SLOVENSKI STANDARD
SIST EN 15512:2021+A1:2022

01-maj-2022

Stabilni jekleni sistemi za skladiščenje - Sistemi za nastavljive regale za palete - Načela dimenzioniranja

Steel static storage systems - Adjustable pallet racking systems - Principles for structural design

Ortsfeste Regalsysteme aus Stahl - Verstellbare Palettenregale - Grundlagen der statischen Bemessung

Systèmes de stockage statiques en acier - Systèmes de rayonnages à palettes réglables - Principes applicables au calcul des structures

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ICS:

53.080	Skladiščna oprema	Storage equipment

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EUROPEAN STANDARD

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English Version

Steel static storage systems - Adjustable pallet racking systems - Principles for structural design

Systèmes de stockage statiques en acier - Systèmes de rayonnages à palettes réglables - Principes applicables au calcul des structures

Ortsfeste Regalsysteme aus Stahl - Verstellbare Palettenregale - Grundlagen der statischen Bemessung

This European Standard was approved by CEN on 8 June 2020 and includes Amendment 1 approved by CEN on 14 January 2022.

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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

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

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European foreword

This document (EN 15512:2020+A1:2022) has been prepared by Technical Committee CEN/TC 344 "Steel static storage systems", the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by September 2022, and conflicting national standards shall be withdrawn at the latest by September 2022.

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 [A1⟩ EN 15512:2020 ⟨A1].

This document includes Amendment 1 approved by CEN on 14 January 2022.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1⟩ ⟨A1].

Compared to EN 15512:2009, the overall document structure has been updated to be more similar to the Eurocode, several clauses were updated to current state of Standards and FEM recommendations, alternative options for testing setups were included. A probabilistic reliability study was carried out to verify reduced load factors were according to Eurocode principles resulting in minor adjustments on the material factors.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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, 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 the United Kingdom.

0 Introduction

0.1 Racking

Racking systems are load bearing structures for the storage of goods in warehouses. The goods to be stored are generally on pallets or in box-containers.

Racking is constructed from steel components including upright frames and beams. Special beam to column (upright) connections and bracing systems are utilized, in order to achieve a three dimensional steel 'sway' or 'braced' structure with "aisles" to enable order pickers, industrial trucks or stacker cranes to reach the storage positions. Although components are standardized, they are only standard to each manufacturer. These components differ from traditional column and beam structures in the following regard:

1) continuous perforated uprights;

2) hook-in connections;

3) structural components for racking generally consist of cold-formed thin gauge members.

0.2 Requirement for EN Standards for racking in addition to the Eurocodes

Because of the differences in shape of structural components, detailing and connection types additional technical information to the Eurocodes are required, in order to have reliable state of the art guidance for the practicing designer involved in designing racking.

The scope of CEN/TC 344 is to establish European Standards providing guidance for the specification, design, methods of installation, accuracy of build and guidance for the user on the safe use of steel static storage systems.

This, together with the need for common design rules was the reason that FEM Racking and Shelving has taken the initiative for CEN/TC 344. CEN/TC 344 is in the course of preparation of a number of European Standards for specific types of racking and shelving.

0.3 Liaison

CEN/TC 344 "Steel Storage Systems" liaise with CEN/TC 250 "Structural Eurocodes", CEN/TC 135 "Execution of steel structures and aluminium structures" and CEN/TC 149 "Power-operated warehouse equipment".

0.4 Racking and Work Equipment regulations

Although racking is a load bearing structure, national regulatory requirements may require that racking be considered as 'work equipment' and therefore may be subject to the European Directive 89/391/EEC. This document is not a standalone document and is intended to be used in conjunction with EN 15620, EN 15629 and EN 15635.

0.5 Additional information specific to EN 15512

EN 15512 is intended to be used with EN 1990, Basis of Structural Design, EN 1991, Actions on structures, and the EN 1993 series for the Design of steel structures.

EN 15512 is intended for use by:

— designers and structural engineers;

— relevant authorities.

Numerical values for partial factors and other reliability parameters are basic values that provide an acceptable level of reliability assuming an appropriate level of workmanship and quality management.

1 Scope

This document specifies the structural design requirements applicable to all types of adjustable beam pallet rack systems fabricated from steel members intended for the storage of unit loads and subject to predominantly static loads. Both un-braced and braced systems are included.

This document gives guidelines for the design of clad rack buildings where requirements are not covered in the EN 1993 series. The requirements of this document also apply to ancillary structures, where rack components are employed as the main structural members.

This document does not cover other generic types of storage structures. Specifically, this document does not apply to mobile storage systems, drive-in, drive-through, pallet live storage, push back, shuttle systems, systems where two or more cranes operates one above another in the same aisle and cantilever racks or static steel shelving systems.

For the specific design of adjustable pallet racking for use in seismic areas, this document is to be used in combination with EN 16681.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1090-4, *Execution of steel structures and aluminium structures — Part 4: Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*

EN 1990, *Eurocode — Basis of structural design*

EN 1991-1-1:2002, *Eurocode 1: Actions on structures — Part 1-1: General actions — Densities, self-weight, imposed loads for buildings*

EN 1992-4, *Eurocode 2 — Design of concrete structures — Part 4: Design of fastenings for use in concrete*

EN 1993-1-1:2005, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 1993-1-3:2006, *Eurocode 3: Design of steel structures — Part 1-3: General rules — Supplementary rules for cold-formed members and sheeting*

EN 1993-1-8:2005, *Eurocode 3: Design of steel structures — Part 1-8: Design of joints*

EN 15620, *Steel static storage systems — Adjustable pallet racking — Tolerances, deformations and clearances*

EN 15629, *Steel static storage systems — Specification of storage equipment*

EN 15635, *Steel static storage systems — Application and maintenance of storage equipment*

EN 16681, *Steel static storage systems — Adjustable pallet racking systems — Principles for seismic design*

EN ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1)*