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Cranes - Power driven winches and hoists - Part 1: Power driven winches

Krane - Kraftgetriebene Winden und Hubwerke - Teil 1: Kraftgetriebene Winden

Appareils de levage à charge suspendue - Treuils et palans motorisés - Partie 1 : Treuils motorisés

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ICS:

53.020.20 Dvigala Cranes

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Cranes - Power driven winches and hoists - Part 1: Power driven winches

Appareils de levage à charge suspendue - Treuils et palans motorisés - Partie 1 : Treuils motorisés

Krane - Kraftgetriebene Winden und Hubwerke - Teil 1: Kraftgetriebene Winden

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 147.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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prEN 14492-1:2015 (E)**Foreword**

This document (prEN 14492-1:2015) has been prepared by Technical Committee CEN/TC 147 “Cranes — Safety”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14492-1:2006+A1:2009.

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 and ZB, which is an integral part of this document.

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

- *Part 1: Power driven winches* [the present document];
- *Part 2: Power driven hoists*.

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

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Introduction

This European standard is a harmonized standard to provide one means for power driven winches to conform to the essential health and safety requirements the Machinery Directive 2006/42/EC.

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 in accordance with the provisions of this type C standard.

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prEN 14492-1:2015 (E)**1 Scope**

This draft European Standard is applicable to the design, information for use, maintenance and testing of power driven winches for which the prime mover is an electric motor, hydraulic motor, internal combustion motor or pneumatic motor. Winches are designed for the movement or manipulation of loads supported on level or inclined planes in situations where risks resulting from a failure of the winding mechanism or pulling medium are mitigated by external control measures.

This draft European Standard is not applicable to devices which handle freely suspended loads, e.g. construction winches.

Generally, a winch is used without any additional transport movement, except in cases where a winch is used on a stranded vehicle for self-recovery of the vehicle.

This European Standard is applicable to the following types of winch:

- a) rope winches;
- b) belt winches, except steel belts used as pulling media;
- c) traction winches.

These types of winches a) to c) also include the following specific applications:

- vehicle recovery winches;
- winches on boat trailers;
- forestry winches;
- winches for stationary offshore applications;
- winches for drilling applications.

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NOTE Examples are shown in Annex A.

This European Standard does not apply to:

- power-driven hoists in accordance with EN 14492-2;
- winches for seagoing vessels and mobile offshore units;
- winches for the lifting of persons;
- NGL building hoists in accordance with EN 14492-2;
- winches for the handling of hot molten masses (risk covered by EN 14492-2).

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

This European Standard does not specify additional requirements for hazards related to the use of winches in explosive atmospheres in underground works.

This document applies to winches manufactured after approval by CEN with a transitional period of 2 years.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 983:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Pneumatics*

EN 1127-1:2011, *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 12644-1:2001+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, *Crane safety — General design — Part 2: Load actions*

EN 13001-3-1:2012+A1:2013, *Cranes — General Design — Part 3-1: Limit States and proof competence of steel structure*

EN 13001-3-2:2014, *Cranes — General design — Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*

prEN 13001-3-5:2013, *Cranes — General design — Part 3-5: Limit states and proof of competence of forged hooks*

EN 13135:2013, *Cranes — Safety — Design — Requirements for equipment*

EN 13411-3:2004+A1:2008, *Terminations for steel wire ropes — Safety — Part 3: Ferrules and ferrule-securing*

EN 13411-4:2011, *Terminations for steel wire ropes — Safety — Part 4: Metal and resin socketing*

EN 13411-6:2004+A1:2008, *Terminations for steel wire ropes — Safety — Part 6: Asymmetric wedge socket*

EN 13411-7:2006+A1:2008, *Terminations for steel wire ropes — Safety — Part 7: Symmetric wedge socket*

EN 13463-1:2009, *Non-electrical equipment for use in potentially explosive atmospheres — Part 1: Basic method and requirements*

EN 13463-5:2011, *Non-electrical equipment intended for use in potentially explosive atmospheres — Part 5: Protection by constructional safety 'c'*

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

EN 14492-2:2006, *Cranes — Power driven winches and hoists — Part 2: Power driven hoists*

EN 60034-5:2001, *Rotating electrical machines — Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) — Classification (IEC 60034-5:2000)*

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

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EN 60079-1:2007, *Explosive atmospheres — Part 1: Equipment protection by flameproof enclosures "d"* (IEC 60079-1:2007)

EN 60079-2, *Explosive atmospheres — Part 2: Equipment protection by pressurized enclosure "p"* (IEC 60079-2:2007)

EN 60079-5:2007, *Explosive atmospheres — Part 5: Equipment protection by powder filling "q"* (IEC 60079-5:2007)

EN 60079-6:2007, *Explosive atmospheres — Part 6: Equipment protection by oil immersion "o"* (IEC 60079-6:2007)

EN 60079-7:2003, *Explosive atmospheres — Part 7: Equipment protection by increased safety "e"* (IEC 60079-7:2001)

EN 60079-11:2012, *Explosive atmospheres — Part 11: Equipment protection by intrinsic safety "i"* (IEC 60079-11:2011)

EN 60079-18:2009, *Explosive atmospheres — Part 18: Equipment protection by encapsulation "m"* (IEC 60079-18:2009)

EN 60079-25:2010, *Explosive atmospheres — Part 25: Intrinsically safe electrical systems* (IEC 60079-25:2010)

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

EN 60529:1991, *Degrees of protection provided by enclosures (IP Code)*

EN 61000-6-2:2005, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments* (IEC 61000-6-2:2005)

EN 61000-6-3:2001, *Electromagnetic compatibility (EMC) — Part 6-3: Generic standards — Emission standard for residential, commercial and light-industrial environments (CISPR/IEC 61000-6-3:1996, modified)*

EN 61000-6-4:2007, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments* (IEC 61000-6-4:2006)

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

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 11688-1:1998, *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 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design* (ISO 13849-1:2006)

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

ISO 12482:2014, *Cranes — Monitoring for crane design working period*

FEM 9.901:1991, *Rules for the design of series lifting equipment and cranes equipped with series lifting equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100 and the following apply.

3.1

winch

machine designed for the movement or manipulation of a load supported on level or inclined planes using a pulling medium (e.g. rope) and winding mechanism

Note 1 to entry: Examples are given in Annex A.

3.2

anchorage

complete device to anchor the pulling media to a fixed point

3.3

belt drive

system of belts, belt pulleys, belt drums and belt anchorages

3.4

direct control

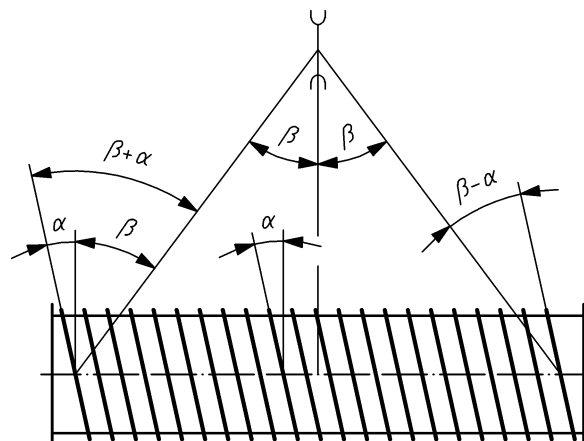
main power circuit is directly controlled by the hand controlled actuator without additional means between the actuator and the main power circuit

3.5

fleet angle

angle β or $\beta - \alpha$ or $\beta + \alpha$ (see Figure 1)

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Key

β	= fleet angle on the pulley
$\beta - \alpha$ or $\beta + \alpha$	= fleet angle on the drum
α	= angle of the grooves on the drum

Figure 1 — Fleet angle

Note 1 to entry: On drums without grooves, the fleet angle is the angle between the rope axis and a line drawn perpendicular to the axis of the drum.

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- 3.6**
force transmission
two or more connected parts which transmit forces
- 3.7**
forestry winches
rope winches fitted to forestry machines such as pushing tractors and row crop tractors according to ISO 6814 and used on agricultural tractors, e.g. for fitting in a three-point rod assembly, used in the forest
- 3.8**
hydraulic components
elements (e.g. valves, filters) interconnected and forming an operational hydraulic system
- 3.9**
hydraulic overpressure
pressure exceeding the rated pressure or dynamic pressure
- 3.10**
hydraulic systems
definition in ISO 5598 applies
- 3.11**
hydraulic transmission
supply, control and distribution of energy by means of pressurised fluid
- 3.12**
indirect control
main power circuit is controlled by additional means between the hand controlled actuator and the main power circuit
- 3.13**
raising/lowering
movement of the load which results in a change to its vertical position
- 3.14**
maximum speed
maximum of all speeds in accordance with the intended purpose
- Note 1 to entry: For inverter driven winches this speed can occur at the maximum frequency but with a load smaller than the maximum pulling force of the winch.
- 3.15**
power source
provider of the energy to drive the prime mover of a winch e.g.: electrical, hydraulic, pneumatic, or by internal combustion
- 3.16**
pulling
moving of loads supported on level or inclined planes where the removal of the pulling force or a failure of the pulling mechanism or pulling medium results either in no movement, or controllable movements of the load
- Note 1 to entry: A controllable movement means a movement which can be affected by external control measures (see Scope).
- 3.17**
pulling medium
means by which the winch is connected to the load (e.g. rope, belt)

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3.18**pulling force limiter**

device that automatically prevents the winch from pulling loads in excess of its rated pulling force, taking into account the dynamic effects occurring during normal operational use

3.19**rated lowering speed**

linear speed of the pulling medium when paying-out under the influence of a load corresponding to the maximum pulling force of the winch, which implies:

- in case of electric motors the rated voltage and rated frequency applies;
- in case of hydraulic motors the rated flow applies;
- in case of pneumatic motors the rated pressure applies;

for rope winches, the speed at the lowest rope-layer on the drum

3.20**rated pressure**

pressure in hydraulic or pneumatic systems at which the component is intended to operate for a number of repetitions sufficient to assure adequate service life

3.21**rated pulling force**

largest force which the winch is designed to pull

Note 1 to entry: In the case of winches with multi-layer winding, this is the value in the bottom layer of the drum.

3.22**rated pulling speed**

linear speed of the load when pulling under the effect of a load corresponding to the maximum pulling force of the winch

- in case of electric motors, the rated voltage and rated frequency applies;
- in case of hydraulic motors, the rated flow applies;
- in case of pneumatic motors, the rated pressure applies

3.23**rope anchorage**

arrangement comprising the parts which connect the rope termination to the major load bearing structure, e.g. pins, bolts, compensating levers, tension rods

Note 1 to entry: This does not include the rope fastening on the rope drum.

3.24**rope drive**

system of ropes running on rope drums or traction sheaves and over rope sheaves, and rope attachment parts

3.25**rope end termination**

arrangement that has direct contact with the rope in order to allow its connection to e.g. rope anchorage and hook