

KRAANAD. ÜLDINE EHITUS. OSA 3-5: SEPISTATUD
KONKSUDE PIIRSEISUNDID JA KÕLBLIKKUSE
TÕENDAMINE

Cranes - General design - Part 3-5: Limit states and
proof of competence of forged and cast hooks

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 13001-3-5:2016+A1:2021 sisaldab Euroopa standardi EN 13001-3-5:2016+A1:2021 ingliskeelset teksti.	This Estonian standard EVS-EN 13001-3-5:2016+A1:2021 consists of the English text of the European standard EN 13001-3-5:2016+A1:2021.
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 and Accreditation.
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EUROPEAN STANDARD

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Cranes - General design - Part 3-5: Limit states and proof of competence of forged and cast hooks

Appareils de levage à charge suspendue - Conception générale - Partie 3-5 : États limites et vérification des crochets forgés et moulés

Krane - Konstruktion allgemein - Teil 3-5: Grenzzustände und Sicherheitsnachweise von geschmiedeten und gegossenen Haken

This European Standard was approved by CEN on 19 May 2016 and includes Amendment 1 approved by CEN on 12 April 2021.

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European foreword

This document (EN 13001-3-5:2016+A1:2021) has been prepared by Technical Committee CEN/TC 147 “Crane — Safety”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by November 2021, and conflicting national standards shall be withdrawn at the latest by November 2021.

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 13001-3-5:2016 A1.

This document includes Amendment 1 approved by CEN on 21 April 2021.

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

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.

A1 The major changes in this document compared to EN 13001-3-5:2016 are in 4.1, 4.2, 6.5.4, 6.6.4 and 8.2 so as to extend the scope of the standard to “cast hooks. A1

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 3-4: Limit states and proof of competence of machinery - Bearings¹*
- *Part 3-6: Limit states and proof of competence of machinery - Hydraulic cylinders²*

For the relationship with other European Standards for cranes, see Annex L.

¹ Currently at Enquiry stage.

² Currently at Enquiry stage.

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.

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Introduction

This European Standard has been prepared to provide a means for the mechanical design and theoretical verification of cranes to conform to essential health and safety requirements. This European Standard also establishes interfaces between the user (purchaser) and the designer, as well as between the designer and the component manufacturer, in order to form a basis for selecting cranes and components.

This European Standard is a type C standard as stated in EN ISO 12100.

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

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines.

1 Scope

This European Standard 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 by design and theoretical verification, mechanical hazards in crane hooks.

A1 It is intended to be used together with the other generic parts of EN 13001 series of standards, see Annex L. **A1**

This European Standard covers the following parts of hooks and types of hooks:

- **A1** bodies of any type of hooks made of steel forgings or steel castings, including stainless steel; **A1**
- machined shanks of hooks with a thread/nut suspension.

Principles of this European Standard can be applied to machined shanks of hooks in general. However, stress concentration factors relevant to designs not given in this standard would have to be determined and applied.

A1 The hazards covered by this document are identified by Annex M. **A1**

NOTE 1 **A1** Plate hooks, which are those, assembled of one or several parallel parts of rolled steel plates, are not covered in this document. **A1**

The following is a list of significant hazardous situations and hazardous events that could result in risks to persons during normal use and foreseeable misuse. Clauses 4 to 8 of this document are necessary to reduce or eliminate the risks associated with the following hazards:

- a) **A1** exceeding the limits of yield strength, ultimate strength, fatigue strength, brittle fracture; **A1**
- b) exceeding temperature limits of material.

A1 The requirements of this document are stated in the main body of the document and are applicable to hook designs in general. **A1**

The commonly used hook body and shank designs listed in Annexes A, B and F are only examples and should not be referred to as requirements of this European Standard. Annex I gives guidance for the selection of a hook size, where a hook body is in accordance with Annex A or B. The selection of hook form is not limited to those shown in Annexes A and B.

This European Standard is applicable to cranes, which are manufactured after the date of approval of this European Standard by CEN, and serves as a reference base for product standards of particular crane types.

NOTE 2 This part of EN 13001 deals only with the limit state method in accordance with EN 13001-1.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

A1 EN 1369:2012, *Founding — Magnetic particle testing*

EN 1370:2011, *Founding — Examination of surface condition*

- EN 1371-1:2011, *Founding — Liquid penetrant testing — Part 1: Sand, gravity die and low pressure die castings*
- EN 1559-1:2011, *Founding — Technical conditions of delivery — Part 1: General*
- EN 10025-3:2019, *Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*
- EN 10204:2004, *Metallic products — Types of inspection documents*
- EN 10213:2017, *Steel castings for pressure purposes*
- EN 10222-4:2017, *Steel forgings for pressure purposes — Part 4: Weldable fine grain steels with high proof strength*
- EN 10228-1:2016, *Non-destructive testing of steel forgings — Part 1: Magnetic particle inspection*
- EN 10228-2:2016, *Non-destructive testing of steel forgings — Part 2: Penetrant testing*
- EN 10228-3:2016, *Non-destructive testing of steel forgings — Part 3: Ultrasonic testing of ferritic or martensitic steel forgings*
- EN 10250-1:1999, *Open die steel forgings for general engineering purposes — Part 1: General requirements*
- EN 10250-2:1999, *Open die steel forgings for general engineering purposes — Part 2: Non-alloy quality and special steels*
- EN 10250-3:1999, *Open die steel forgings for general engineering purposes — Part 3: Alloy special steels*
- EN 10254:1999, *Steel closed die forgings — General technical delivery conditions*
- EN 10340:2007, *Steel castings for structural uses*
- EN 12680-1:2003, *Founding — Ultrasonic examination — Part 1: Steel castings for general purposes*
- EN 13001-1:2015, *Cranes — General design — Part 1: General principles and requirements*
- EN 13001-2:2014, *Crane safety — General design — Part 2: Load actions*
- EN 13001-3-2:2014, *Cranes — General design — Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*
- EN ISO 148-1:2016, *Metallic materials — Charpy pendulum impact test — Part 1: Test method (ISO 148-1:2016)*
- EN ISO 642:2016, *Steel — Hardenability test by end quenching (Jominy test) (ISO 642:1999)*
- EN ISO 643:2012, *Steels — Micrographic determination of the apparent grain size (ISO 643:2012)*
- EN ISO 683-2:2018, *Heat-treatable steels, alloy steels and free-cutting steels — Part 2: Alloy steels for quenching and tempering (ISO 683-2:2016)*

EN ISO 898-2:2012, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 2: Nuts with specified property classes — Coarse thread and fine pitch thread (ISO 898-2:2012)*

EN ISO 4287:1998, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287:1997)*

EN ISO 6892-1:2016, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature (ISO 6892-1:2016)*

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

CEN ISO/TR 15608:2017, *Welding — Guidelines for a metallic materials grouping system (ISO/TR 15608:2017)*

ISO 965-1:2013, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*

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

EN ISO 6506-1:2014, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1:2014)*

EN ISO 15614-1:2017, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys (ISO 15614-1:2017, Corrected version 2017-10-01) ^(A1)*

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 and the following apply.

3.1.1

hook shank

^(A1) upper part of the hook, from which the hook is suspended to the hoist medium of the crane ^(A1)

3.1.2

hook body

lower, curved part of the hook below the shank

3.1.3

hook seat

bottom part of the hook body, where the load lifting attachment is resting

3.1.4

hook articulation

feature of the hook suspension, allowing the hook to tilt along the inclined load line

3.1.5

stand alone hook

hook which is designed, manufactured and released to the market as a component or as part of a hook block, without connection to a specific crane or application