SLOVENSKI STANDARD
SIST EN 13852-2:2005

01-januar-2005

Dvigala (žerjavi) – Priobalna dvigala - 2. del: Plovna dvigala

Cranes - Offshore cranes - Part 2: Floating cranes

Krane - Offshore-Krane - Teil 2: Schwimmende Krane

Appareils de levage a charge suspendue - Grues offshore - Partie 2 : Grues flottantes

Ta slovenski standard je istoveten z: **EN 13852-2:2004**

ICS:

47.020.40	Dvigalna oprema in oprema za pretovor	Lifting and cargo handling equipment
53.020.20	Dvigala	Cranes

SIST EN 13852-2:2005 **en**

EUROPEAN STANDARD

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English version

Cranes - Offshore cranes - Part 2: Floating cranes

Appareils de levage à charge suspendue - Grues offshore - Partie 2 : Grues flottantes

Krane - Offshore-Krane - Teil 2: Schwimmende Krane

This European Standard was approved by CEN on 23 August 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.

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 Central Secretariat has the same status as the official versions.

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

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Contents

page

Foreword

This document (EN 13852-2:2004) 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of an identical text or by endorsement, at the latest by April 2005, and conflicting national standards shall be withdrawn at the latest by April 2005.

This standard is one part of EN 13852. The other part is:

Part 1: General - purpose offshore cranes

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.

Introduction

This document is NOT harmonized.

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

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 a type B standard, the provisions of this type C standard take precedence over the provisions of other standards, for machines that have been designed and built according to the provisions of this type C standard.

The extent to which hazards are covered are indicated in the scope of this document. In addition, machinery should comply as appropriate with EN ISO 12100-1 for hazards, which are not covered by this document.

1 Scope

This document specifies the safety requirements for floating cranes including their supporting pedestals or structures.

This document applies to cranes manufactured after the date of issue of this document.

This document does not cover:

a) fabrication, assembly, dismantling or changing the configuration of the crane;

b) lifting accessories, i.e. any item between the hook and the load;

c) design temperature below –20 °C;

d) operations at an ambient temperature above 50 °C;

e) cranes covered by the Machinery Directive.

The significant hazards covered by this document are identified in clause 4.

This document includes requirements for lifting of persons. The use of cranes for lifting of persons may be subject to specific national regulations. Where National Authorities permit the use of a floating crane for the lifting of persons, the crane would at least need to fulfil the requirements of this standard and be adopted in accordance with the relevant National regulations for the lifting of persons.

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 418:1992, *Safety of machinery – Emergency stop equipment, functional aspects – Principles for design.*

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

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

EN 842, *Safety of machinery – Visual danger signals – General requirements, design and testing.*

EN 894-3, *Safety of machinery – Ergonomics requirements for the design of displays and control actuators – Part 3: Control actuators.*

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

EN 982, *Safety of machinery – Safety requirements for fluid power systems and their components – Hydraulics.*

EN 983, *Safety of machinery – Safety requirements for fluid power systems and their components – Pneumatics.*

EN 1005-3, *Safety of machinery – Human physical performance – Part 3: Recommended force limits for machinery operation.*

EN 1050, *Safety of machinery – Principles for risk assessment.*

EN 1070:1998, *Safety of machinery – Terminology.*

EN 1127-1:1997, *Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology.*

EN 10025, *Hot rolled products of non-alloy structural steels – Technical delivery conditions.*

EN 10083-1+A1, *Quenched and tempered steels – Part 1: Technical delivery conditions for special steels (includes amendment A1:1996).*

EN 10083-2+A1, *Quenched and tempered steels – Part 2: Technical delivery conditions for unalloyed quality steels (includes amendment A1:1996).*

EN 10113-1, *Hot-rolled products in weldable fine grain structural steels – Part 1: General delivery conditions.*

EN 10113-2, *Hot-rolled products in weldable fine grain structural steels – Part 2: Delivery conditions for normalized/normalized rolled steels.*

EN 10113-3, *Hot-rolled products in weldable fine grain structural steels – Part 3: Delivery conditions for the thermo mechanical rolled steels.*

EN 10137-1, *Plates and wide flats made of high yield strength structural steels in the quenched and tempered or precipitation hardened conditions – Part 1: General delivery conditions.*

EN 10137-2, *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 10204, *Metallic products – Types of inspection documents.*

EN 12077-2, *Cranes safety – Requirements for health and safety – Part 2: Limiting and indicating devices.*

EN 12385-1, *Steel wire ropes – Safety – Part 1: General requirements.*

EN 12385-2, *Steel wire ropes – Safety – Part 2: Definitions, designation and classification.*

EN 12385-3, *Steel wire ropes – Safety – Part 3: Information for use and maintenance.*

EN 12385-4, *Steel wire ropes – Safety – Part 4: Stranded ropes for general lifting applications.*

EN 12644-1, *Cranes – Information for use and testing – Part 1: Instructions.*

EN 12644-2, *Cranes – Information for use and testing – Part 2: Marking.*

EN 13135-1, *Cranes – Safety – Design – Requirements for equipment – Part 1: Electrotechnical equipment.*

EN 13135-2, *Cranes – Equipment – Part 2: Non-electrotechnical equipment.*

EN 13411-3:2004, *Terminations for steel wire ropes – Safety – Part 3: Ferrules and ferrule securing.*

EN 13411-4:2002, *Terminations for steel wire ropes – Safety – Part 4: Metal and resin socketing.*

EN 13411-6, *Terminations for steel wire ropes – Safety – Part 6: Asymmetric wedge socket.*

prEN 13411-7, *Terminations for steel wire ropes – Safety – Part 7: Symmetric wedge socket.*

EN 13463-1:2001, *Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic method and requirements.*

EN 13557, *Cranes – Controls and control stations.*

EN 13586, *Cranes – Access.*

prEN 14502-1:2002, *Cranes – Equipment for the lifting of persons – Part 1: Suspended baskets.*

EN 50015, *Electrical apparatus for potentially explosive atmospheres – Oil immersion «o».*

EN 50016, *Electrical apparatus for potentially explosive atmospheres – Pressurized apparatus «p».*

EN 50017, *Electrical apparatus for potentially explosive atmospheres – Powder filling «q».*

EN 50020, *Electrical apparatus for potentially explosive atmospheres – Intrinsic safety «i».*

prEN 50039, *Electrical apparatus for potentially explosive atmospheres – Intrinsically safe electrical systems 'i' - Group II systems for gas atmospheres.*

EN 60079-0:, *Electrical apparatus for explosive gas atmospheres - Part 0: General requirements (IEC 60079-0:2004) / Note: Reprint includes the Corrigendum of 2004-04 and replaces the corrigendum March 2004*

EN 60079-1, *Electrical apparatus for potentially explosive atmospheres – Part 1: Flameproof enclosure "d" (IEC 60079-1:2003) / Note: Reprint includes the corrigendum 2004-03*

EN 60079-7, *Electrical apparatus for explosive gas atmospheres – Part 7: Increased safety «e» (IEC 60079-7:2001).*

EN 60079-14, *Electrical apparatus for explosive gas atmospheres – Part 14: Electrical installations in hazardous areas (other than mines) (IEC 60079-14:2002).*

EN 60079-15, *Electrical apparatus for explosive gas atmospheres – Type of protection «n» (IEC 60079-15:2001, modified).*

EN 60079-18, *Electrical apparatus for explosive gas atmospheres - Part 18: Construction, test and marking of type of protection encapsulation "m" electrical apparatus (IEC 60079-18:2004)*

EN 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments (IEC 60079-6-2:1999, modified).*

EN 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments (IEC 61000-6-4:1997, modified).*

EN 61131-3:1993, *Programmable Controllers – Part 3: Programming languages (IEC 61131-3:2003) / Note: Endorsement notice.*

EN 61310-1, *Safety of machinery – Indication, marking and actuation – Part 1: Requirements for visual, auditory and tactile signals (IEC 61310-1:1995).*

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

EN 61310-3, *Safety of machinery – Indication, marking and actuation – Part 3: Requirements for location and operation of actuators (IEC 61310-3:1999).*

EN ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel – Part 1: Bolts, screws and studs (ISO 898-1:1999).*

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

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

EN ISO 11688-2, *Acoustics – Recommended practice for the design of low-noise machinery and equipment – Part 2: Introduction to the physics of low-noise design (ISO/TR 11688-2:1998).*

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

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

ISO 8566-1, *Cranes – Cabins – Part 1: General.*

ISO 9927-1, *Cranes – Inspections – Part 1: General.*

ISO 12478-1, *Cranes – Maintenance manual – Part 1: General.*

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

ISO 12482-1, *Cranes – Condition monitoring – Part 1: General.*

F.E.M. 1.001 Section I,

Heavy Lifting Appliances, 1998 3rd edition revised

— *Booklet 1 Object and scope*

— *Booklet 2 Classification and loading on structures and mechanisms*

— *Booklet 3 Calculating the stresses in structures*

— *Booklet 4 Checking for fatigue and choice of mechanism components, except for wire rope safety factors Z_p, for which Annex G of this standard applies*

— *Booklet 9 Supplements and comments to booklets 1 to 8*

NOTE New design standards for cranes are under preparation by CEN for which in due course the references to standards issued by FEM in clause 5 of this standard will be substituted by the new design standards, i.e. EN 13001-1 and EN 13001-2, etc.

3 Terms, definitions and symbols

For the purposes of this document, the terms and definitions given in EN 1070:1998 and the following apply.

3.1
active heave compensation system (AHC)
system, which maintains the position of the load using external energy

3.2
actual hook load
total static weight of the load including any equipment placed between the load and the hook

3.3
active rope tensioning system (ART)
system, which forces the tension of the hoisting rope to a predefined value using external energy

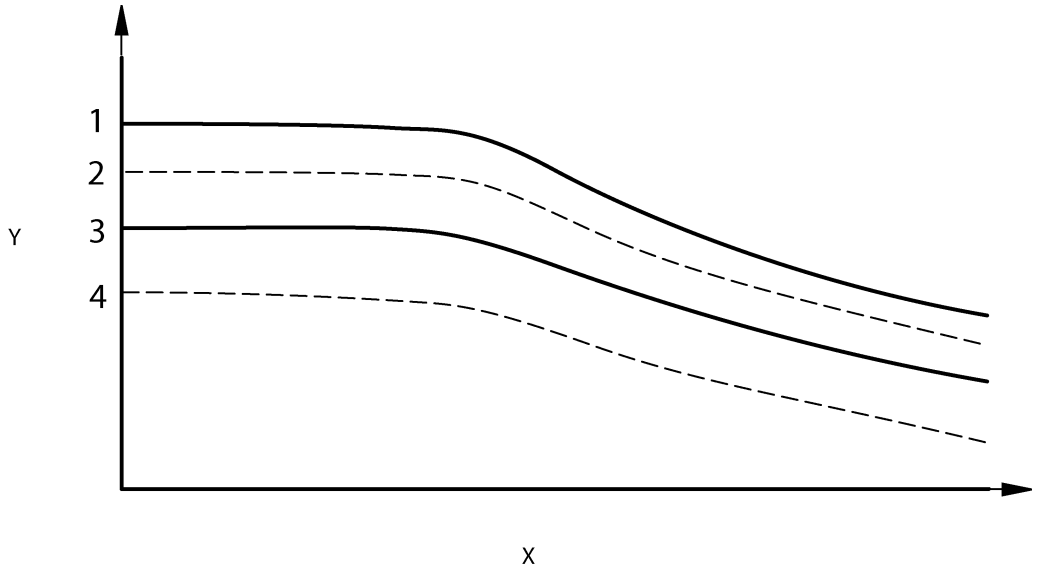
3.4
component
single part or assembly of parts of a crane, which is subjected to load effects (e.g. ropes (stationary or running), traverse beams, pendant bars, sheaves, axles, gears, couplings, brakes, hoists, hydraulic cylinders, rope sheaves, shafts and pins)

3.4.1
primary component
component which is essential for the safety and structural integrity of the crane

3.4.2
secondary component
any component that is not a primary component

3.5
crane stiffness (C)
vertical static force applied at the hook required to produce unit vertical deflection assuming the pedestal support structure to be rigid

3.6
design load
maximum theoretical load ($R_0 \times \Phi_0$) that can be safely lifted by the crane at any given radius/outreach in the design condition such that the permissible stresses are not exceeded, see Figure 1



$R_0 \times \Phi_0 \geq R_n \times \Phi_n$ + "Loss" (1)

Key

X	Radius/outreach
Y	Load
1	Design load R_0 x Φ_0
2	Operational design load R_n x Φ_n
3	Still water lift ($H_{1/3}$ = 0 m) R_0
4	Sea lift R_n
“Loss”	Effects due to environmental conditions and out of-plane influences

Figure 1 – Design load

3.7
design moment
maximum moment caused by the design load multiplied by radius

3.8
design temperature (T_d)
reference temperature for the area in which the crane is operated, used as a criterion for the selection of materials. The design temperature shall be taken as the lowest mean daily air temperature with an annual probability of exceedance of 10^{-2}

3.9
dynamic coefficient (Φ_n)
ratio between the maximum dynamic load at the hook and the actual hook load for any given configuration or operating condition

3.10
emergency load release system (ELRS)
system activated by the crane operator, that protects the crane against overload and over-moment by allowing the hoisting wire to be pulled away from the crane, thus reducing the load carrying capacity

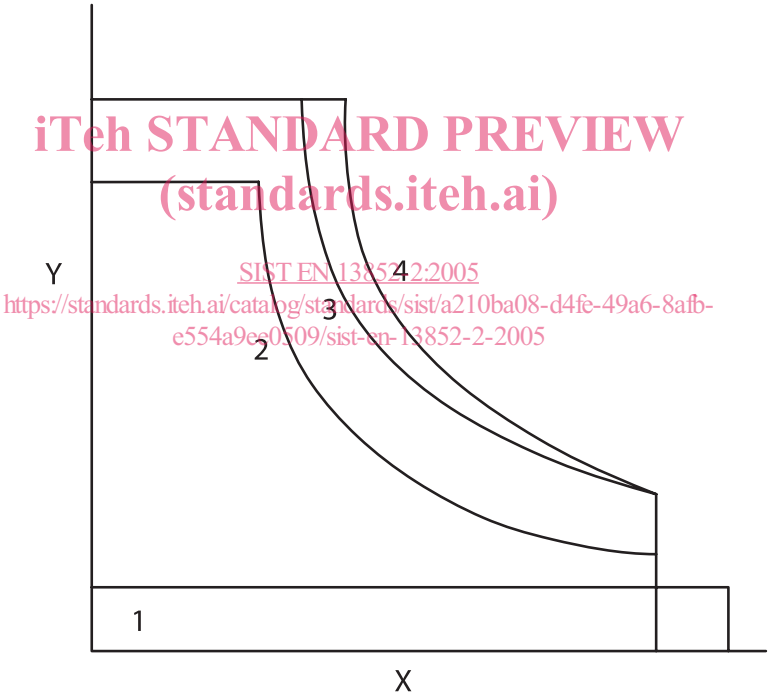
3.11
floating crane
crane permanently mounted on a vessel designed for its support and transport, primarily intended for construction/deconstruction operations in a marine environment

3.12
folding system
mechanical system, which causes the knuckle boom assembly to be folded or unfolded

3.13
hazardous area
area in which a potentially explosive atmosphere (gas and/or dust) can be present

3.14
load chart
diagram or table showing the rated capacity relative to the radius/outreach, environmental conditions, out of plane influences and type of operation. The load chart shall state the in service operational limits of the crane, e.g. wind, heel, trim, ice, etc.

An example is given in Figure 2.



Key

X	Radius/outreach
Y	Rated capacity
1	Aux. hoist rated capacity R_{a0} for still water lifts with wave height $H_{1/3}$ = 0 m
2	Main hoist rated capacity R_2 for sea lifts with wave height $H_{1/3}$ = 2 m
3	Main hoist rated capacity R_1 for sea lifts with wave height $H_{1/3}$ = 1 m
4	Main hoist rated capacity R_0 for still water lifts with wave height $H_{1/3}$ = 0 m

Figure 2 – Load chart