KRAANAD. ÜLDINE EHITUS. OSA 3-4: MASINATE PIIRSEISUNDID JA KÕLBLIKKUSE TÕENDAMINE. LAAGRID

Cranes - General design - Part 3-4: Limit states and proof of competence of machinery - Bearings

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13001-3-4:2018 sisaldab Euroopa standardi EN 13001-3-4:2018 ingliskeelset teksti.	This Estonian standard EVS-EN 13001-3-4:2018 consists of the English text of the European standard EN 13001-3-4:2018.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 05.12.2018.	Date of Availability of the European standard is 05.12.2018.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 21.100.01, 53.020.20

EUROPEAN STANDARD

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English Version

Cranes - General design - Part 3-4: Limit states and proof of competence of machinery - Bearings

Appareils de levage à charge suspendue - Conception générale - Partie 3-4 : États limites et vérification d'aptitude des éléments de mécanismes - Paliers

Krane - Konstruktion allgemein - Teil 3-4: Grenzzustände und Sicherheitsnachweise für Maschinenbauteile - Lager

This European Standard was approved by CEN on 22 July 2018.

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European foreword

This document (EN 13001-3-4:2018) has been prepared by Technical Committee CEN/TC 147 “Cranes - Safety”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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 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 Annexes ZA, which are an integral part of this document.

This European Standard is one Part of the EN 13001 series. The other parts are as follows:

— Part 1: *General principles and requirements;*

— Part 2: *Load actions;*

— Part 3-1: *Limit states and proof of competence of steel structures;*

— Part 3-2: *Limit states and proof of competence of wire ropes in reeving systems;*

— Part 3-3: *Limit states and proof of competence of wheel/rail contacts;*

— Part 3-5: *Limit states and proof of competence of forged hooks;*

— Part 3-6: *Limit states and proof of competence of machinery — Hydraulic cylinders;*

— Part 3-7: *Limit states and proof of competence of machinery — Gears;*

— Part 3-8: *Limit states and proof of competence of machinery — Shafts.*

Annexes A, B, C and D are informative.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document is to be used together with EN 13001-1 and EN 13001-2 and as such they specify general conditions, requirements and methods to prevent mechanical hazards of cranes by design and theoretical verification.

NOTE 1 Specific requirements for particular types of crane are given in the appropriate European Standard for the particular crane type.

This document covers bearings in cranes. It is not intended for bearings being part of standard components, e.g. gearboxes, motors … however those bearings shall be designed using load actions from EN 13001-2 and classification parameters of EN 13001-1.

NOTE 2 EN 13001-3-7 is under preparation for gears and gearboxes and deals with load actions for bearings in gear boxes.

The following is a list of significant hazardous situations and hazardous events that could result in risks to persons during intended use and reasonably foreseeable misuse. Clauses 4 to 7 of this document are necessary to reduce or eliminate risks associated with the following hazards:

— exceeding the limits of strength (yield, ultimate, fatigue);

— exceeding temperature limits of material or components;

— elastic instability of the crane or its parts (buckling, bulging).

This document is not applicable to cranes which are manufactured before the date of its publication as an EN and serves as reference base for the European Standards for particular crane types (see Annex D).

NOTE EN 13001-3-4 deals only with limit state method in accordance with EN 13001-1.

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 10083-1:2006, *Steels for quenching and tempering — Part 1: General technical delivery conditions*

EN 10247:2017, *Micrographic examination of the non-metallic inclusion content of steels using standard pictures*

EN 13001-1, *Cranes — General design — Part 1: General principles and requirements*

EN 13001-2, *Crane safety — General design — Part 2: Load actions*

EN 13001-3-1, *Cranes — General design — Part 3-1: limit states and proof of competence of steel structure*

EN ISO 148-1, *Metallic materials, Charpy pendulum impact test — Part 1: Test method (ISO 148-1)*

EN ISO 683-17, *Heat-treated steels, alloy steels and free-cutting steels — Part 17: Ball and roller bearing steels (ISO 683-17)*

EN ISO 4287:1998, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287)*

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

ISO 76:2006, *Rolling bearings — Static load ratings*

ISO 281:2007, *Rolling bearings — Dynamic load ratings and rating life*

ISO 4306-1:2007, *Cranes — Vocabulary — Part 1: General*

3 Terms and definitions, symbols and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and ISO 4306-1:2007, Clause 6 for the definitions of loads, and the following applies.

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

3.1.1
plain bearing
bearing in which the type of relative movement is sliding but with the exclusion of those operating under conditions of hydrodynamic lubrication

3.1.2
rolling bearing
bearing operating with rolling motion between the parts supporting load and moving in relation to each other, which comprises raceway members and rolling elements with or without means for their spacing and/or guiding

Note 1 to entry: For the purposes of this document, it is designed to support radial, axial, or combined radial and axial load.

[SOURCE: ISO 5593, modified]

3.1.3
slewing ring
slewing ring bearing
large-size rolling-element bearing providing a connection between two adjacent structures and allowing rotation and transmission of loads between them (axial and radial loads and a tilting moment)

Note 1 to entry: Slewing ring is usually provided with holes for fixing bolts, with internal or external gear facilitating the rotation of one structure relative to the other and with lubrication and seals.

3.1.4
nominal contact angle
α
angle between a plane perpendicular to a bearing axis (a radial plane) and the nominal line of action of the resultant of the forces transmitted by a bearing ring or washer to a rolling element (see reference 04.02.10 in Figure 1 below)

[see SOURCE: ISO 5593:1997, definition 04.02.10 and Figures 93, 94]