SLOVENSKI STANDARD
oSIST prEN 528:2019

01-oktober-2019

Regalna dvigala in oprema - Varnostne zahteve

Rail dependent storage and retrieval equipment - Safety requirements for S/R machines

Regalbediengeräte - Sicherheitsanforderungen

Transtockeurs - Prescriptions de sécurité

Ta slovenski standard je istoveten z: **prEN 528**

ICS:

53.080	Skladiščna oprema	Storage equipment

oSIST prEN 528:2019 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 528

August 2019

ICS 53.080

Will supersede EN 528:2008

English Version

Rail dependent storage and retrieval equipment - Safety requirements for S/R machines

Transtockeurs - Prescriptions de sécurité

Regalbediengeräte - Sicherheitsanforderungen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 149.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

CEN members are the national standards bodies of 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (prEN 528:2019) has been prepared by Technical Committee CEN/TC 149 “Power-operated warehouse equipment”, the secretariat of which is held by DIN.

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.

This document supersedes EN 528:2008.

The main changes compared to the previous edition EN 528:2008 are as follows:

— clearer / more understandable Annex C dealing with preventing access to dangerous movements across the load entry/exit points;

— Annex ZA has been updated by introducing the generic template for Annex ZA amended in accordance with decision of EU commission;

— revision and adaption of Annex B Performance level according to EN ISO 13849-1:2015;

— the scope has been stated more precisely;

— more readable and clearer text in standard due to avoidness of separate chapters for automatic and manual machine;

— amendment or rather change of the following definitions (3):

  — on-board control position (3.4), permanent on-board control position (3.5), powered access cabin (3.6), climb assistance system (3.7), rated speed (3.13), normal operation (3.19), satellite vehicle (3.20), load entry / exit points (3.21), working place (3.22), pick and deposit (P&D) station (3.24), restricted area (3.25), danger area (3.27);

— speed limitation (4.9.4) has been updated and been stated more precisely;

— an additional braking system is required if the end stops (e.g. buffers) are designed for a speed less than 70 % of the rated speed (4.5.1.3);

— where a powered access cabin is provided, it shall comply with the requirements for control positions (4.9.7.1);

— for detachable ladders on the lift mast a fall arrest system is required from a height of 3m onwards (4.9.7);

— safety gear required for lifting carriages, that are designed to carry person(s) (4.4.4.1);

— the ratio of the minimum breaking force to the maximum static force for all types of suspension elements to the lifting of persons has been reduced from 10 to 8 (4.4.5);

— requirements for additional person(s) on the lifting carriage has been stated more precisely (4.9.2.1);

— ladder along the mast shall be fitted with a guided type of a fall arresters according with EN 353-1:2014+A1:2017 and anchor devices Class 1 of EN 795:2012 at the transition points (4.9.3);

— prevention against load falling into adjacent automatically operated aisles: Safety level (PL_r) is not more depending on the frequency of access to the aisle (4.10.8.1);

— physical safety backstops must be dimensioned according to the loads that occur (4.10.8);

— information on the planned dismantling of the installation is required in information for use (6.8).

Introduction

This document is a type C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulars, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises).

The above-mentioned stakeholder groups have been given possibility to participate at the drafting process of this document.

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

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

While producing this standard, it was assumed that:

a) only competent persons operate the machine;

b) components without specific requirements are:

   1) designed in accordance with the usual engineering practice and calculation codes, including all failure modes;

   2) of suitable mechanical and electrical construction;

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

c) harmful materials, such as asbestos are not used as part of the machine;

d) components are kept in good repair and working order, so that the required characteristics remain despite wear;

e) by design of the load bearing elements, safe operation of the machine is assured for loading ranging from zero to 100 % of the rated possibilities;

f) discussions have taken place between the user and the supplier concerning particular conditions for the use and places of use of the machinery;

g) working area is adequately lit;

h) places of installation allow a safe use of the machine.

1 Scope

This document applies to all types of Storage and Retrieval (S/R) machines, restricted to the rails on which they travel within and outside the aisles for the storage and retrieval of unit loads and/or long goods such as bar materials and/or for order picking or similar duties. These machines shall embody lifting means along a mast and may include lateral handling facilities. Also included is the transfer equipment used to change between aisles. Control of machines may range from manual to fully automatic.

S/R-machine-related satellite vehicles according to definition 3.20 are included as a load-handling-device (LHD).

References in this standard to racking, buildings and systems only apply where it is necessary to assess the hazards and risks at their interfaces with S/R machines.

This document deals with all significant hazards relevant to rail dependent storage and retrieval equipment, when they are used under the conditions intended by the manufacturer including reasonably foreseeable misuse (see Annex F "List of significant hazards")).

This document applies to machines and equipment that are manufactured after the date of issue of this document.

Illustrations of examples of machines and transfer equipment to which this standard applies are shown in Annex A.

Safety requirements and/or measures in this standard apply to equipment used under indoor conditions. However, additional risk assessments and safety measures need to be considered for uses in severe conditions, e.g. extremely high temperatures, loads, the nature of which could lead to a dangerous situation (e.g. especially brittle loads, explosives), earthquake effects and also contact with foodstuff.

This document also deals with the technical requirements for electromagnetic compatibility (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.

EN 81-50:2014, *Safety rules for the construction and installation of lifts — Examinations and tests — Part 50: Design rules, calculations, examinations and tests of lift components*

EN 341:2011, *Personal fall protection equipment — Descender devices for rescue*

EN 353-1:2014+A1:2017, *Personal fall protection equipment — Guided type fall arresters including an anchor line — Part 1: Guided type fall arresters including a rigid anchor line*

EN 358:2018, *Personal protective equipment for work positioning and prevention of falls from a height — Belts and lanyards for work positioning or restraint*

EN 361:2002, *Personal protective equipment against falls from a height — Full body harnesses*

EN 363:2018, *Personal fall protection equipment — Personal fall protection systems*

EN ISO 13851:2019, *Safety of machinery — Two-hand control devices — Principles for design and selection (ISO 13851:2019)*

EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 619:2002+A1:2010, *Continuous handling equipment and systems — Safety and EMC requirements for equipment for mechanical handling of unit loads*

EN 795:2012, *Personal fall protection equipment — Anchor devices*

EN 894-1:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-2:1997+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3:2000+A1:2008, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 12385-4:2002+A1:2008, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications*

EN 13501-1:2018, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

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

EN IEC 61000-6-2:2019, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:2016)*

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

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

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

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

ISO 13050:2014, *Synchronous belt drives — Metric pitch, curvilinear profile systems G, H, R and S, belts and pulleys*

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 13855:2010, *Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

EN ISO 13856-1:2013, *Safety of machinery — Pressure-sensitive protective devices — Part 1: General principles for design and testing of pressure-sensitive mats and pressure-sensitive floors (ISO 13856-1:2013)*

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 14122-1:2016, *Safety of machinery — Permanent means of access to machinery — Part 1: Choice of fixed means and general requirements of access (ISO 14122-1:2016)*

EN ISO 14122-2:2016, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2:2016)*

EN ISO 14122-3:2016, *Safety of machinery — Permanent means of access to machinery — Part 3: Stairs, stepladders and guard-rails (ISO 14122-3:2016)*

EN ISO 14122-4:2016, *Safety of machinery — Permanent means of access to machinery — Part 4: Fixed ladders (ISO 14122-4:2016)*

ISO 16625:2013, *Cranes and hoists — Selection of wire ropes, drums and sheaves*

3 Terms and definitions

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

3.1
control position
every place, from where the machine can be controlled, including external control position (3.2), emergency control position (3.3) and on-board control position (3.4)

3.2
external control position
control position placed in a safe area, out of the working area of the S/R machine, from where the movements of the machine can be controlled

3.3
emergency control position
position on the machine or inside the danger area of the machine, from where the machine can be controlled in case of fault clearing (emergency) or maintenance works

3.4
on-board control position
protected position on the machine, from where the movements of the machine can be controlled (includes permanent on-board-control position as defined in 3.5)

3.5
permanent on-board control position
protected position on the machine, from where the movements of the machine can be controlled, intended to be used by an on-board operator in the normal mode

Note 1 to entry: Permanent on-board control is used e.g. for on-board picking.

3.6
powered access cabin
enclosed cabin moving independently from the lifting carriage along the mast in order to provide access to and egress from the lifting carriage and/or maintenance platforms

Note 1 to entry: The on-board control position may be installed within this powered access cabin.

3.7
climb assistance system
powered device used in conjunction with a full body harness in order to ease climbing by providing a defined lifting force (below person`s weight) along the access ladder

3.8
operators work area
area on or off the machine where order picking, stocktaking or similar work is carried out

3.9
load handling device
part of the machine for carrying the specified loads including (one or more) satellite vehicles, related to the crane

3.10
deterring device
any physical obstacle which, without totally preventing access to a danger area, reduces the probability of access to this zone and indicates the beginning of this zone by offering an obstruction to free access

3.11
rated load
maximum load which the machine has been designed to carry, excluding the mass of operator(s) and any part of the machine

3.12
test load
rated load plus additional load for test purposes

3.13
rated speed
maximum speed of the machine for which it has been designed and for which normal operation is guaranteed by the manufacturer

3.14
safety gear
mechanical device for stopping and maintaining stationary the lifting carriage in case of overspeed in the downward direction

3.15
specified load
load with specified characteristics (mass, dimensions, pallet or container, packaging, etc.) which the machine has been designed to carry

3.16
transfer device
device which is used for transferring a S/R machine from one aisle to another and which is not integral with the S/R machine