

KRAANAD. LAADURKRAANAD

Cranes - Loader cranes

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 12999:2020 sisaldab Euroopa standardi EN 12999:2020 ingliskeelset teksti.	This Estonian standard EVS-EN 12999:2020 consists of the English text of the European standard EN 12999:2020.
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 14.10.2020.	Date of Availability of the European standard is 14.10.2020.
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](mailto:standardiosakond@evs.ee).

ICS 53.020.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

## Cranes - Loader cranes

Appareils de levage à charge suspendue - Grues de  
chargement

Krane - Ladekrane

This European Standard was approved by CEN on 10 August 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

CEN members are the national standards bodies of 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 United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

# Contents

Page

European foreword.....	4
Introduction .....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms, definitions, illustration of parts and abbreviated terms .....	8
3.1 Terms and definitions .....	8
3.2 Illustration of parts .....	13
3.3 Abbreviated terms.....	15
4 List of significant hazards .....	15
5 Safety requirements and/or protective/risk reduction measures.....	18
5.1 General.....	18
5.2 Structural calculation .....	18
5.3 Stress analysis .....	24
5.4 Mechanical arrangements.....	25
5.5 Hydraulic system.....	27
5.6 Limiting and indicating devices .....	29
5.7 Controls.....	34
5.8 Control stations.....	35
5.9 Electrical systems.....	38
5.10 Installation .....	38
6 Verification of the safety requirements and/or protective/risk reduction measures.....	40
6.1 General.....	40
6.2 Testing and test procedures.....	44
6.3 Noise emission measurement.....	50
7 Information for use .....	50
7.1 General.....	50
7.2 Instructions.....	50
7.3 Marking.....	53
Annex A (informative) Examples of configurations and mountings.....	62
Annex B (informative) Stress history parameter $s$ and stress history classes $S$ .....	69
Annex C (informative) Explanatory notes .....	73
Annex D (informative) Examples of dangerous movements .....	75
Annex E (normative) Symbols for working and setting-up functions.....	77
Annex F (informative) Control system – Preferred vertical layout for controls operated from the ground.....	79
Annex G (informative) Control system – Horizontal layout order .....	81
Annex H (informative) Control levers for high seats and remote controls.....	84
Annex I (normative) Cabins fitted on vehicle mounted loader cranes up to a net lifting moment of 250 kNm.....	87
Annex J (informative) Examples of raised control stations .....	90

<b>Annex K (normative) Raised control stations – Measures regarding handrails and handholds, ladders and steps.....</b>	<b>93</b>
<b>Annex L (informative) Installation of a loader crane on a vehicle.....</b>	<b>96</b>
<b>Annex M (informative) Selection of a suitable set of crane standards for a given application ..</b>	<b>102</b>
<b>Annex ZA (informative) Relationship between this European Standard and the essential requirements of EU Directive 2006/42/EC aimed to be covered .....</b>	<b>104</b>
<b>Bibliography .....</b>	<b>107</b>

## European foreword

This document (EN 12999:2020) has been prepared by Technical Committee CEN/TC 147 “Cranes - 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 April 2021, and conflicting national standards shall be withdrawn at the latest by April 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 EN 12999:2011+A2:2018.

The two major changes are the following:

- replacing the reference to EN 954-1:1996 with a reference to EN ISO 13849-1:2015;
- improving the subclause on stability test.

This document has been prepared under a standardization request 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.

The new requirements concerning limiting and indicating devices that are introduced in 5.6.1 of this revision of the document are not mandatory to cranes manufactured the first 12 months after the Date of Availability of the revised document. Annex M provides a list of standards that are relevant to other types of cranes.

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.

## Introduction

This document is a harmonized standard to provide one means for loader cranes to conform to the essential health and safety requirements of the Machinery Directive 2006/42/EC.

This document is a type-C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

- machine manufacturers (small, medium and large enterprises);
- health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

- machine users/employers (small, medium and large enterprises);
- machine users/employees (e.g. trade unions, organizations for people with special needs);
- service providers, e.g. for maintenance (small, medium and large enterprises);
- consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

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

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

The machinery concerned and the extent to which hazards are covered are indicated in the scope of this document.

## 1 Scope

This document specifies minimum requirements for design, calculation, examinations and tests of hydraulic powered loader cranes and their mountings on vehicles or static foundations.

This document applies to loader cranes designed to be installed on:

- road vehicles, including trailers, with load carrying capability;
- tractors (road or agricultural), where only a towed trailer has capability to carry goods;
- demountable bodies to be carried by any of the above;
- other types of carriers (e.g. separate loaders, crawlers, rail vehicles, non-seagoing vessels);
- static foundations.

This document also applies to loader cranes equipped with special tools or interchangeable equipment (e.g. grapple, clamshell bucket, pallet clamp, etc.), as specified in the operator's manual.

This document does not apply to loader cranes used on board sea going vessels or to articulated boom system cranes which are designed as total integral parts of special equipment such as forwarders.

The hazards covered by this document are identified in Clause 4.

This document does not cover hazards related to the lifting of persons.

NOTE The use of cranes for lifting of persons can be subject to specific national regulations.

This document is not applicable to loader cranes manufactured before the publication of this document. For loader cranes designed before the publication of this document, the provisions concerning stress calculations in the version of EN 12999 that was valid at the time of their design, are still applicable.

## 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.

NOTE In the event of conflicting statements between referenced documents and this document, the statements in this document apply.

EN 1677-2:2000+A1:2008, *Components for slings - Safety - Part 2: Forged steel lifting hooks with latch, Grade 8*

EN 12077-2:1998+A1:2008, *Cranes safety - Requirements for health and safety - Part 2: Limiting and indicating devices*

EN 14492-2:2019, *Cranes - Power driven winches and hoists - Part 2: Power driven hoists*

EN 12644-1:2001+A1:2008, *Cranes - Information for use and testing - Part 1: Instructions*

EN 12644-2:2000+A1:2008, *Cranes - Information for use and testing - Part 2: Marking*

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 13001-3-1:2012+A2:2018, *Cranes - General Design - Part 3-1: Limit States and proof competence of steel structure*

EN 13001-3-2:2014, *Cranes - General design - Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*

EN 13001-3-5:2016, *Cranes - General design - Part 3-5: Limit states and proof of competence of forged hooks*

EN 13001-3-6:2018, *Cranes - General design - Part 3-6: Limit states and proof of competence of machinery - Hydraulic cylinders*

EN 13135:2013+A1:2018, *Cranes - Safety - Design - Requirements for equipment*

EN 13557:2003+A2:2008, *Cranes - Controls and control stations*

EN 13586:2004+A1:2008, *Cranes - Access*

EN 14033-2:2017, *Railway applications - Track - Railbound construction and maintenance machines - Part 2: Technical requirements for travelling and working*

EN IEC 61000-6-2:2019, *Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments (IEC 61000-6-2:2016)*

EN IEC 61000-6-4:2019, *Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments (IEC 61000-6-4:2018)*

EN 60204-32:2008, *Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*

EN 62745:2017, *Safety of machinery - Requirements for cableless control systems of machinery*

EN ISO 898-1:2013, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread (ISO 898-1:2013)*

EN ISO 3744:2010, *Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane (ISO 3744:2010)*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4871:2009, *Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 5353:1998, *Earth-moving machinery, and tractors and machinery for agriculture and forestry - Seat index point (ISO 5353:1995)*

EN ISO 6892-1:2019, *Metallic materials - Tensile testing - Part 1: Method of test at room temperature (ISO 6892-1:2019)*

EN ISO 11201:2010, *Acoustics - Noise emitted by machinery and equipment - Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections (ISO 11201:2010)*

EN ISO 11688-1:2009, *Acoustics - Recommended practice for the design of low-noise machinery and equipment - Part 1: Planning (ISO/TR 11688-1:1995)*

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

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13849-2:2012, *Safety of machinery - Safety-related parts of control systems - Part 2: Validation (ISO 13849-2:2012)*

EN ISO 13854:2019, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13857:2019, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

### **3 Terms, definitions, illustration of parts and abbreviated terms**

#### **3.1 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 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 <https://www.iso.org/obp>

##### **3.1.1 Loader crane**

###### **3.1.1.1**

###### **loader crane**

power driven crane comprising a column, which slews about a base, and a boom system which is attached on to the top of the column and being designed for loading and unloading vehicles

Note 1 to entry: Annex A gives examples of configuration and mountings.

###### **3.1.1.2**

###### **self-powered loader crane**

loader crane that has power source and hydraulic pump as integral parts of the machine

###### **3.1.1.3**

###### **timber handling crane**

loader crane specifically designed, manufactured and equipped with a grapple for loading/unloading of unprepared timber (e.g. tree trunks, branches)

###### **3.1.1.4**

###### **separate loader**

vehicle, with no load carrying capacity, equipped with a loader crane and designed to load or unload other vehicles and trailers