SLOVENSKI STANDARD
SIST EN 1570-2:2017

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Varnostne zahteve za dvižne mize - 2. del: Dvižne mize za dvigovanje do več kot dveh stalnih nivojev v stavbi, katerih hitrost navpičnega dvigovanja ne presega 0,15 m/s

Safety requirements for lifting tables - Part 2: Lifting tables serving more than 2 fixed landings of a building, for lifting goods with a vertical travel speed not exceeding 0,15 m/s

Sicherheitsanforderungen an Hubtische - Teil 2: Hubtische zum Heben von Gütern, die mehr als 2 Haltestellen eines Gebäudes anfahren und deren Hubgeschwindigkeit 0,15 m/s nicht überschreitet

Prescriptions des tables élévatrices - Partie 2: Tables élévatrices desservant plus de deux paliers fixes d'un bâtiment utilisées pour transporter des marchandises et dont la vitesse ne dépasse pas 0,15 m/s

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EUROPEAN STANDARD
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English Version

Safety requirements for lifting tables - Part 2: Lifting tables serving more than 2 fixed landings of a building, for lifting goods with a vertical travel speed not exceeding 0,15 m/s

Prescriptions de sécurité des tables élévatrices - Partie 2 : Tables élévatrices desservant plus de deux paliers fixes d'un bâtiment utilisées pour transporter des marchandises et dont la vitesse ne dépasse pas 0,15 m/s

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This European Standard was approved by CEN on 27 August 2016.

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.

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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Contents

Page

European foreword

This document (EN 1570-2:2016) has been prepared by Technical Committee CEN/TC 10 “Lilts, 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 May 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the essential requirements of 2006/42/EU.

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.

For the relationship with EU Directive, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard document was drafted as a design guidance manual to provide a means of achieving conformance to the essential safety requirements stipulated under Machinery Directive 2006/42/EC.

The machines concerned and the extent to which hazards, hazardous situations and hazardous incidents are covered are indicated in the scope of this European Standard. In addition, the machines should be designed according to the principles of EN ISO 12100 for relevant but non significant hazards, which are not dealt with in this standard.

As lifting tables are used in a wide range of applications, it is equally necessary to perform individual risk assessments in accordance with EN ISO 12100 for the actual operating conditions.

Products sold indirectly to end-users should be built to cover all the risks related to the use and all conditions foreseeable by the manufacturer, as described in the instruction manual.

Where the text gives an example of a safety measure for the purposes of greater clarity, this should not be considered as the only possible solution. Any other solution leading to the same risk reduction is permissible if an equivalent or increased level of safety is achieved.

While drafting this European Standard document, it was assumed that:

- the lifting tables are only operated by persons trained in using the equipment in accordance with the manufacturer's instructions, and that the working area is adequately lit;
- the lifting tables are installed on hard-standing, even, appropriately prepared surfaces.
- where there are special requirements on low noise levels, such as for hospital applications and theatres etc., the customer should specify these requirements and the manufacturer should then take all appropriate measures.

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.

1 Scope

1.1 This European Standard specifies the safety requirements applicable to lifting tables presenting the following characteristics:

— serving more than two fixed landings of a construction;

— able to pass landings;

— designed exclusively for lifting or lowering goods and not persons;

— only accessible to persons during the loading/unloading phases;

— with a travel speed of no more than 0,15 m/s;

— permanently installed.

1.2 This European Standard deals with all significant hazards pertinent, with the exception of noise, to lifting tables when used as intended and under the conditions foreseen by the manufacturer (see Clause 4). This European Standard specifies the appropriate technical measures for eliminating and reducing the risks arising from the significant hazards.

1.3 This European Standard does not apply to the following equipment:

— permanently installed lifting tables serving specific levels of a construction, with a vertical travel speed exceeding 0,15 m/s (EN 81-31);

— lifting tables serving not more than two fixed landings of a construction (EN 1570-1);

— lifting tables, serving more than 2 fixed landings of a construction for lifting operators, with a vertical travel speed not exceeding 0,15 m/s;

— lifting tables carrying operators and installed in enclosures with a vertical travel speed not exceeding 0,15 m/s;

— lifting tables used on ships;

— lifting tables designed for artists and stage set features during artistic performances;

— lifting tables driven by pusher chains.

1.4 This European Standard does not establish the additional requirements for:

— electromagnetic compatibility;

— operation in severe conditions (e.g. extreme climates, freezer applications, strong magnetic fields);

— operation subject to special rules (e.g. potentially explosive atmospheres, mines);

— handling of loads, the nature of which could lead to dangerous situations (e.g. molten metal, acids, radiating materials, particularly brittle loads, loose loads (gravel, tubes));

— hazards occurring during construction, transportation and disposal;

— equipment installed on the load platform or the replacing or maintaining of it;

— integration into broader systems or other machines, etc.;

— cable-less controls;

— lifting tables where the hydraulic pressure is derived directly from gas pressure;

— lifting tables powered by internal combustion engines.

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 349:1993+A1:2008, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body*

EN 13001 (all parts), *Cranes - General design*

EN 60204-1:2006[1], *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60224-1:2005, modified)*

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

EN 60529:1991[2], *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60947-5-1:2004,[3] *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices (IEC 60947-5-1:2003)*

EN 60947-5-3:2013, *Low-voltage switchgear and controlgear - Part 5-3: Control circuit devices and switching elements - Requirements for proximity devices with defined behaviour under fault conditions (PDDB) (IEC 60947-5-3:2013)*

EN 61310-2:2008, *Safety of machinery - Indication, marking and actuation - Part 2: Requirements for marking (IEC 61310:2007)*

EN 61496-1:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1:2012)*

EN 61496-2:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 2: Particular requirements for equipment using active opto-electronic protective devices (AOPDs) (IEC 61496-2:2013)*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

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

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[1] As impacted by EN 60204-1:2006/A1:2009.

[2] As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013

[3] As impacted by EN 60947-5-1:2004/A1:2009

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

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 14119:2013, *Safety of machinery - Interlocking devices associated with guards - Principles for design and selection (ISO 14119:2013)*

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

ISO 606:2015, *Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets*

ISO 4347:2015, *Leaf chains, clevises and sheaves — Dimensions, measuring forces, tensile strengths and dynamic strengths*

3 Terms and definitions

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

3.1
lifting table
load-lifting device with a load-supporting platform rigidly guided throughout its travel (e.g. a scissor lift)

3.2
fixed landing
permanent level of the construction for loading and unloading the lifting table

3.3
platform
part of the lifting table designed to accommodate the working load; fork arms are considered as a load platform for goods only

3.4
vertical travel
vertical distance between the lowest and highest fixed landing for which the lifting table is designed

3.5
rated load
load that the manufacturer has stated that the machine is capable of lifting/lowering when used in accordance with the instruction handbook

3.6
guard
part of the machine specifically used to provide protection by means of a physical barrier

3.7
emergency stop control
component of emergency stop equipment which generates the emergency stop signal when the associated manual control (actuator) is operated

3.8
operator
person who is trained to operate the lifting table, according to the manufacturer's instructions

3.9
maximum working pressure
highest pressure in the hydraulic system at which it is intended to operate under normal working conditions with rated load

3.10
travel zone
space through which the lifting mechanism, platform and any attachment to it, moves

3.11
restricted area
area to which access is restricted only to persons who are authorized to be in that area, and not accessible to the public

3.12
public area
areas to which the public have access

3.13
travel speed
average lifting and lowering speed of the platform when measured throughout its normal travel range

3.14
screen
permanent protection from access to the hazard for the whole body, also called distance guards in EN ISO 14120:2015

3.15
guard-rail
device for protection against accidental fall or accidental access to a hazardous area, with which stairs, step ladders, landing or platforms and walkways (level surface used for moving from one point to another) may be equipped

3.16
enclosure
permanent protection where the whole of the travel zone is protected with rigid panels to make the lifting table inaccessible whilst in operation

3.17
automatic programmable controlled lifting table
lifting table designed for the lifting of goods only, where movement that takes place is not initiated by hold-to run manual controls

3.18
toe guard
vertical component extending downwards from the platform entrance

3.19
gate
opening part of the protection means, to give access from a fixed landing to the platform (e.g. barrier, door, vertical hinged, sliding…)

4 List of hazards

The table that contains all the significant hazards, hazardous situations and events, identified by risk assessment significant for lifting tables and for which require action to eliminate or reduce the risk is in Annex C.

5 Safety requirements and/or protective measures

5.1 General

Lifting tables shall comply with the safety requirements and/or protective measures within this clause. In addition, the lifting table shall be designed according to the principles of EN ISO 12100 for relevant but insignificant hazards, which are not dealt with by this standard.

5.2 Calculations

5.2.1 Stresses

5.2.1.1 The lifting table shall be designed in accordance with known standard calculation rules (e.g. EN 13001, all parts) and good engineering practices, and all equipment failure modes shall be taken into account, including fatigue failure.

5.2.1.2 The stresses in any part of the lifting table assessed using the permissible stress method shall not, under normal working conditions, exceed the lowest of the following values:

a) 0,66 times the yield stress of the material used; or

b) 0,50 times the ultimate tensile stress of the material used.

5.2.1.3 The stresses shall be calculated for a lifting table carrying its rated load and being used in compliance with the manufacturer's instructions.

The loads shall include all real static and dynamic forces, both vertical and horizontal, all wind forces, and all forces applied to the platform during loading and unloading.

5.2.1.4 The minimum dynamic forces to be used for the calculations set out under 5.2.1.3 shall result from:

a) the total vertical load (this includes the rated load and the self-weight of the moving parts of the structure) increased by the dynamic factor for the category of lift shown in Table 1; and

b) the horizontal load coefficient for the category of lift shown in Table 1, taken as acting horizontally at the platform level in the direction causing the maximum stress in the part being considered.

Table 1 — Load factors for lifting tables

Lift category	Dynamic factor	Horizontal load coefficient [in % of the rated load]	Lifetime [b] minimum load cycles under full load [x10³]	Examples of use (informative)
1	1,4	10 %	128[a]	Lifting tables for general purpose.
2	1,1	2,5 %	8	Lifting tables with a clearly defined lifting load and where other forces can be excluded; height adjustment without systematic lateral forces.
3	1,2	5,0 %	32	Not applicable
4	1,3	10 %	128	Lifting tables suited for crossing with, e.g. manually operated industrial trucks, electric pallet-stacking trucks with a maximum braking of 10 %. Lifting tables with mounted gravity conveyors.
5	1,4	10 %	512	Lifting tables suited for a high number of cycles
When a lifting table is crossed by vehicles, or is integrated in a handling device, the lateral forces have to be verified in individual cases. Higher horizontal load coefficients have to be established if required.				

a This minimum number of cycles shall be increased by the manufacturer according to the use of the lifting table.

b When used (load cycle) according to lifting categories, the lifetime of lifting tables is generally 10 years when maintained in accordance with the manufacturer's instructions.

NOTE 1 If permanent protection prevents loading or unloading across a side, or other means prevent movement of the platform in a particular direction, the horizontal load coefficient in this direction need not be considered.

NOTE 2 Lifting tables are classified in 5 categories (called lift category) depending on the use for which it is designed. The dynamic factor, horizontal load coefficient and number of cycles used in the design calculations are defined in Table 1.

5.2.1.5 It shall be possible for the forces produced when the mechanical safety device is operated, to be accepted without permanent deformation of the normal load bearing parts, when used in accordance with the manufacturer's instructions.

5.2.2 Platform deflection

All lifting tables shall be designed to meet the following minimum requirements:

a) in one case, lift half the rated load distributed over half the length or longest side of the platform;

b) and in another case, lift one third of the rated load distributed over half the width or shortest side of the platform.