

**SLOVENSKI
STANDARD**

SIST EN 13000:2004

september 2004

Dvigala - Mobilna dvigala

Cranes - Mobile cranes

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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 22 April 2004.

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 Central Secretariat or to any CEN member.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13000:2004) 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of an identical text or by endorsement, at the latest by December 2004, and conflicting national standards shall be withdrawn at the latest by December 2004.

This document has been prepared by Product Working Group CEN/TC147/WGP 1 “Mobile cranes”, the secretariat of which is held by DIN.

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.

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, N.1 to N.3, Q, T and V 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

This European Standard is a type C standard as stated in EN 1070.

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.

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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 with the exception of loader cranes (see 3.1.1 of EN 12999:2002). Examples of mobile crane types and of their major parts are given in annex A and B.

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

NOTE 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: 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

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 457:1992, *Safety of machinery — Auditory danger signals — General requirements, design and testing (ISO 7731:1986, modified)*

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 563:1994, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit for hot surfaces*

EN 614-1:1995, *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*

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*

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- 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 894-3:1992, *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 moveable 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 1070:1998, *Safety of machinery — Terminology*
- EN 10025:1993, *Hot rolled products of non-alloy structural steels — Technical delivery conditions (includes amendment A1:1993)*
- EN 10113-2:1993, *Hot-rolled products in weldable fine grain structural steels — Part 2: Delivery conditions for normalized/normalized rolled steels*
- EN 10137-2:1995, *Plates and wide flats made of high yield strength structural steels in the quenched and tempered or precipitation hardened conditions — Part 2: Delivery conditions for quenched and tempered steels.*
- EN 12077-2:1998, *Cranes safety — Requirements for health and safety — Part 2: Limiting and indicating devices*
- EN 12644-1:2001, *Cranes — Information for use and testing — Part 1: Instructions*
- EN 12999:2002, *Cranes — Loader cranes*
- EN 13586:1999, *Cranes — Access*
- ENV 26385:1990, *Ergonomic principles of the design of work systems (ISO 6385:1981).*
- EN 60204-32:1998, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines (IEC 60204-32:1998)*
- EN 61000-6-2:2001, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards; Immunity for industrial environments (IEC 61000-6-2:1999, modified)*
- EN 61000-6-4:2001, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards; Emission standard for industrial environments (IEC 61000-6-4:1997, modified)*
- EN 61310-1:1995, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995)*

EN 61310-2:1995, *Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking (IEC 61310-2:1995)*

EN ISO 3411:1999, *Earth-moving machinery — Human physical dimensions of operators and minimum operator space envelope (ISO 3411:1995)*

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 4014:2000, *Hexagon head bolts — Product grades A and B (ISO 4014:1999)*

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 1: Practical guidance for measurement at the workplace (ISO 5349-2:2001)*

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

EN ISO 6683:1999, *Earth-moving machinery — Seat belts and seat belt anchorages (ISO 6683:1981 + Amendment 1:1990)*

EN ISO 7096:2000, *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 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 11688-1:1998, *Acoustics — Recommended practice for the design of low-noise machinery and equipment — Part 1: Planning (ISO/TR 11688:1995)*

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)*

ISO 261:1998, *ISO general-purpose metric screw threads — General plan*

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

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

ISO 3864:1984, *Safety colours and safety signs*

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 4306-1:1990, *Cranes — Vocabulary — Part 1: General.*

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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 utilisation*

ISO 4309:1990, *Cranes — Wire ropes — Code of practice for examination and discard*

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

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

ISO 7000:1989, *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 7752-2:1985, *Lifting appliances — Controls- 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 8995:2002, *Lighting of indoor 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/CD 11662-2:1995, *Mobile cranes — Experimental determination of crane performance — Part 2: Structural competence under static loading*

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*

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3 Terms and definitions

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For the purposes of this European Standard, the term and definitions given in EN 1070:1998 applies. For specific definitions and terminology applicable to mobile cranes the following terms and definitions apply¹⁾. For other terms and definitions ISO 4306-1:1990 and ISO 4306-2:1994 apply.

3.1

angle indicator

device to display the actual angle of parts of the crane to the horizontal, e. g. jib angle indicator, fixed fly jib angle indicator, luffing fly jib indicator and/or mast angle indicator

1) The definitions are listed alphabetically.

3.2**angle limiter**

device to limit the motion of parts of the crane regarding their angles, e. g. jib angle limiter, fly jib angle limiter and/or mast angle limiter

3.3**cabin**

control station with protective enclosure (see 3.6, 3.7 and 3.9)

3.4**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.

3.5**crane level indicator**

device to indicate the "levelled position" of the crane

3.6**crane operating cabin**

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

3.7**crane travelling cabin**

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

3.8**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

3.9**control station**

permanent position of controls on or off the crane

3.10**derricking (luffing) limiter**

device to prevent derricking (luffing) motions of the jib and/or fly jib beyond specified limits

3.11**hoisting limiter**

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

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3.13**indicator**

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

3.14**jib length indicator**

device to display the actual jib length

3.15

load bearing component

single part or assembly of parts of a crane, which are directly subjected to load effects (e. g. hooks, ropes (stationary or running), traverse beams, pendant bars, wheels, axles, gears, couplings, brakes, hoists, hydraulic cylinders, shafts and pins). 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

self powered jib crane capable of travelling loaded or unloaded without the need for fixed runways and relying on gravity for stability. Examples of mobile cranes are given in the annexes A, B.1 and B.2

NOTE 1 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 2 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 jib and the load.

NOTE 3 Mobile cranes can be equipped either with telescopic jibs, with articulated jibs, with lattice jibs – or a combination of these – of such a design that they can readily be lowered.

NOTE 4 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 (e. g. 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 (e. g. 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 (see partial load coefficients γ_p)

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3.22

performance limiter

device which automatically prevents a design performance characteristic from being exceeded

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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). 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

3.32**wind speed indicator**

device to indicate to the crane operator the actual wind speed

3.33**working load**

load on the hook plus mass (weight) of hook and block

3.34**working load factor**

safety margin for the permissible stress method chosen as described in annex A of ISO 8686-1:1989 (see coefficients applied to the specified strength γ_F)

iTeh STANDARD PREVIEW

4 Safety requirements and/or protective measures (standards.iteh.ai)

4.1 Structures and components

[SIST EN 13000:2004](#)

4.1.1 General

<https://standards.iteh.ai/catalog/standards/sist/1e7bb25c-a5b2-41a8-99e8-4b63d0c4d647/sist-en-13000-2004>

Machinery shall comply with the safety requirements and/or protective measures of this clause. In addition, the machine shall be designed according to the principles of EN ISO12100 for hazards relevant but not significant, which are dealt with by this document (e.g. sharp edges).

Mechanical hazards can arise when loads acting on a crane exceed limiting conditions. Such an overload can cause the entire crane and/or its components to lose stability (elastic or rigid body) as well as cause the supporting structure and/or components to be subjected to failure.