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Dvigala (žerjavi) - Nakladalni žerjavi

Cranes - Loader Cranes

Krane - Ladekrane

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ICS:

53.020.20 Dvigala

Cranes

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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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 December 2010.

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Foreword

This document (EN 12999:2011) 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of an identical text or by endorsement, at the latest by July 2011, and conflicting national standards shall be withdrawn at the latest by July 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12999:2002.

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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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EN 12999:2011 (E)**Introduction**

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

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 that have been designed and built according to the provisions of this type C standard.

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

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1 Scope

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

This European Standard does not apply to loader cranes used on board ships or floating structures or to articulated boom system cranes which are designed as total integral parts of special equipment such as forwarders.

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

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

This European Standard is not applicable to loader cranes which are manufactured before the date of its publication as EN.

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

2 Normative references

The following referenced documents are indispensable for the application 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 349:1993+A1:2008, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*
- EN 12077-2:1998+A1:2008, *Cranes safety — Requirements for health and safety — Part 2: Limiting and indicating devices*
- EN 14492-2:2006+A1:2009, *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 13001-1:2004+A1:2009, *Cranes — General design — Part 1: General principles and requirements*
- EN 13001-2:2004+A3:2009, *Cranes safety — General design — Part 2: Load effects*
- prEN 13001-3-1:2010, *Cranes — General design — Part 3-1: Limit states and proof competence of steel structure*
- EN 13557:2003+A2:2008, *Cranes — Controls and control stations*
- EN 13586:2004+A1:2008, *Cranes — Access*
- EN 61000-6-2:2005, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:2005)*
- EN 61000-6-4:2007, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4:2006)*
- EN 60204-32:2008, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*

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EN 954-1:1996, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design*

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 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 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

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3 Terms, definitions and terminology

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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. ¹⁾

3.1.1

loader crane

powered crane comprising a column, which slews about a base, and a boom system which is attached on to the top of the column, usually fitted on a commercial vehicle (including trailer) with a significant residual load carrying capability, and being designed for loading and unloading the vehicle as well as for other duties as specified by the manufacturer in the operator's manual

NOTE 1 A loader crane, as defined above in 3.1.1, installed on a static foundation is still considered a loader crane.

NOTE 2 Annex A gives examples of configuration and mountings.

3.1.2

articulated movement

movement of boom members pivoting about a pin joint

¹⁾ For convenience of reference the definitions are - with the exception of 3.1.1 loader crane - grouped in alphabetical order in the English version.

3.1.3**base**

housing incorporating anchoring points and bearings for the slewing column

3.1.4**boom**

structural member in the boom system of the loader crane

3.1.5**boom extension, hydraulic**

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

3.1.6**boom extension, manual**

part of the boom which can be manually extended or retracted

3.1.7**boom system**

complete system, consisting of booms, boom extensions and cylinders

3.1.8**column**

structural member which supports the boom system

3.1.9**control system**

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

3.1.10**control station**

position from which the loader crane may be operated

3.1.11**crane inclination**

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

3.1.12**danger zone**

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

[EN ISO 12100:2010]

3.1.13**dead load**

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

3.1.14**dynamic pressure**

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

3.1.15**fixed load lifting attachment**

equipment from which the net load may be suspended and which is fitted directly to the boom head as an integral part of the crane

NOTE This comprises for example hooks or grapples.

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EN 12999:2011 (E)**3.1.16****flow sensitive check valve**

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

3.1.17**gross load**

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

3.1.18**high seat**

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

3.1.19**hoist**

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

3.1.20**hydraulic line rupture**

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

3.1.21**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

3.1.22**main relief valve**

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

3.1.23**maximum working load**

the maximum load that may be lifted

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NOTE The largest load appearing in the load plate.

3.1.24**maximum working pressure**

maximum pressure in pump circuit or individual working function

3.1.25**net lifting moment**

rated capacity multiplied by outreach

3.1.26**non-fixed load lifting attachment**

lifting accessory 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

3.1.27**outreach**

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

3.1.28**outreach, hydraulic**

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

3.1.29**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)

3.1.30**port relief valve**

valve which limits the pressure supplied to a hydraulic actuator

3.1.31**pressure relief valve**

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

3.1.32**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 (see Annex K)

3.1.33**rated capacity**

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

3.1.34**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

3.1.35**rated capacity limiter**

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

3.1.36**setting-up function**

crane function used to prepare the crane for lifting

3.1.37**sink rate**

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

3.1.38**slewing**

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

3.1.39**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

3.1.40**stabilizer extension**

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

3.1.41**stabilizer leg**

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

EN 12999:2011 (E)**3.1.42****static foundation**

fixed support incorporating mounting points for a crane

3.1.43**timber handling crane**

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

NOTE The operator controls the crane from a high seat or from a cabin.

3.1.44**total lifting moment**

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

3.2 Terminology

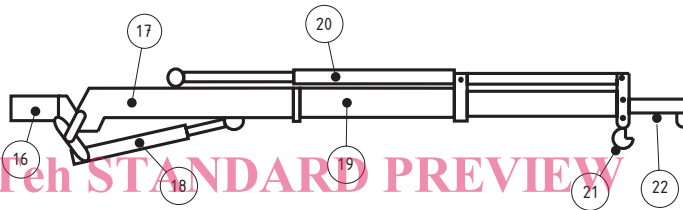
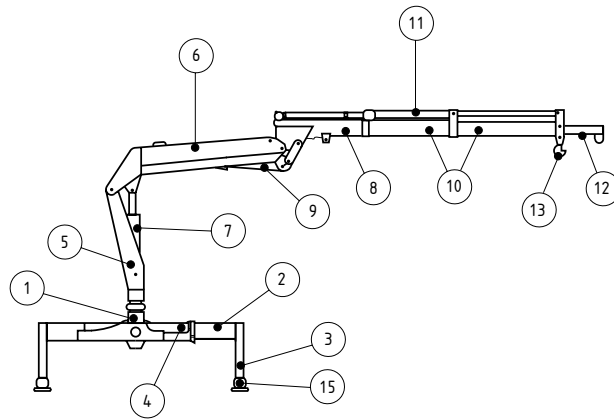
The terms which are used in this European Standard for the main parts of a loader crane are indicated in Figure 1.

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

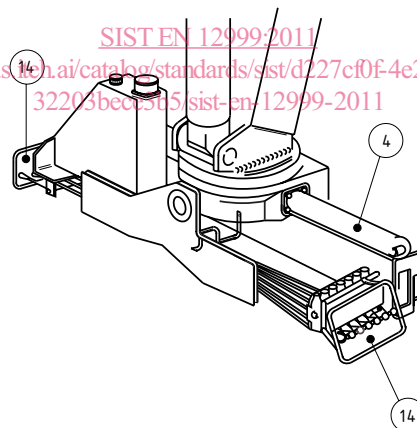
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Key

1	base	7	1 st boom cylinder	13	hook	19	boom extension, hydraulic
2	stabilizer extension	8	2 nd boom	14	controls	20	extension cylinders
3	stabilizer leg	9	2 nd boom cylinder	15	stabilizer foot	21	hook
4	slewing mechanism	10	boom extension, hydraulic	16	3 rd boom adapter	22	boom extension, manual
5	column	11	extension cylinders	17	3 rd boom		
6	1 st boom	12	boom extension, manual	18	3 rd boom cylinder		

Figure 1 — Main parts of a loader crane