing — Part 2-14: Tests — Test N: Change of temperature (IEC 60068-2-14:2009)*

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EN 60068-2-27:2009, *Environmental testing — Part 2: Tests — Test Ea and guidance: Shock* (IEC 60068-2-27:2008)

EN 60068-2-29:1993, *Basic environmental testing procedures — Part 2: Tests — Test Eb and guidance: Bump* (IEC 60068-2-29:1987)

EN 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials* (IEC 60112:2003)

EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements* (IEC 60204-1:2005, modified)

EN 60204-32, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines* (IEC 60204-32:2008)

EN 60664-1:2007, *Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests* (IEC 60664-1:2007)

EN 60747-5-1:1997, *Discrete semiconductor devices and integrated circuits — Part 5-1: Optoelectronic devices — General* (IEC 60747-5-1:1997)

EN 60747-5-2, *Discrete semiconductor devices and integrated circuits — Part 5-2: Optoelectronic devices — Essential ratings and characteristics* (IEC 60747-5-2:1997)

EN 60947-4-1:2001, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters; Electromechanical contactors and motor-starters* (IEC 60947-4-1:2000) (including EN 60947-4-1:2001/A1:2002)

EN 60947-5-1:2004, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements — Electromechanical control circuit devices* (IEC 60947-5-1:2003)

EN 60950 (all parts), *Information technology equipment — Safety* <https://standards.iteh.ai/catalog/standards/sist/34397f20-5b63-4a91-b827-3c939c0785ba/sist-en-81-31-2010>

EN 61249-2 (all sub-parts), *Materials for printed boards and other interconnecting structures — Part 2: Reinforced base materials, clad and unclad* (IEC 61249-2 (all sub-parts))

EN 61558-1:2005, *Safety of power transformers, power supplies, reactors and similar products — Part 1: General requirements and tests* (IEC 61558-1:2005)

EN 62326-1:2002, *Printed boards — Part 1: Generic specification* (IEC 62326-1:2002)

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology* (ISO 12100-1:2003)

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles* (ISO 12100-2:2003)

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs* (ISO 13857:2008)

EN ISO 14121-1:2007, *Safety of machinery — Risk assessment — Part 1: Principles* (ISO 14121-1:2007)

EN ISO 14122-3, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails* (ISO 14122-3:2001)

ISO 1219-1, *Fluid power systems and components — Graphic symbols and circuit diagrams — Part 1: Graphic symbols for conventional use and data-processing applications*

ISO 6403:1988, *Hydraulic fluid power — Valves controlling flow and pressure — Test methods*

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 (IEC 60227-3:1993, modified)*

HD 21.4 S2:1990, *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) (IEC 60227-5:1979, modified)*

HD 22.4 S4:2004, *Cables of rated voltages up to and including 450/750 V and having crosslinked insulation — Part 4: Cords and flexible cables*

HD 360 S2, *Circular rubber insulated lift cables for normal use*

HD 60364-5-54:2007, *Low-voltage electrical installations — Part 5-54: Selection and erection of electrical equipment — Earthing arrangement and protective bonding conductors (IEC 60364-5-54:2002, modified)*

### 3 Terms, definitions, units and symbols

#### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100-1:2003 and the following apply.

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##### 3.1.1

##### **accessible goods only lift**

**fr** monte charge accessible

**de** betretbarer 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

##### **apron**

**fr** garde-pieds

**de** 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**

**fr** surface utile de la cabine

**de** 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**

**fr** masse d'équilibrage

**de** 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**

**fr** amortisseur

**de** Puffer

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

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## 3.1.6

**clamping device**

fr dispositif de blocage

de Klemmvorrichtung

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, by gripping the ram

## 3.1.7

**counterweight**

fr contrepoids

de Gegengewicht

mass which ensures traction

## 3.1.8

**direct acting accessible goods only lift**

fr monte charge accessible à action directe

de direkt angetriebener Aufzug

hydraulic accessible goods only lift where the means of driving is directly attached to the load carrying unit or its sling

## 3.1.9

**dissipation type buffer**

fr amortisseur à dissipation d'énergie

de Energie verzehrende Puffer

buffer that disperses the energy of a moving mass within defined levels of deceleration

## 3.1.10

**down direction valve**

fr soupape descente

de Abwärtsventil

electrically controlled valve in a hydraulic circuit for controlling the descent of the load carrying unit

## 3.1.11

**electric safety chain**

fr chaîne électrique des sécurités

de elektrische Sicherheitskette

total of the electric safety devices connected in series

## 3.1.12

**full load pressure**

fr pression à pleine charge

de Druck bei Volllast

static pressure exerted on the piping directly connected to the jack, the load carrying unit with the rated load being at rest at the highest landing level

## 3.1.13

**guide rails**

fr guides

de Führungsschienen

rigid components which provide guiding for the load carrying unit or the counterweight or the balancing weight, if there is one

## 3.1.14

**headroom**

fr partie supérieure de la gaine

de Schachtkopf

part of the well between the highest landing served by the load carrying unit and the ceiling of the well

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**3.1.15****hydraulic accessible goods only lift****fr** monte charge accessible hydraulique**de** hydraulisch betriebener betretbarer Güteraufzug

accessible goods only lift in which the lifting power is derived from an electrically driven pump transmitting hydraulic fluid to a jack, acting directly or indirectly on the load carrying unit (multiple motors, pumps and/or jacks may be used)

**3.1.16****hydraulic buffer****fr** amortisseur hydraulique**de** hydraulischer Puffer

buffer that uses hydraulic fluid as a means to dissipate energy

**3.1.17****indirect acting accessible goods only lift****fr** monte charge accessible à action indirecte**de** indirekt angetriebener betretbarer Güteraufzug

hydraulic accessible goods only lift where the means of driving is connected to the load carrying unit or its sling by suspension means (e.g. ropes, chains, belts)

**3.1.18****instantaneous safety gear****fr** parachute à prise instantanée**de** Sperrfangvorrichtung

safety gear in which the full gripping action on the guide rails is almost immediate

**3.1.19****jack****fr** vérin**de** Heber

combination of a cylinder and a ram forming a hydraulic actuating unit

**3.1.20****levelling****fr** nivelage**de** Einfahren

operation which improves the accuracy of stopping at landings

**3.1.21****lift machine****fr** machine**de** Triebwerk

unit which drives and stops the load carrying unit

**3.1.22****load carrying unit****fr** unité de transport**de** Lastträger

part of the accessible goods only lift which carries the loads

**3.1.23****machine room****fr** local de machines**de** Triebwerksraum

room in which machine or machines and/or the associated equipment are placed

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