



SLOVENSKI STANDARD

oSIST prEN 15620:2020

01-marec-2020

Stabilni jekleni sistemi za skladiščenje - Tolerance, deformacije in prosti prostori

Steel static storage systems - Tolerances, deformations and clearances

Ortsfeste Regalsysteme aus Stahl - Verstellbare Palettenregale - Grenzabweichungen, Verformungen und Freiräume

Systèmes de stockage statiques en acier - Rayonnages à palettes réglables - Tolérances, déformations et jeux

Ta slovenski standard je istoveten z: prEN 15620

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ICS:

53.080

Skladiščna oprema

Storage equipment

oSIST prEN 15620:2020

en,fr,de

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 15620

January 2020

ICS

Will supersede EN 15620:2008

English Version

Steel static storage systems - Tolerances, deformations and clearances

Systèmes de stockage statiques en acier - Rayonnages à palettes réglables - Tolérances, déformations et jeux

Ortsfeste Regalsysteme aus Stahl - Verstellbare Palettenregale - Grenzabweichungen, Verformungen und Freiräume

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 344.

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European foreword

This document (prEN 15620:2020) has been prepared by Technical Committee CEN/TC 344 “Steel static storage systems”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15620:2008.

In this document

- floor tolerances have been removed (reference is made to alternative sources),
- tolerances for Drive-In racking and Cantilever racking have been added,
- tolerances for crane racking have been removed (reference is made to alternative sources),
- the classification system for racking operated by industrial trucks has been removed.

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Introduction

The determination of the safe load bearing capacity of racking is a structural issue and therefore the Eurocodes are relevant, especially EN 1993. The most relevant parts for racking are EN 1993-1-1 and EN 1993-1-3.

In order to have reliable state of the art guidance for those involved in designing these products and due to the differences in the shape of the structural components, detailing and connection types, additional technical information to the Eurocodes is required.

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

This, together with the need for harmonized design rules, was the reason that FEM Product Group Racking and Shelving (FEM R&S) has taken the initiative for the CEN/TC 344. This TC is in the course of preparing a series of European Standards regarding Steel static storage systems.

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1 Scope

This document specifies tolerances, deformations and clearances that pertain to the production, assembly and erection of pallet racking and cantilever racking. These tolerances, deformations and clearances are important in relation to the functional requirements and ensuring the proper interaction of the handling equipment used by personnel, trained and qualified as competent, in association with the specific type of racking system. The interaction conditions are also important in determining the reliability of the storage system to ensure that the chance of mechanical handling equipment impact, pallet impact or a system breakdown is acceptably low. This document, in conjunction with FEM 10.2.14/4.103 and FEM 9.831-1, are essential to the design safety philosophy of EN 15512.

This document is limited to:

- single deep adjustable beam pallet racking operated with industrial trucks,
- single and double deep adjustable beam pallet racking operated with stacker cranes,
- drive-in racking systems operated with industrial trucks,
- cantilever racking systems operated with industrial trucks.

This document does not apply to specialized types of equipment such as automated trucks, miniload, satellite systems, systems involving the use of articulated trucks, trucks using intrusive stacking methods or industrial truck serviced rack-clad buildings.

This document specifically excludes the tolerances and deformation of the industrial trucks, stacker cranes and floors.

It is the responsibility of the specifier in cooperation with the client or user to ensure that the tolerances, deformations and clearances, as quoted in this document are acceptable for safe operation of the overall system considering all factors of influence and the user informed by means such as operation instructions. The specifier may carry out appropriate design/calculations to vary some of the parameters provided that an equivalent safe operation is achieved.

This document gives guidance to be used in conjunction with mechanical handling equipment and floor information.

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 15512, *Steel static storage systems - Adjustable pallet racking systems - Principles for structural design*

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

EN 15635:2008, *Steel static storage systems - Application and maintenance of storage equipment*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15878 and the following apply. ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

racking aisle width

minimum dimension measured across the aisle at the floor and at any beam level between the rack structure

3.2

coordinate positioning

positioning of the storage and retrieval machine using global (x and y) coordinates

3.3

deformation

displacement due to external actions

3.4

gangway / transfer aisle

space for movement or transport which does not give access to the picking or loading faces of the storage racking

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3.5

location fine positioning

local adjustment of the machine with respect to the rack components in the x and/or y directions using sensors on the crane and location devices on the rack

3.6

installer

trained and qualified as competent personnel who assemble and build the racking at the site location

3.7

intrusive stacking

placement or retrieval of a unit load where the turning radius or length of an industrial truck is greater than the operating aisle width and part of the storage location concerned is used by the truck forks and load when turning to place or retrieve a unit load

3.8

mechanical handling equipment

MHE

mechanical or electro-mechanical equipment used to transport, lift, pick and deposit unit loads

3.9

free-movement truck

industrial truck that is free to move in any direction in the aisle and make 90° turns into the rack face for loading and off loading

3.10

upright protector

component to protect the lower part of uprights against accidental impact from mechanical handling equipment. Can be either free-standing or connected to the upright

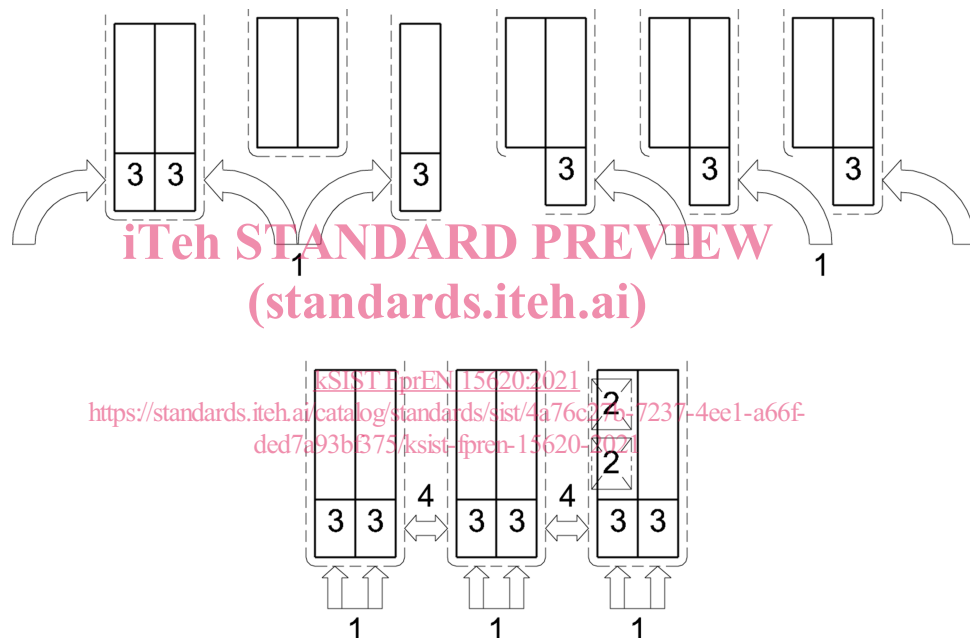
3.11

pick up and deposit station

P & D station

structure at the end of an operating aisle used as an interface between different types of mechanical handling equipment

Note 1 to entry The P and D station as shown in Figure 1 can be used as an interface between the unit load and handling equipment that is dedicated to the rack aisle (such as very narrow aisle trucks or cranes) and the conveyors or free movement trucks which service the installation. The P and D station can also be used to accurately fix the location of the unit load relative to the racking.



Key

- 1 free movement truck access
- 2 unit load positions in the racks
- 3 P and D stations
- 4 very narrow aisle (VNA)

Figure 1 — Example of P and D stations

3.12

racking types

3.12.1

wide aisle racking

pallet racking arranged to leave aisles of sufficient width for use with free-movement trucks

prEN 15620:2020 (E)**3.12.2****narrow aisle racking**

pallet racking arranged in a similar way to wide aisle racking and for use with free-movement trucks, but having aisles of a reduced width for use with more specialist types of industrial truck

3.12.3**very narrow aisle racking****VNA**

pallet racking arranged with aisles of a width to cater only for the truck and the unit load width plus an operational clearance where the truck cannot make 90° turns into the rack face for loading and off loading

3.12.4**crane racking class 100 and 200**

pallet racking operated by a stacker crane running on a rail and stabilised at the top of the mast by a top guide rail

3.12.5**Drive-In Rack****DIR**

system of racking that provides storage where pallets are stored two or more deep and where access is gained by driving an industrial truck into a lane with pallets supported along their sides on beam rails supported from the uprights. In DIR, the industrial truck drives into a lane and reverses out

3.12.6**Drive-Through Rack****DTR**

similar to DIR but in DTR the industrial truck could drive through the lane if there are no pallets in the lane

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Note 1 to entry Drive-Through racking lanes are not designed as access routes through the racking but allow full access for pallets to be placed from either end of the aisle, enabling the first-in first-out logistic principle.

3.13**reference directions**

directions at 90° to each other related to the orientation of the racking

Note 1 to entry The reference directions X, Y and Z are defined in Figure A.1. X is the down aisle direction, Y is the vertical direction and Z is the cross aisle direction.

3.14**specifier**

person or company that provides the supplier with a specification based on the user's requirements

Note 1 to entry The specifier may be a consultant, other specialist, the user or the equipment supplier acting as the specifier.

3.15**stacker crane**

storage and retrieval machine running on a rail and stabilised at the top of the mast by an upper guide rail

3.16**tolerances**

dimensional variations from the nominal dimension or position arising from manufacture, assembly and erection

3.17**user**

company or person who manages and operates the installation on a daily basis and is responsible for the continuing safety of the installation

3.18**cantilever arm**

load-carrying member connected at one end to the cantilever column in the cross-aisle direction

Note 1 to entry: arms can either be fixed or adjustable dependent upon the type of racking.

3.19**cantilever base**

horizontal structural component fixed to the bottom of the cantilever column and to allow load transfer and fixing to the floor

3.20**cantilever column**

vertical member supporting the cantilever arms that can either be single sided or double sided

3.21**double sided cantilever rack**

rack with cantilever arms on two opposite sides of the cantilever column

3.22**single sided cantilever rack**

rack with cantilever arms on one side of the cantilever column only

3.23**cantilever arm end-stop**

bolted or welded up-stand at the ends of cantilever arms or base

Note 1 to entry: can be either fixed or removable

3.24**datum**

reference point, line or plane

4 Racking types**4.1 General**

Erection tolerances, deformations and clearances have been divided into groups to cover the general requirements of the handling equipment. The racking for each group requires a different standard of installation tolerances, deformations and minimum clearances for safe operation. See Annex B for more information on general safety philosophy.

4.2 Class 100, Stacker crane

Pallet racking arranged as for a very narrow aisle system but operated by a stacker crane. The aisles are wide enough only for the stacker crane or load width plus operational clearance as shown in Figure 2.

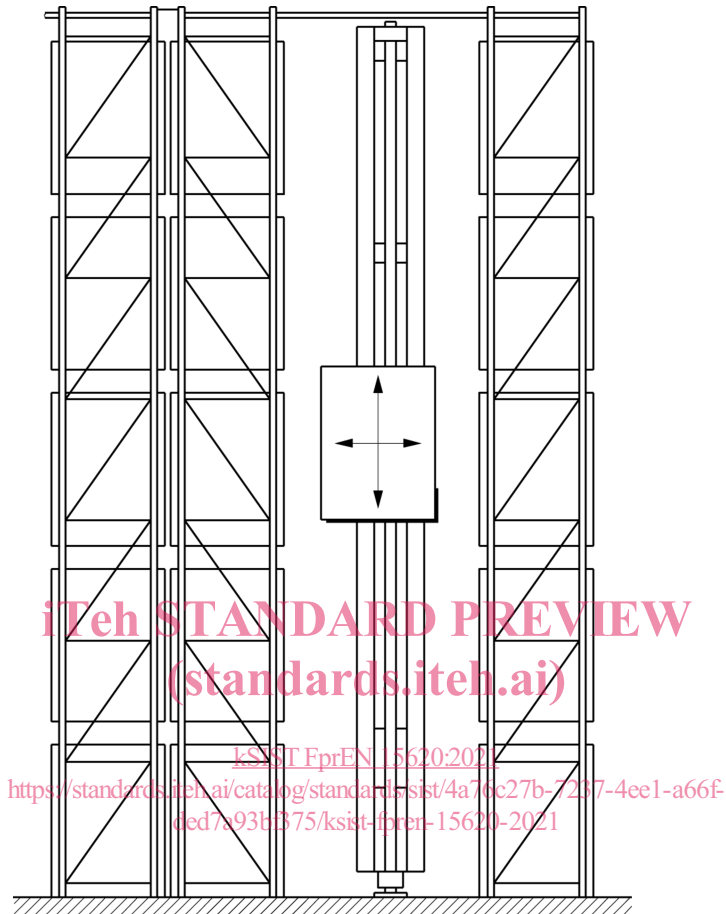


Figure 2 — Crane racking

The stacker cranes are automatically controlled, do not have a fine positioning system at the unit load storage positions and are usually for storage systems up to approximately 18 m in height.

4.3 Class 200, Stacker crane

Crane operated installations where the stacker cranes are automatically controlled and have fine positioning system at the unit load storage positions. Also includes installations where the stacker crane is manually controlled.

4.4 Very narrow aisle

4.4.1 General

Very narrow aisle pallet racking is arranged with aisles of a width to cater only for the truck and the unit load width plus operational clearance as shown in Figure 3.

The unit loads are handled within the aisles without the need for the truck to turn bodily into the rack face.

The trucks are usually guided into and along the aisle length and have fixed or rising cabs.

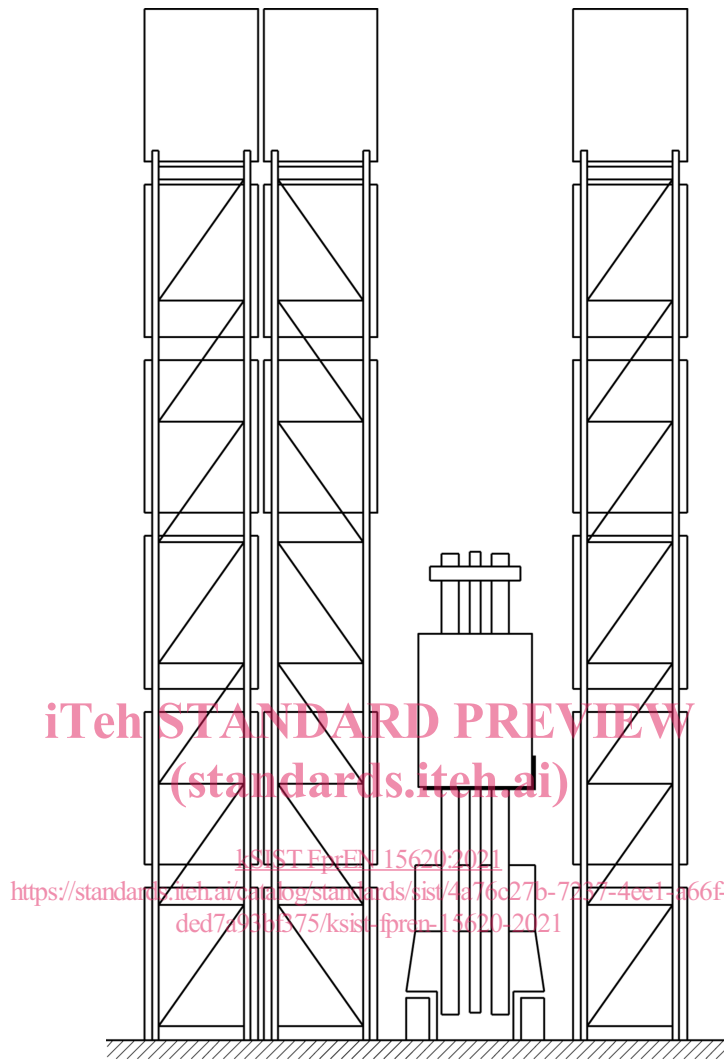


Figure 3 — Very narrow aisle racking

4.4.2 Very narrow aisle (operator up)

Very narrow aisle installations where the truck operator is raised and lowered with the unit load and has manual height adjustment to position the load. Alternatively, the operator remains at ground level and has the use of an indirect visibility aid such as closed circuit television (CCTV) or an equivalent system to guide the operator.

4.4.3 Very narrow aisle (operator down)

Very narrow aisle installations where the truck operator remains at ground level 'man-down' and does not have the use of an indirect visibility aid.

4.4.4 Operation

In VNA operations the maximum stroke of the industrial truck is fixed individually for each application. The tolerances, deformations and clearances given in this document are based on an operational