



SLOVENSKI STANDARD
SIST EN 13000:2010+A1:2014

01-julij-2014

Nadomešča:

SIST EN 13000:2010

SIST EN 13000:2010/AC:2011

Žerjavi - Mobilni žerjavi

Cranes - Mobile cranes

Krane - Fahrzeugkrane

Appareils de levage à charge suspendue - Grues mobiles

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ICS:

53.020.20 Dvigala Cranes

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EUROPEAN STANDARD
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EN 13000:2010+A1

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English Version

Cranes - Mobile cranes

Appareils de levage à charge suspendue - Grues mobiles

Krane - Fahrzeugkrane

This European Standard was approved by CEN on 19 December 2009 and includes Corrigendum 1 issued by CEN on 6 October 2010 and Amendment 1 approved by CEN on 9 February 2014.

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.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN 13000:2010+A1:2014) 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of an identical text or by endorsement, at the latest by November 2014, and conflicting national standards shall be withdrawn at the latest by November 2014.

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 A1 EN 13000:2010 A1.

This document includes Amendment 1 approved by CEN on 2014-02-09.

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).

A1 For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document. A1

This standard applies to mobile cranes which are put on the market 12 months after the date of ratification by CEN of this standard or at the latest 2015-02-09.

This document has been prepared by Product Working Group CEN/TC 147/WG 11 "Mobile Cranes", the secretariat of which is held by DIN.

A1 CEN/TC 147 WG11 has reviewed EN 13000:2010 to adapt the standard to the technical progress, new requirements and changes in standards referenced; the main topics are:

- The scope of this standard has been amended to cover gaps and overlaps with other European Standards.
- Several wind related incidents forced the introduction of more clarification on wind loads and the development of explanations to be added in the instruction manual (4.1.2.2.2 and 6.2.2.4).
- The limit value for the noise measured at the operator position has been aligned with the actual legal requirements and the former noise clause has been reorganized to improve readability (5.3, 6.1.2 and Annex G).
- To cover the risk of a wrong setting of the outrigger configuration and to align the standard with other European Standards and recently introduced regulations outside of the EEA, requirements for outrigger monitoring are introduced (4.2.6.2.5). A1

Annexes A, C, D, E, F, G.1 and G.2, H, J.1 to J.4, K.1 to K.5, L, M, P, R, S and U are normative. Annexes B.1 and B.2, N.1 to N.3, Q, T, V and W are informative.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 13000:2010+A1:2014 (E)**Introduction**

This European Standard is a type C standard.

This European Standard has been prepared to provide one means for mobile cranes to conform with the essential health and safety requirements of the Machinery Directive.

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

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.

^{A1} CEN/TC147 WG11 had set up a dedicated working group with representatives from crane manufacturers, electronic component suppliers and Health and Safety organizations. This group did a thorough investigation in the transition from EN 954 to EN ISO 13849 and came to the conclusion that this transition is not currently feasible for mobile cranes.

The required Performance Level was determined by risk assessment according to EN 1050; it was established as PL_r=c; this value is not achievable with components currently available on the market and is as such beyond the state of the art for mobile cranes. This is mainly due to the amount of signals to be processed simultaneously.

Therefore, in the present amendment A1, the requirements given for safety related parts of control systems will refer to EN 954. ^{A1}

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1 Scope

This European Standard is applicable to the design, construction, installation of safety devices, information for use, maintenance and testing of mobile cranes as defined in ISO 4306-2 ~~deleted text~~ . Examples of mobile crane types are given in Annex A.

This European Standard does not apply to:

- loader cranes (see EN 12999)
- off-shore cranes (see EN 13852-1)
- floating cranes (see EN 13852-2)
- variable reach truck (see EN 1459)

NOTE 1 Variable Reach Trucks are commonly known as telehandlers.

- mobile self-erecting tower cranes
- earth-moving machinery used for object handling (see EN 474-series).

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

NOTE 2 The use of mobile cranes for the lifting of persons is subject to specific national regulations.

Mobile cranes covered by this European Standard are designed for a limited number of stress cycles and particular properties of motions, e.g. smooth application of the driving forces and loading conditions according to ISO 4301-2:1985, group A1.

For a duty cycle such as grab, magnet or similar work, additional provisions are required which are outside the scope of this European Standard.

The hazards covered by this European Standard are identified by Annex C.

This document is not applicable to mobile cranes which are manufactured before the date of publication of this document by CEN.

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 2:1992, *Classification of fires*

EN 294:1992, *Safety of machinery — Safety distance to prevent danger zones being reached by the upper limbs*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 547-1:1996, *Safety of machinery — Human body measurements — Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 614-1:2006, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 626-1:1994, *Safety of machinery — Reduction of risk to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers*

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- EN 811:1996, *Safety of machinery — Safety distances to prevent danger zones being reached by the lower limbs*
- EN 842:1996, *Safety of machinery — Visual danger signals — General requirements, design and testing*
- EN 853:1996, *Rubber hoses and hose assemblies - Wire braid reinforced hydraulic type - Specification*
- EN 854:1996, *Rubber hoses and hose assemblies - Textile reinforced hydraulic type - Specification*
- EN 856:1996, *Rubber hoses and hose assemblies - Rubber-covered spiral wire reinforced hydraulic type - Specification*
- EN 894-2:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*
- EN 894-3:2000, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*
- EN 953:1997, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*
- EN 954-1:1996, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design*
- EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*
- EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components Pneumatics*
- EN 1005-3:2002, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*
- EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up*
- EN 10025-2:2005, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*
- EN 10025-3:2004, *Hot rolled products of structural steels - Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*
- EN 10025-6:2005, *Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*
- [A1]** *deleted text [A1]*
- EN 12644-1:2001, *Cranes — Information for use and testing — Part 1: Instructions*
- EN 13557:2003, *Cranes — Control and control stations*
- EN 13586:1999, *Cranes — Access*
- EN 14502-2:2005, *Cranes — Equipment for the lifting of persons — Part 2: Elevating control stations*
- EN 60204-32:2008, *Safety of machinery—Electrical equipment of machines — Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*
- 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 61310-1:2008, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

EN 61310-2:2008, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking (IEC 61310-2:2007)*

EN ISO 3411:2007, *Earth-moving machinery - Physical dimensions of operators and minimum operator space envelope (ISO 3411:2007)*

EN ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)*

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

EN ISO 5349-1:2001, *Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration - Part 1: General requirements (ISO 5349-1:2001)*

EN ISO 5349-2:2001, *Mechanical vibration - Measurement and evaluation of human exposure to hand-transmitted vibration - Part 2: Practical guidance for measurement at the workplace (ISO 5349-2:2001)*

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

EN ISO 6385:2004, *Ergonomic principles in the design of work systems (ISO 6385:2004)*

EN ISO 6683:2008, *Earth-moving machinery - Seat belts and seat belt anchorages - Performance requirements and tests (ISO 6683:2005)*

EN ISO 7096:2008, *Earth-moving machinery - Laboratory evaluation of operator seat vibration (ISO 7096:2000)*

EN ISO 7250:1997, *Basic human body measurements for technological design (ISO 7250:1996)*

EN ISO 7731:2008, *Ergonomics - Danger signals for public and work areas - Auditory danger signals (ISO 7731:2003)*

EN ISO 11201:1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)*

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

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

EN ISO 13732-1:2008, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13850, *Safety of machinery — Emergency stop — Principles for design (ISO 13850)*

ISO 2631-1:1997, *Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements*

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ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 3864-1:2002, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs in workplaces and public areas*

ISO 4301-1:1986, *Cranes and lifting appliances — Classification — Part 1: General*

ISO 4301-2:1985, *Lifting appliances — Classification — Part 2: Mobile cranes*

ISO 4305:1991, *Mobile cranes — Determination of stability*

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

ISO 4306-2:1994, *Cranes — Vocabulary — Part 2: Mobile cranes*

ISO 4308-1:2003, *Cranes and lifting appliances — Selection of wire ropes — Part 1: General*

ISO 4308-2:1988, *Cranes and lifting appliances — Selection of wire ropes — Part 2: Mobile cranes — Coefficient of utilization*

ISO 4309:2004, *Cranes — Wire ropes — Care, maintenance, installation, examination and discard*

ISO 4310:1981, *Cranes — Test code and procedures*

ISO 6309:1987, *Fire protection — Safety signs*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

ISO 7296-1:1991, *Cranes — Graphic symbols — Part 1: General*

ISO 7296-2:1996, *Cranes — Graphic symbols — Part 2: Mobile cranes*

ISO 7752-2:2011, *Cranes — Control layout and characteristics — Part 2: Basic arrangement and requirements for mobile cranes*

ISO 8087:1985, *Mobile cranes — Drum and sheave sizes*

ISO 8566-2:1995, *Cranes — Cabins — Part 2: Mobile cranes*

ISO/CIE 8995-1:2002, *Lighting of indoor work places — Part 1: Indoor*

ISO/DIS 8995-2:2006, *Lighting of indoor work places — Part 2: Outdoor*

ISO/CIE 8995-3:2006, *Lighting of indoor work places — Part 3: Lighting requirements for safety and security of outdoor work places*

ISO 11660-2:1994, *Cranes — Access, guards and restraints — Part 2: Mobile cranes*

ISO 11662-1:1995, *Mobile cranes — Experimental determination of crane performance — Part 1: Tipping loads and radii*

ISO 12480-1:1997, *Cranes — Safe use — Part 1: General*

ISO 13200:1995, *Cranes — Safety signs and hazard pictorials — General principles*

FEM 1.001:1998, *Rules for the design of hoisting appliances (3rd edition)*

FEM 5.004:1994, *Rules for the design of the steel structures of general use mobile cranes*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4306-1:2007 and ISO 4306-2:1994 and the following apply¹⁾.

3.1

angle indicator

device to display the actual angle of parts of the crane to the horizontal

EXAMPLES \square_{A1} Boom \square_{A1} angle indicator, fixed fly jib angle indicator, luffing fly jib indicator and/or mast angle indicator.

3.2

angle limiter

device to limit the motion of parts of the crane regarding their angles

EXAMPLES \square_{A1} Boom \square_{A1} angle limiter, fly jib angle limiter and/or mast angle limiter.

3.3

cabin

control station with protective enclosure

NOTE See 3.6, 3.7 and 3.9.

3.4

configuration

combination of structural members, counterweights, support or outrigger position, hook block reeving and similar items assembled, positioned and erected according to manufacturer's instructions and ready for operation

3.5

control station

permanent position of controls on or off the crane

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3.6

crane

machine for cyclic lifting or cyclic lifting and handling of loads suspended on hooks or other load handling devices, whether manufactured to an individual design, in series or from prefabricated components

NOTE "Suspended" can include additional means fitted to prevent swinging, rotation of the load, etc.

3.7

crane level indicator

device to indicate the "levelled position" of the crane

3.8

crane operating cabin

cabin provided for the operation of the crane motions to move the load

3.9

crane travelling cabin

cabin provided for the transportation of the crane by road from one job site to another

3.10

derricking (luffing) limiter

device to prevent derricking (luffing) motions of the \square_{A1} boom \square_{A1} and/or fly jib beyond specified limits

¹⁾ The definitions are listed alphabetically.

EN 13000:2010+A1:2014 (E)**3.11****hoisting limiter**

device either to prevent the fixed load lifting attachment from being raised such that it strikes the crane structure, or to prevent any other specified upper limitation of the load lifting attachment from being exceeded

NOTE It can also include any other design limitation imposing a restriction on lifting.

3.12**hook load indicator**

device to display the actual mass (weight) of the load

3.13**indicator**

device which provides warnings and/or data to facilitate the competent control of the crane within its design parameters

3.14 **A_1 boom A_1 length indicator**

device to display the actual A_1 boom A_1 length

3.15**load bearing component**

single part or assembly of parts of a crane, which are directly subjected to load effects

EXAMPLES Hooks, ropes (stationary or running), traverse beams, pendant bars, wheels, axles, gears, couplings, brakes, hoists, hydraulic cylinders, shafts and pins.

NOTE In contrast to (steel) structures components can be regarded as independent units.

3.16**lock indicator**

device to display the locked condition of a part or function

3.17**lowering limiter**

device to ensure that the specified minimum number of turns of rope on the hoist drum is maintained at all times during operation

3.18**mobile crane**

A_1 self-powered crane with a boom, which may be fitted on a mast (tower) and capable of travelling laden or unladen, without the need for fixed runways and which relies on gravity for stability, the chassis of the crane not having any capability to carry goods A_1

NOTE 1 Examples of mobile cranes are given in the Annexes A, B.1 and B.2.

NOTE 2 Mobile cranes can operate on tyres, crawlers or with other mobile arrangements. In fixed positions, they can be supported by outriggers or other accessories increasing their stability.

NOTE 3 The superstructure of mobile cranes can be of the type of full circle slewing, of limited slewing or non slewing. It is normally equipped with one or more hoists and/or hydraulic cylinders for lifting and lowering the A_1 boom A_1 and the load.

NOTE 4 Mobile cranes can be equipped either with telescopic A_1 booms A_1 , with articulated A_1 booms A_1 , with lattice A_1 booms A_1 – or a combination of these – of such a design that they can readily be lowered.

NOTE 5 Loads can be handled by hook block assemblies or other load-lifting attachments for special services.

3.19**off-road mobile crane**

mobile crane which travels on site

EXAMPLES Rough terrain crane, crawler crane.

3.20

on-road mobile crane

mobile crane which has the necessary equipment to travel on public roads and on the job site

EXAMPLES All terrain crane, truck crane.

3.21

partial safety coefficient

safety margin for the method of limit states chosen as described in Annex A of ISO 8686-1:1989

NOTE See partial load coefficients γ_p .

3.22

performance limiter

device which automatically prevents a design performance characteristic from being exceeded

3.23

radius indicator

device to display the actual radius of the load

3.24

rated capacity

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

NOTE For mobile cranes the mass (weight) of the hook block is part of the load.

3.25

rated capacity indicator

device which gives, within specified tolerance limits, at least a continuous indication that the rated capacity is exceeded, and another continuous indication of the approach to the rated capacity

3.26

rated capacity limiter

device that automatically prevents the crane from handling loads in excess of its rated capacity, taking into account the dynamic effects during normal operational use

3.27

slack rope limiter

device to automatically prevent dangers from slack rope situations

3.28

slew position indicator

device to indicate to the crane operator the actual slew position

3.29

slew range indicator

device to indicate to the crane operator the permitted slew range for the selected configuration

3.30

slewing limiter

device to prevent slewing beyond specified limits

3.31

telescoping limiter

device to prevent telescoping beyond specified limits