



SLOVENSKI STANDARD
SIST EN 14492-1:2007
01-januar-2007

Dvigala (žerjavi) - Motorni vitli in dvižni mehanizmi - 1. del: Motorni vitli

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

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

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

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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 European Standard was approved by CEN on 19 August 2006.

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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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Contents

	Page
Foreword.....	5
Introduction.....	6
1 Scope.....	7
2 Normative references.....	8
3 Terms and definitions.....	10
4 List of significant hazards.....	14
5 Safety requirements and/or protective measures.....	19
5.1 General.....	19
5.2 Devices.....	20
5.3 Couplings.....	27
5.4 Brakes for lifting and lowering movements.....	27
5.5 Gearbox.....	28
5.6 Load hooks.....	28
5.7 Rope drive.....	28
5.8 Chain drives.....	31
5.9 Belt drives.....	32
5.10 Pneumatic equipment.....	33
5.11 Hydraulic equipment.....	35
5.12 Electrical equipment of winches.....	38
5.13 Reduction of noise by design.....	41
5.14 Winches for use in a potentially explosive atmosphere.....	42
5.15 Additional requirements for vehicle recovery winches and winches on boat trailers.....	43
5.16 Additional requirements for forestry winches.....	44
5.17 Additional and deviating requirements for winches for pulling purposes.....	45
6 Verification of the safety requirements and/or protective measures.....	46
6.1 Winches manufactured in series.....	46
6.2 Winches designed individually.....	47
7 User information.....	56
7.1 General.....	56
7.2 Special requirements.....	56
7.3 Marking.....	58
Annex A (informative) Examples of winches.....	59
A.1 Drum winches.....	59
A.2 Traction winches.....	60
A.3 Vehicle recovery winches.....	62
A.4 Winches for boat trailers.....	62
A.5 Forestry winches.....	63
Annex B (informative) Additional requirements for winches intended to be used in potentially explosive atmospheres.....	64
B.1 Introduction.....	64
B.2 General.....	64
B.3 Hazard sources in explosion hazard areas.....	65
B.3.1 Electrically caused hazards.....	65
B.3.2 Mechanically caused hazards.....	65
B.3.3 Hazards caused by environmental conditions.....	65
B.3.4 Measures to eliminate hazards in explosion hazard areas.....	66
B.3.5 Marking.....	66
B.4 User information.....	66
Annex C (informative) Additional requirements for operation in aggressive environments and outdoors.....	67

C.1	General.....	67
C.2	Ropes and chains.....	67
Annex D (informative) Additional requirements for operation at low temperatures		69
Annex E (informative) Documents for hooks		70
Annex F (normative) Noise test code		71
F.1	Scope	71
F.2	Standards used in this annex.....	71
F.3	Description of the machine family	71
F.4	Determination of the emission sound pressure level at the operator's position by measurement	71
F.4.1	General.....	71
F.4.2	Winches other than construction winches	72
F.5	Determination of the sound power level	72
F.5.1	General.....	72
F.5.2	Winches other than construction winches	72
F.5.3	Construction winches	73
F.6	Mounting and operating conditions	74
F.6.1	General.....	74
F.6.2	Winches other than construction winches	75
F.6.3	Construction winches	75
F.7	Uncertainties	75
F.8	Information to be recorded.....	75
F.9	Information to be reported.....	75
F.10	Declaration and verification of noise emission values.....	76
Annex G (informative) Selection of a suitable set of cranes standards for a given application.....		77
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 98/37/EC.....		78
Annex ZB (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC.....		79
Bibliography.....		80

Figures

Figure 1 — Fleet angle	11
Figure 2 — Undercut groove base profile	31
Figure A.1.1 — Drum winch, manufactured in series	59
Figure 1.2 — Drum winch, manufactured individually.....	59
Figure A.1.3 — Drum winch, pneumatically driven.....	59
Figure A.2.1 — Traction winch, standard type	60
Figure A.2.2 — Traction winch with 2 load bearing ropes and storage drum.....	60
Figure A.2.3 — Traction winch with storage drum.....	61
Figure A.3.1 — Vehicle recovery winch with electrical drive.....	62
Figure A.3.2 — Vehicle recovery winch with hydraulic drive.....	62
Figure A.4.1 — Winch for boat trailers with electrical drive.....	62

EN 14492-1:2006 (E)

Figure A.5.1 — Forestry winch with rope drum and hydraulic drive.....	63
Figure F.1 — Microphone positions on the hemisphere	74

Tables

Table 1 — List of significant hazards and associated requirements	15
Table 2 — Values for v_h for estimation of ϕ_{IAL}	25
Table 3 — Limit revolutions for three-phase slipping motors	40
Table 4 — Stall torques for three-phase slipping motors with contactor control	40
Table 5 — Methods to be used to verify conformity with the safety requirements and/or measures	48
Table F.1 — Coordinates of the 6 microphone positions	73

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<https://standards.iteh.ai/catalog/standards/sist/b2beb6da-b00c-4a40-ba00-f7a9b3b8f9d4/sist-en-14492-1-2007>

Foreword

This document (EN 14492-1:2006) 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 March 2007, and conflicting national standards shall be withdrawn at the latest by March 2007.

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

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

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

— Part 2: Power driven hoists

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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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 14492-1:2006 (E)**Introduction**

This European Standard is a harmonised standard to provide one means for power driven winches to conform to the essential health and safety requirements of the Machinery Directive, as amended.

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 12100-1.

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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SIST EN 14492-1:2007

<https://standards.iteh.ai/catalog/standards/sist/b2beb6da-b00c-4a40-ba00-f7a9b3b8f9d4/sist-en-14492-1-2007>

1 Scope

This 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. They are designed for the lifting and lowering of loads which are suspended on hooks or other load handling devices or for the lifting and lowering of loads on inclined planes or the exclusive pulling of loads on planes which are normally horizontal.

NOTE Within the period of utilization, the place of use of a winch may be variable.

As a rule, a winch is used without any additional transport movement.

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

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

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

- vehicle recovery winches;
- winches on boat trailers;
- forestry winches;
- winches for stationary offshore applications;
- winches for drilling applications;
- winches to be used exclusively for the pulling of loads.

NOTE Examples are shown in Annex A.

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EN 14492-1:2006 (E)

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

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

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

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

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

EN 12644-2:2000, *Cranes — Information for use and testing — Part 2: Marking*

EN 13001-2:2004, *Cranes — General design — Part 2: Load actions*

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

EN 13411-7:2003, *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 13463-5:2003, *Non-electrical equipment intended for use in potentially explosive atmospheres — Part 5: Protection by constructional safety "c"*
- EN 13557:2003, *Cranes — Controls and control stations*
- EN 14492-2:2006, *Cranes — Power driven winches and hoists — Part 2: Power driven hoists*
- EN 60034-1:2004, *Rotating electrical machines — Part 1: Rating and performance (IEC 60034-1:2004)*
- EN 60079-0:2004, *Electrical apparatus for explosive gas atmospheres — Part 0: General requirements (IEC 60079-0:2004)*
- EN 60079-7:2003, *Electrical apparatus for explosive gas atmospheres — Part 7: Increased safety 'e' (IEC 60079-7:2001)*
- EN 60204-32:1998, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines (IEC 60204-32:1998)*
- 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 (IEC 61000-6-3:1996, 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 ISO 3744:1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essential 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 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 11688-1:1995)*
- 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 606:2004, *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*
- ISO 4308-1:2003, *Cranes and lifting appliances — Selection of wire ropes — Part 1: General*
- ISO 12482-1:1995, *Cranes — Condition monitoring — Part 1: General*
- FEM 1.001:1998, *Rules for the design of hoisting appliances, booklets 1, 2, 3, 4, 5 and 8*

EN 14492-1:2006 (E)

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 12100:2003 and the following apply.

3.1**anchorage**

complete device to anchor the hoisting media to a fixed point

3.2**belt drive**

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

3.3**chain drive**

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

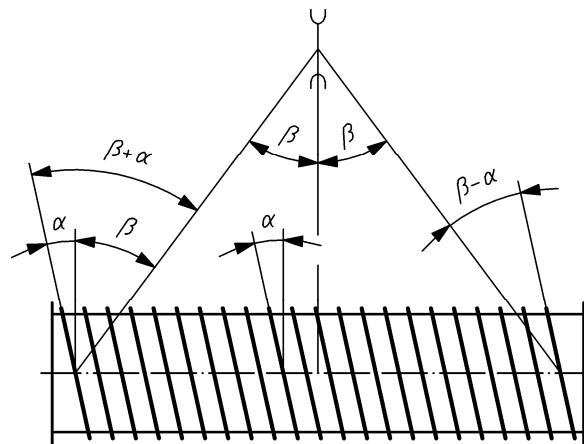
3.5**fleet angle**

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

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Figure 1 — Fleet angle

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

3.6**force transmission**

two or more connected parts which transmit forces

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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 for pushing works in the forest

3.8**hoist medium or pulling medium**

either rope, belt, steel link chain or roller chain that connects the winch to the load

3.9**hydraulic components**

elements (e.g. switches, valves, filters) interconnected and forming an operational hydraulic system

3.10**hydraulic overpressure**

pressure exceeding the rated pressure or dynamic pressure

3.11**hydraulic systems**

definition in ISO 5598 applies

3.12**hydraulic transmission**

supply, control and distribution of energy by means of pressurised fluid

EN 14492-1:2006 (E)**3.13****indirect control**

main power circuit is controlled by additional means between the hand controlled actuator and the main power circuit

3.14**lifting/lowering**

movement of loads with the level of the load being changed

NOTE Lifting/lowering is the vertical or the vertical and horizontal movement of the loads and all combinations.

3.15**maximum speed**

maximum of all speeds in the kind of movement in accordance with the intended purpose (lifting, lowering, pulling)

NOTE For inverter driven winches this speed can occur at the maximum frequency but with a load smaller than the rated capacity of the winch.

3.16**power source**

energy to drive the prime mover of a winch e.g.: electrical, hydraulic, pneumatic, or by internal combustion

3.17**pulling**

moving of loads on planes which are normally horizontal; in case of the pulling force being removed from the load, caused by stopping or failure of the winch including hoist media, no load movement takes place. For each working cycle, the pulling media needs to be spooled off respectively pulled out

NOTE Pulling is a special case of a load movement with the load movement taking place on a surface, the inclination of which is almost zero or insubstantial.

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3.18**pulling force**

force which the winch is designed to pull

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3.19**rated capacity**

load that the winch is designed to lift; in case of winches with multi-layer winding, this is the value in the top layer of the drum

3.20**rated capacity limiter**

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

This can be achieved by limiting the force flow (direct acting rated capacity limiter) or by switching off the energy supply to the lifting drive and stopping the lifting movement (indirect acting rated capacity limiter)

3.21**rated lifting speed**

linear speed of the load when lifting a load corresponding to the rated capacity of the winch

— in case of electric motors at rated voltage and rated frequency as indicated on the nameplate;

— in case of hydraulic motors at rated flow as indicated on the nameplate;

— in case of pneumatic motors at rated pressure as indicated on the nameplate.

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

3.22**rated lowering speed**

linear speed of the hoist medium when lowering a load corresponding to the rated capacity 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.

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

3.23

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

3.24

rated pulling speed

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

3.25

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

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NOTE This does not include the rope fastening on the rope drum.

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3.26

rope drive

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

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3.27

rope end termination

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

3.28

rope fastening on the rope drum

all parts with which the rope is fastened on the rope drum

3.29

stall torque (of an a.c. motor)

maximum steady-state asynchrony torque which the motor develops without an abrupt drop in speed, when the motor is supplied at the rated voltage and frequency

3.30

vehicle recovery winches

winches fitted e.g. onto a service car. They are used for loading or pulling an inoperative vehicle onto the service car, or for partly lifting an inoperative vehicle. Also, they may be used for unloading or pulling off an inoperative vehicle.

Vehicle recovery winches may also be directly fitted to a vehicle and used for self-recovery and/or recovery of another vehicle

3.31

winches

machines designed for the lifting and lowering of loads which are suspended on hooks or other load handling devices, or for the moving (pulling and lowering) of loads on inclined planes, or the exclusive pulling of loads on