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Cranes - Power driven winches and hoists - Part 2: Power driven hoists

Krane - Kraftgetriebene Winden und Hubwerke - Teil 2: Kraftgetriebene Hubwerke

Appareils de levage à charge suspendue - Treuils et palans motorisés - Partie 2: Palans motorisés

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Cranes - Power driven winches and hoists - Part 2: Power driven hoists

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

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European foreword

This document (EN 14492-2:2019) 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of an identical text or by endorsement, at the latest by December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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 14492-2:2006+A1:2009.

CEN/TC 147 WG 17 has reviewed EN 14492-2:2006+A1:2009 to adapt the standard to the technical progress, new requirements and changes in standards referenced; the main topics are:

— the design and calculation references to EN 13001-1, EN 13001-2 and EN 13001-3-1 are adopeted in the document FEM-documents FEM 1.001, FEM 9.901 are no longer referenced;

— the design and calculation to EN 13001-3-2, *Limit states and proof of competence of wire ropes in reeving systems* is adopted in the document. The standard ISO 4308-1:2003, in the Chapter 5.7 Rope drives is no longer referenced.

— the design and calculation to EN 13001-3-5, *Limit states and proof of competence of forged hooks* is adopted in the document. The standards DIN 15400, UNI 9465 in the Annex H (informative) are no longer referenced;

— a guidance of relationships between the FEM and ISO-Classification (Hoist Classification) and the new Classification according to the EN 13001 series is added; see Annex C;

— the EN 14492-2 references to EN 13135;

— this document will supersede EN 14492-2:2006+A1:2009 and the relevant clauses of EN 14492-1:2006+A1:2009 winches dealing with lifting applications.

This is the second part of the standard “*Cranes — Power driven winches and hoists*”. The parts of the standard are:

— *Part 1: Power driven winches*

— *Part 2: Power driven hoists* [the present document]

For the relationship with other European Standards for cranes, see Annex O.

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 Annexes ZA and ZB, which are integral parts of this document.

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

Introduction

This European standard is a harmonized standard to provide one means for power driven hoists to conform to the essential health and safety requirements of the EU Directive 2006/42/EC (Machinery) and essential safety requirements of EU Directive 2014/34/EU (ATEX).

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

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

1 Scope

This document is applicable to the design, information for use, maintenance and testing of power driven hoists, compact or open construction, with or without trolleys for which the prime mover is an electric, hydraulic or pneumatic motor. They are designed for the lifting and lowering of loads that are suspended on hooks or other load lifting attachments. Hoists can be used either in cranes, in other machines, e.g. rail dependent storage and retrieval equipment, monorail conveyors or by itself.

This document is applicable to the following types of hoist:

a) rope hoist;

b) chain hoist;

c) belt hoist, except belt hoist with steel belts as hoisting media;

d) NGL building hoists including supporting structures;

e) Winches used for lifting operation.

This document is not applicable of the following hazards:

f) this document does not cover hazards related to builders hoists for the transport of goods as defined in Noise Outdoor Directive (OND) 2000/14/EC;

g) this document does not cover hazards related to the lifting of persons.

This document does not specify additional requirements for hazards related to the use of hoists in explosive atmospheres in underground mines.

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

This document is not applicable to power driven hoists that are manufactured before the date of publication of this document by CEN.

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.

EN 81-50:2014, *Safety rules for the construction and installation of lifts — Examinations and tests — Part 50: Design rules, calculations, examinations and tests of lift components*

EN 818-1:1996+A1:2008, *Short link chain for lifting purposes — Safety — Part 1: General conditions of acceptance*

EN 818-7:2002+A1:2008, *Short link chain for lifting purposes — Safety — Part 7: Fine tolerance hoist chain, Grade T (Types T, DAT and DT)*

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

EN 12077-2:1998+A1:2008, *Cranes safety — Requirements for health and safety — Part 2: Limiting and indicating devices*

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

EN 13001-1, *Cranes — General design — Part 1: General principles and requirements*

EN 13001-2, *Crane safety — General design — Part 2: Load actions*

EN 13001-3-1, *Cranes — General Design — Part 3-1: Limit States and proof competence of steel structure*

EN 13001-3-2, *Cranes — General design — Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*

EN 13001-3-3, *Cranes — General design — Part 3-3: Limit states and proof of competence of wheel/rail contacts*

EN 13001-3-5, *Cranes — General design — Part 3-5: Limit states and proof of competence of forged hooks*

EN 13135, *Cranes — Safety — Design — Requirements for equipment*

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

EN 13411-4, *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*

EN 13411-7, *Terminations for steel wire ropes — Safety — Part 7: Symmetric wedge socket*

EN 13557:2003+A2:2008, *Cranes — Controls and control stations*

EN 60034-5, *Rotating electrical machines — Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) — Classification (IEC 60034-5)*

EN 60079-0:2012, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2011)*

EN 60079-14, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14)*

EN 60204-32:2008, *Safety of machinery — Electrical equipment of machines - Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 61000-6-2, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2)*

EN 61000-6-3, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments (IEC 61000-6-3)*

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

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 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414)*

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

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

EN ISO 12100, *Safety of machinery — General principles for design - Risk assessment and risk reduction (ISO 12100)*

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

EN ISO 13849-1, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1)*

EN ISO 13850:2015, *Safety of machinery — Emergency stop function — Principles for design (ISO 13850:2015)*

EN ISO 80079-36, *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36)*

EN ISO 80079-37, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k" (ISO 80079-37)*

ISO 606, *Short-pitch transmission precision roller and bush chains, attachments and associated chain sprockets*

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

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

ISO 4309, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

ISO 12482, *Cranes — Monitoring for crane design working period*

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1) ISO 4301:1986 is "time based" approached and changed in the updated versions.

3 Terms, definitions and symbols

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100, ISO 4306-1 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 http://www.iso.org/obp

3.1.1
belt drive
system of belts as hoisting medium including related belt pulleys, belt drums and belt anchorages

Note 1 to entry: Belts in transmissions of drive forces are excluded.

3.1.2
chain drive
system of fine tolerance steel link chains, roller chains, driven and non-driven chain wheels and chain anchorages

3.1.3
chain anchorage
arrangement comprising the parts which connect the loaded chain end termination to the major load bearing structure, e.g. pins, bolts, tension rods

3.1.4
belt anchorage
arrangement comprising the parts which connect the belt end termination to the major load bearing structure, e.g. pins, bolts, tension rods, the belt fastening on the drum are not included

3.1.5
working coefficient for ropes, chains and belts
ratio between the minimum breaking force and the maximum static tensile force of the ropes, chains and belts under rated capacity m_{RC}

3.1.6
direct control
main power circuit is directly controlled by the hand controlled actuator without additional means between the actuator and the main power circuit