



SLOVENSKI STANDARD

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Nadomešča:

SIST EN 81-21:2009+A1:2012

Varnostna pravila za konstruiranje in vgradnjo dvigal (liftov) - Dvigala za prevoz oseb in blaga - 21. del: Nova osebna in tovorno-osebna dvigala v obstoječih stavbah

Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 21: New passenger and goods passenger lifts in existing building

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Sicherheitsregeln für die Konstruktion und den Einbau von Aufzügen - Aufzüge für die Personen- und Gütertransport - Teil 21: Neue Personen- und Lastenaufzüge in bestehenden Gebäuden

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Règles de sécurité pour la construction et l'installation des élévateurs - Elévateur pour le transport de personnes et d'objets - Partie 21 : Ascenseurs et ascenseurs de charge neufs dans les bâtiments existants

Ta slovenski standard je istoveten z: EN 81-21:2018

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91.140.90 Dvigala. Tekoče stopnice Lifts. Escalators

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EUROPEAN STANDARD
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English Version

**Safety rules for the construction and installation of lifts -
Lifts for the transport of persons and goods - Part 21: New
passenger and goods passenger lifts in existing building**

Règles de sécurité pour la construction et l'installation
des élévateurs - Elévateur pour le transport de
personnes et d'objets - Partie 21 : Ascenseurs et
ascenseurs de charge neufs dans les bâtiments
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Sicherheitsregeln für die Konstruktion und den Einbau
von Aufzügen - Aufzüge für den Personen- und
Gütertransport - Teil 21: Neue Personen- und
Lastenaufzüge in bestehenden Gebäuden

This European Standard was approved by CEN on 11 May 2017.

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-CENELEC Management Centre or to any CEN member.

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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-CENELEC Management Centre has the same status as the official versions.

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

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EN 81-21:2018 (E)**European foreword**

This document (EN 81-21:2018) 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 September 2018 and conflicting national standards shall be withdrawn at the latest by September 2018.

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

This document supersedes EN 81-21:2009+A1:2012.

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.

The main changes with respect to the previous edition (EN 81-21:2009+A1:2012) are as follows:

- updating of references and their associated requirements with regard to EN 81-20:2014;
- removal of duplicated text in reference to the requirements for refuge spaces expressed in EN 81-20:2014;
- replacement of Annex ZA with regard to the commission mandate M/549/C(2016) 5844 Final and Directive 2014/33/EU.

This standard is part of the EN 81 series of standards “*Safety rules for the construction and installation of lifts*”. This is the second edition.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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

When provisions of this type C standard are different from those 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.

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

Where one or several requirements in EN 81-20:2014 cannot be fulfilled, due to reasons such as the constraints of the structure of the existing building, the corresponding requirements in this European Standard apply. According to section 2.2 of Annex I to the Lifts Directive, the application of alternative measures to prevent the risk of crushing above and underneath the lift car is restricted to installations where the requirement for free space or refuge is impossible to fulfil and may be subject to prior approval by national authorities.

The main concern dealt with in this standard is the reduction of top and pit clearances that may be required due to site conditions. The adopted principle of safety is based on two levels of achievement: first by means of an electrical stopping of the lift car, then by means of a mechanical stopping of the lift car.

When drafting this standard, it has been considered for reduced overhead and pit the following:

- a) Risk reduction measures that rely solely on operations in compliance with procedures are considered as not acceptable, except in a few situations in which mistake-proof solutions are not available (e.g. some activities in repair and installation in which safety devices cannot be operational);
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- b) The risk reduction measures are automatically (without any intervention) activated, or may be manually activated if mistake-proof-by-design, or a combination of both is used.

EN 81-21:2018 (E)**1 Scope**

This European Standard specifies the safety rules related to new passenger and goods/passenger lifts permanently installed in existing buildings where in some circumstances due to limitations enforced by building constraints, some requirements of EN 81-20:2014 cannot be met.

This European Standard addresses a number of these constraints and gives requirements for alternative solutions. It will be read and applied in conjunction with the European Standard EN 81-20:2014.

This European Standard covers:

- either the construction and installation of one or more complete new lift(s) including new well and machinery spaces in an existing building; or
- the replacement of one or more existing lift(s) by new ones in existing well(s) and machinery spaces.

This European Standard does not cover:

- replacement or modifications of some parts to a lift already installed;
- other applications outside of the scope of EN 81-20:2014.

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2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 81-20:2014 *Safety rules for the construction and installation of lifts - Lifts for the transport of persons and goods - Part 20: Passenger and goods passenger lifts*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

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

ISO 3864-1:2011, *Graphical symbols - Safety colours and safety signs - Part 1: Design principles for safety signs and safety markings*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN 81-20:2014 and the following apply.

3.1 existing building

building, which is used or was already used before the order for the lift was placed

Note 1 to entry: A building whose internal structure is completely renewed is considered as a new building.

3.2

movable stop

mechanical device that under normal operation allows the free movement of the lift between normal terminal stops

Note 1 to entry: Where a person enters on the car roof or in the pit, the device limits the travel of the car to ensure sufficient refuge space in the headroom or in the pit.

3.3

triggering device

device for operating a stopping gear by a mechanical linkage when the lift car passes a predetermined position in the well

Note 1 to entry: This device is activated when an access to the lift well is opened by means of a key.

3.4

stopping gear

mechanical device for stopping, and maintaining stationary the lift car in the case of movement of the lift car above and/or below a predetermined position in the well to protect person(s) on the car roof and/or in the pit

3.5

pre-triggered stopping system

system including the triggering device, the stopping gear and a mechanical linkage in between

Note 1 to entry: Under normal operation of the lift, the system allows the free movement of the lift between normal terminal stops. Where a person enters on the car roof or in the pit the system ensures refuge spaces in the headroom or in the pit.

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4 List of significant hazards

This clause contains a list of 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 machinery and which require action to eliminate or reduce the risk (see Table 1).

Table 1 — List of significant hazards

No	Hazards as listed in Annex B of EN ISO 12100:2010	Relevant clauses in this standard
1	Mechanical hazards due to: - Machine parts or work pieces, e.g.: - Accumulation of energy inside the machinery, e.g.:	
	Crushing hazard	5.5, 5.7
	Shearing hazard	5.2 a), 5.4.2
	Drawing-in or trapping hazard	5.5.3, 5.7.3
	Impact hazard	5.3, 5.4.3, 5.9, 5.10, 5.11, 5.12.
	Slip, trip and fall of persons (related to machinery)	5.2 b), 5.4.2, 5.8
	- Uncontrolled amplitude of movements	5.4.1, 5.4.3
	- From insufficient mechanical strength of parts	5.5.2.3.2 d), 5.6.1.2 a), 5.7.2.3.2 d), 5.8.1
	- Falling of person from person carrier	5.6, 5.8.1
8	Hazards generated by neglecting ergonomic principles in machinery design as, e.g. hazards from:	
	Access	5.4.2 d), 5.9, 5.10, 5.11, 5.12
	Inadequate local lighting	5.4.2 h), 5.4.2 i)
	Unhealthy postures	5.5.1
	Human error, human behaviour	5.5.4, 5.7.4, 7.2
	From abnormal conditions of assembly / testing / use / maintenance	5.4, 5.5, 5.6, 5.7, 5.8
9	Hazards associated with the environment in which the machine is used	
	Failure of the power supply	5.5.2.5.1.1, 5.5.3.1, 5.5.3.2, 5.7.2.5.1.1, 5.7.3.1, 5.7.3.2
	Failure of the control circuit	5.5, 5.7
	Unexpected start-up, unexpected overrun / overspeed (or any similar malfunction) from;	
	- Restoration of energy supply after an interruption	5.5.4, 5.7.4

5 Safety requirements and/or protective measures

5.1 General

Lifts within the scope of this standard shall comply with the relevant safety requirements and/or protective measures of the following clauses where one or several requirements in EN 81-20:2014 cannot be fulfilled. In addition, the lift shall be designed according to the principles of EN ISO 12100:2010 for relevant but not significant hazards, which are not dealt with by this standard.

5.2 Perforate wall of the lift well

The requirements for the well enclosure of EN 81-20:2014, 5.2.5.2 are complemented by the following:

Any existing well enclosure may be perforate provided that

- a) EN ISO 13857:2008, 4.2.4.2 is fulfilled; and
- b) a protective imperforate screen shall be provided around the landing door locking devices in order to prevent any manipulation of the locking devices by means of a rigid rod 0,30 m long.

NOTE National regulations for the preservation of historical buildings may require the retention of an existing perforate enclosure.

5.3 Distance between car, counterweight or balancing weight

The requirements of EN 81-20:2014, 5.2.5.5.1 h) for this distance may be replaced by the following:

The car and its associated components shall be at a distance of at least 25 mm from the counterweight or balancing weight (if there is one) and its associated components.

To avoid any impact between the car (and its associated components) and the counterweight or balancing weight (and its associated components), in case of failure of normal guidance, emergency guidance on the car and counterweight shall be provided to maintain the car and the counterweight in their horizontal position.

5.4 Counterweight or balancing weight in a separate well

5.4.1 General

The counterweight or the balancing weight may be installed in a separate well from the car, provided that the configuration on site does not permit the installation of a lift having an available car area sufficient to fulfil the transport needs.

NOTE The standard covers only the installation of one counterweight (or balancing weight) in its own well.

The following requirements shall be met.

5.4.2 Counterweight or balancing weight well provisions

The requirements of EN 81-20:2014, 5.2.5.1.2 are complemented as follows:

In case of a separate well for the counterweight/balancing weight the following requirements apply:

- a) all requirements related to the totally enclosed well (EN 81-20:2014, 5.2.1.8 and 5.2.5.2) shall be fulfilled for the well of the counterweight/balancing weight;
- b) inspection doors shall be provided at both ends of the separate well and where necessary between them to allow safe maintenance and examinations of the well equipment; they shall comply with EN 81-20:2014, 5.2.3;

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- c) the distance between inspection doors and equipment requiring maintenance or inspection shall not exceed 0,7 m;
- d) where a safety gear is installed at the counterweight/balancing weight, inspection doors shall provide access to be able to inspect and maintain the full travel of the counterweight/balancing weight;
- e) stopping device(s) accessible on opening the inspection doors at both ends of the separate well shall be provided, in conformity with the requirements of EN 81-20:2014, 5.12.1.11;
- f) electric socket outlets accessible on opening the inspection doors at both ends of the well shall be provided as defined in EN 81-20:2014, 5.10.7.2;
- g) the separate well shall be exclusively used for the lift in compliance with EN 81-20:2014, 5.2.1.2;
- h) the separate well shall be provided with permanently installed electric lighting, giving an intensity of at least 50 lux on the equipment requiring maintenance/inspection;
- i) means to switch the separate well lighting shall be provided on opening the inspection door at the lower end of the well.

5.4.3 Guiding of the counterweight or balancing weight

The requirements of EN 81-20:2014, 5.7.1 are supplemented as follows:

When travelling in a separate well, the counterweight or the balancing weight may be guided by ropes or by the shape of the counterweight or the balancing weight and its well enclosure.

If the counterweight or balancing weight is resting on its buffers it shall be kept in a substantially upright position by the use of a small distance to the well enclosure or an emergency guiding.

Provisions shall be made so as to avoid the counterweight or the balancing weight to rotate, e.g. by using equal number of left and right twisted suspension ropes.

Where its shape guides the counterweight or balancing weight, the enclosure of the well shall be continuous and flush without any protrusion from which the counterweight or the balancing weight can be blocked. The well enclosure shall be covered by durable material.

In case of ropes as guiding elements a minimum number of 4 ropes shall be used. Springs or weights shall tighten the ropes. The horizontal free distance between the counterweight or the balancing weight and the well enclosure shall be at least 50 mm if the enclosure of the well is continuous and flush otherwise it shall be increased by 2 mm for each meter of distance between the fixations of the ropes.

5.5 Reduced clearances in the headroom**5.5.1 General**

The requirements of EN 81-20:2014, 5.2.5.7 may be replaced by the following:

5.5.2 Devices providing refuge spaces in the headroom**5.5.2.1 General**

The devices shall be:

- a) either movable stops; or
- b) a pre-triggered stopping system.