

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 15512:2009 sisaldab Euroopa standardi EN 15512:2009 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 30.04.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 18.03.2009.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 15512:2009 consists of the English text of the European standard EN 15512:2009.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 30.04.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 18.03.2009.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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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 17 January 2009.

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Foreword

This document (EN 15512:2009) 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of an identical text or by endorsement, at the latest by September 2009, and conflicting national standards shall be withdrawn at the latest by September 2009.

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.

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, 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.

Introduction

0.1 Racking

Racking systems are load bearing structures for the storage and retrieval 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, beams and decking. Special beam to column (upright) connections and bracing systems are utilised, 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 standardised 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 and shelving in addition to the Eurocodes

Because of the differences in shape of structural components, detailing and connection type's 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 harmonised design rules was the reason that the European Racking Federation ERF / 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 and particular applications which exist as European Standards (EN) and working group activities (WG) as follows:

EN 15512: Steel static storage systems - Adjustable pallet racking systems - Principles for structural design.

EN 15620: Steel static storage systems - Adjustable pallet racking - Tolerances, deformations and clearances.

EN 15629: Steel static storage systems - The specification of storage equipment.

EN 15635: Steel static storage systems - The application and maintenance of storage equipment

WG 3c: Terms and Definitions.

WG 4: Technical Principles for the Design of Adjustable Drive-in and Drive-through Racking Systems.

WG 5a: Technical principles for the Design of Pallet Racking Systems in Seismic Regions.

WG 5b: Technical Principles for the Design of Drive-in and Drive-through Racking Systems in Seismic Regions.

WG 6: Technical Principles for the Design of Shelving Systems.

WG 7: Technical Principles for the Design of Cantilever Racking Systems.

WG 8: Technical Principles for the Design of Mobile Racking Systems.

WG 9: Principles of Health and Safety during the installation of Racking Systems.

The intention is for these EN-Series "Racking and Shelving" to be published sequentially over a period of ten years.

In drafting these documents, liaisons with other CEN/TC's will occur as appropriate.

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 Shelving 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 stand alone document and is intended to be used in conjunction with EN15620, 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 EN 1993 for the Design of steel structures.

EN 1993-1 is the first of six parts of EN 1993 – Design of Steel Structures. It gives generic design rules intended to be used with the other parts EN 1993-2 to EN 1993-6. It also gives supplementary rules applicable only to buildings.

EN 1993-1 comprises eleven subparts EN 1993-1-1 to EN 1993-1-11, each addressing specific steel components, limit states or materials.

EN15512 may also be used for design cases not covered by the Eurocodes (other structures, other actions, other materials) serving as a reference document for other CEN TC's concerning structural matters.

EN 15512 is intended for use by

committees drafting design related product, testing and execution standards,

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.

As part of the design process, reference to EN 15629 and EN 15635 shall be required to ensure that both specifier and designer are aware of the interface constraints in each other's responsibility and to allow an effective design to be produced.

1 Scope

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

This European Standard does not cover other generic types of storage structures. Specifically, this European Standard does not apply to mobile storage systems, drive-in, drive-through and cantilever racks or static steel shelving systems, nor does this European Standard establish specific design rules for the assessment of racking in seismic areas.

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 528, *Rail dependent storage and retrieval equipment - Safety*

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 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 10002-1, *Metallic materials - Tensile testing – Part1: Method of test at ambient temperature*

EN 10143, *Continuously hot-dipped coated steel sheet and strip - Tolerances on dimensions and shape*

EN 10162, *Cold rolled steel sections - Technical delivery conditions - Dimensional and cross-sectional tolerances*

EN 10326, *Continuous hot-dip coated strip and sheet of structural steels -Technical delivery conditions*

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

EN 15629, *Steel static storage systems - The specification of storage equipment*

EN 15635, *Steel static storage systems - The application and maintenance of storage equipment*

prEN 15878, *Steel static storage systems - Terms and definitions*

EN ISO 7438, *Metallic materials - Bend test (ISO 7438:2005)*

EN ISO 9001, *Quality management systems - Requirements (ISO 9001:2000)*

ETAG No 001, *Guideline for European Technical Approval of Metal Anchors for Use in Concrete*