



**SLOVENSKI STANDARD**  
**SIST EN 12999:2020**

**01-december-2020**

**Nadomešča:**

**SIST EN 12999:2011+A2:2018**

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**Žerjavi - Nakladalni žerjavi**

Cranes - Loader cranes

Krane - Ladekrane

Appareils de levage à charge suspendue - Grues de chargement

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**Ta slovenski standard je istoveten z: EN 12999:2020**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN 12999**

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## 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.

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

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

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**EN 12999:2020 (E)****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of an identical text or by endorsement, at the latest by April 2021, and conflicting national standards shall be withdrawn at the latest by April 2021.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.

**EN 12999:2020 (E)****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)*

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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](https://www.iso.org/obp/ui/#iso:code=3d:67:f4e45-9730-f0a3e8a2a732/sist-en-12999-2020)

#### **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

**3.1.1.5****demountable body**

detachable frame designed to be carried by a vehicle or trailer

**3.1.2 Components****3.1.2.1****base**

housing incorporating anchoring points and bearings for the slewing column

**3.1.2.2****boom**

structural member in the boom system of the loader crane

**3.1.2.3****boom extension, hydraulic**

part of the boom system which is capable of hydraulic telescopic movement to vary its length

**3.1.2.4****boom extension, manual**

part of the boom system which can be manually attached or manually extended to increase the outreach of the boom system

**3.1.2.5****boom system**

complete system, consisting of booms, boom extensions and cylinders

**3.1.2.6****column**

structural member which supports the boom system

**3.1.2.7****control system**

interface between the operating levers and the actuating components which provide movements of the loader crane

**3.1.2.8****control station**

position from which the loader crane may be operated

**3.1.2.9****fixed load lifting attachment**

lifting attachment which is fitted directly to the boom of a crane but does not increase the outreach of the boom system

EXAMPLE Grapple, pallet clamp, clamshell bucket.

**3.1.2.10****high seat**

control station connected to the column, consequently rotating with the crane

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**EN 12999:2020 (E)****3.1.2.11****hoist**

machines for lifting and lowering suspended loads over predetermined distances, using ropes, chains or belts

**3.1.2.12****non-fixed load lifting attachment**

lifting attachment which can be fitted directly or indirectly to the hook or any other coupling device of a crane by the user without affecting its integrity and does not increase the outreach of the boom system

**3.1.2.13****raised control station**

control station at a height above the ground level, i.e. a high seat attached to the column of the loader crane or a platform positioned above the base of the loader crane

Note 1 to entry: See Annex J.

**3.1.2.14****stabilizer**

aid to the supporting structure connected to the base of the crane or to the vehicle to provide stability, without lifting the vehicle from the ground

**3.1.2.15****stabilizer extension**

part of the stabilizer capable of extending the stabilizer leg laterally from the transport position to the operating position

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**3.1.2.16****stabilizer leg**

part of a stabilizer capable of contacting the ground to provide the required stability

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**3.1.2.17****static foundation**

fixed support incorporating mounting points for a crane

**3.1.3 Hydraulics****3.1.3.1****current working pressure**

working pressure acting on the piston area, giving the same resultant force as the actual pressures acting on both sides of the piston, and that corresponds to the rated capacity at any time

**3.1.3.2****dynamic pressure**

pressure in a hydraulic system component or part of hydraulic system caused by dynamic forces on actuators when handling the load

**3.1.3.3****hydraulic line rupture**

failure of a hydraulic line which results in a loss of pressure in the line

**3.1.3.4****maximum working pressure**

maximum pressure in pump circuit or individual working function

**3.1.3.5****sink rate**

distance in a given time at which the load lowers due to internal leakage of hydraulic components

**3.1.3.6****stability test pressure**

equivalent pressure acting on the piston area of the 1<sup>st</sup> boom cylinder, used for stability testing and giving the same resultant force as the actual pressures acting on both sides of the piston

**3.1.4 Kinematics****3.1.4.1****articulated movement**

movement of boom members pivoting about a pin joint

**3.1.4.2****crane inclination**

angle between the slewing axis and a vertical line, due to working on slanted or uneven ground

**3.1.4.3****lifting movement**

raising or lowering of the boom system and/or the load which causes a change in its vertical position

**3.1.4.4****maximum outreach**

largest outreach shown on the load chart

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**3.1.4.5****outreach**

horizontal distance between the axis of rotation of the column and point of load attachment

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**3.1.4.6****outreach, hydraulic**

outreach which can be obtained with hydraulically actuated parts of the boom system

**3.1.4.7****slewing**

rotational movement of the column and boom system about the axis of the column

**3.1.5 Loads****3.1.5.1****dead load**

force due to masses of fixed and movable crane parts which act permanently on the structure while the crane is being used

**3.1.5.2****gross load**

sum of payload, lifting attachments and if applicable a portion of the hoist rope

**3.1.5.3****maximum working load**

maximum load that may be lifted shown on the load plate

**EN 12999:2020 (E)****3.1.5.4****payload**

load which is lifted by the crane and suspended from the non-fixed load-lifting attachment(s) or, if such an attachment is not used, directly from the fixed load lifting attachment(s)

**3.1.5.5****rated capacity**

load that the crane is designed to lift for a given operating condition (e.g. configuration, position of the load)

**3.1.5.6****rated capacity indicator**

device which gives, within tolerance limits specified in 5.6.2.1, at least a continuous indication that the rated capacity is exceeded, and another continuous indication (on certain crane types) of the approach to the rated capacity

**3.1.5.7****rated capacity limiter**

system that automatically prevents the crane from handling loads in excess of its rated capacity (see also C.1)

**3.1.6 Moments****3.1.6.1****net lifting moment**

rated capacity multiplied by outreach

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**3.1.6.2****total lifting moment**

sum of net lifting moment and the moment produced by dead loads

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**3.1.7 Valves****3.1.7.1****flow sensitive check valve**

valve which stops the flow when a pre-set pressure drop level is exceeded

**3.1.7.2****load holding valve**

valve which is normally closed and is opened by an external force to enable flow of fluid out of a hydraulic actuator

**3.1.7.3****main relief valve**

valve which limits the pressure supplied to the hydraulic system of the crane

**3.1.7.4****port relief valve**

valve which limits the pressure supplied to a hydraulic actuator

**3.1.7.5****pressure relief valve**

valve which automatically relieves the hydraulic oil to the tank when the pressure exceeds a specified value

### 3.1.8 Miscellaneous

#### 3.1.8.1

##### **danger zone**

any space within and/or around machinery in which a person can be exposed to a hazard

[SOURCE: EN ISO 12100:2010, 3.11]

#### 3.1.8.2

##### **setting-up function**

crane function used to prepare the crane for lifting

#### 3.1.8.3

##### **vessel**

floating installation that the crane is mounted on

### 3.2 Illustration of parts

The terms which are used in this document for the main parts of a loader crane are indicated in Figure 1 a) and b).

Boom system consists of items 6 to 12 plus items 16 to 22, if applicable.

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