

Kraanad. Ohutus. Konstruktsioon. Nõuded seadmetele
Cranes - Safety - Design - Requirements for equipment

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Cranes - Safety - Design - Requirements for equipment

Appareils de levage à charge suspendue - Sécurité -
Conception - Prescriptions relatives à l'équipement

Krane - Sicherheit - Konstruktion - Anforderungen an die
Ausrüstungen

This European Standard was approved by CEN on 5 January 2013.

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Contents

Page

Foreword.....	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	8
4 List of significant hazards	11
5 Safety requirements and/or protective measures.....	14
5.1 General	14
5.2 Electrical equipment	14
5.2.1 General	14
5.2.2 Physical environment and operating conditions.....	15
5.2.3 Electrical supply.....	15
5.2.4 Protection against electric shock by direct contact.....	15
5.2.5 Control circuits and control functions.....	15
5.2.6 Operator interface and mounted control devices.....	16
5.2.7 Power driven motions	16
5.2.8 Selection of motors.....	16
5.3 Mechanical equipment.....	24
5.3.1 General	24
5.3.2 Clutches and couplings.....	25
5.3.3 Brakes.....	25
5.3.4 Gear drives	28
5.3.5 Wheels on rails.....	29
5.3.6 Rope systems.....	30
5.3.7 Chain systems.....	33
5.3.8 Belt systems.....	34
5.3.9 Adjustment rods.....	35
5.3.10 Compensating means	36
5.4 Structures associated with mechanical equipment.....	36
5.4.1 Structures.....	36
5.4.2 Structural equipment	36
5.5 Fluid power systems.....	37
5.5.1 Controls and control devices of fluid power systems.....	37
5.5.2 Protective measures	38
5.5.3 Overload testing.....	38
5.5.4 Hydraulic equipment.....	39
5.5.5 Pneumatic equipment	41
5.6 Fixed load lifting attachments	42
5.6.1 General	42
5.6.2 Hooks.....	43
5.7 Equipment for safeguarding	44
5.7.1 General	44
5.7.2 Safety related functions of control systems.....	45
5.7.3 Measures to decrease the consequences of loss of drive power.....	45
5.7.4 Safety devices to prevent overrunning of movements.....	45
5.7.5 Derailment safety device.....	46
5.7.6 Provisions to prevent tipping	47
5.7.7 Storm-locking.....	47
5.7.8 Anti-collision device	47

5.8	Environmental effects	48
5.8.1	Protection against weakening of material.....	48
5.8.2	Temperature	48
5.9	High risk applications	49
5.9.1	General	49
5.9.2	Decreasing of the probability of occurrence of harm.....	49
5.9.3	Additional requirements for the transportation of hot molten metal	51
6	Verification of the safety requirements and/or protective measures.....	55
7	Information for use.....	59
7.1	General	59
7.2	Instructions for operation in special situations	59
7.3	Instructions for installation and maintenance	59
7.4	Maintenance instructions in the case of high risk applications.....	60
7.5	Marking.....	60
Annex A	(informative) Selection of a suitable set of crane standards for a given application	61
Annex B	(informative) Design of rail wheel flanges.....	62
Annex C	(informative) Guidance on rope systems	64
Annex D	(informative) Specification of endurance of equipment.....	65
D.1	Basic approach.....	65
D.2	Examples of application.....	66
D.2.1	Roller bearing	66
D.2.2	Lifting attachment, fixed or non-fixed	66
D.2.3	Turnbuckle.....	67
D.2.4	Electromechanical component.....	67
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	68
Bibliography	69

Foreword

This document (EN 13135:2013) 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 August 2013, and conflicting national standards shall be withdrawn at the latest by August 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13135-1:2003+A1:2010 and EN 13135-2:2004+A1:2010.

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.

Since the previous edition, major changes have been made in 5.2.8, 5.3.3.2, 5.3.3.5, 5.3.6.2, 5.6.2, 5.7.2, 5.9 and in Annex D, which deals with a new issue. There are several updates in standard references, and a number of clauses have been redrafted for reasons of clarity and technical and editorial accuracy.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard is a type C standard as stated in EN ISO 12100.

This European Standard has been prepared to provide one means for equipment of 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.

1 Scope

This European Standard specifies requirements for the design and selection of electrical, mechanical, hydraulic and pneumatic equipment used in all types of cranes and their associated fixed load lifting attachments with the objectives of protecting personnel from hazards affecting their health and safety and of ensuring reliability of function.

NOTE Specific requirements for particular types of cranes, and for load lifting attachments, are given in the appropriate European Standard.

The electrical equipment covered by this European Standard commences at the point of connection of the supply to the crane (the crane supply switch) including systems for power supply and control feeders situated outside the crane, e.g. flexible cables, conductor wires or bars, electric motors and cableless controls.

The principles to be applied for cranes transporting hazardous loads are given in this standard. Particular requirements are given for cranes transporting hot molten metal.

The standard does not cover the detail design of individual items of equipment except with regard to their selection for specific aspects of use.

In general, the proof of competence calculations and related strength requirements or safety margins of equipment and components are not covered by this standard. These questions are covered in EN 13001 parts 1 and 2, and in the EN 13001-3 series that is partly under preparation (see Annex A). Exceptionally, some safety margins are given here for items not covered in EN 13001-series.

Hazards due to noise are not covered by this standard. They are addressed in safety standards specific to each type of crane.

The specific hazards due to potentially explosive atmospheres, ionising radiation, and operation in electromagnetic fields beyond the range of EN 61000-6-2 are not covered by this European Standard.

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

This European Standard is not applicable to cranes, which are manufactured before the date of publication by CEN of this standard.

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

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

EN 1037, *Safety of machinery — Prevention of unexpected start-up*

EN 1561, *Founding — Grey cast irons*

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

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

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*
- CEN/TS 13001-3-2, *Cranes — General design — Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*
- CEN/TS 13001-3-5, *Cranes — General design — Part 3-5: Limit states and proof of competence of forged hooks*
- EN 13155, *Cranes — Safety — Non-fixed load lifting attachments*
- EN 13411-1, *Terminations for steel wire ropes — Safety — Part 1: Thimbles for steel wire rope slings*
- 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 13480-3, *Metallic industrial piping — Part 3: Design and calculation*
- EN 13557, *Cranes — Controls and control stations*
- EN 60034-1:2010, *Rotating electrical machines — Part 1: Rating and performance*
- EN 60204-11, *Safety of machinery — Electrical equipment of machines — Part 11: Requirements for HV equipment for voltages above 1 000 V a.c. or 1 500 V d.c. and not exceeding 36 kV*
- EN 60204-32:2008, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines*
- EN ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413)*
- EN ISO 4414, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414)*
- EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*
- 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, *Safety of machinery — Emergency stop — Principles for design (ISO 13850)*
- IEC 60364-4-41, *Low-voltage electrical installations — Part 4-41: Protection for safety — Protection against electric shock*
- ISO 4306-1:2007, *Cranes — Vocabulary — Part 1: General*
- ISO 4309, *Cranes — Wire ropes — Care and maintenance, inspection and discard*

ISO 4347, *Leaf chains, clevises and sheaves — Dimensions, measuring forces and tensile strengths*

ISO 6336-1, *Calculation of load capacity of spur and helical gears — Part 1: Basic principles, introduction and general influence factors*

ISO 6336-2, *Calculation of load capacity of spur and helical gears — Part 2: Calculation of surface durability (pitting)*

ISO 6336-3, *Calculation of load capacity of spur and helical gears — Part 3: Calculation of tooth bending strength*

ISO 6336-5, *Calculation of load capacity of spur and helical gears — Part 5: Strength and quality of materials*

ISO 10300-1, *Calculation of load capacity of bevel gears — Part 1: Introduction and general influence factors*

ISO 10300-2, *Calculation of load capacity of bevel gears — Part 2: Calculation of surface durability (pitting)*

ISO 10300-3, *Calculation of load capacity of bevel gears — Part 3: Calculation of tooth root strength*

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

ISO 12488-1, *Cranes — Tolerances for wheels and travel and traversing tracks — Part 1: General*

ISO/TR 14521, *Gears — Calculation of load capacity of wormgears*

3 Terms and definitions

For the purposes of this standard, the terms and definitions given in EN ISO 12100:2010, ISO 4306-1:2007, EN 60204-32:2008 and the following apply.

3.1

backup brake

brake that is additional to the service brake that is able to stop and hold the load

Note 1 to entry: A backup brake can have fewer design cycles than the service brake.

Note 2 to entry: Such a brake is also known as emergency brake or safety brake.

3.2

backup limiter

limiter that is only activated if other (primary) limiting means fail to operate as intended

3.3

belt system

system for supporting and moving load or crane part via belt and wheel arrangement, comprising the belts and all the attachments and parts which are in contact with the belts

EXAMPLE Belt drive wheels, belts, belt reversing wheels, belt terminations and belt guides.

3.4

breakdown torque of an a.c. motor

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

Note 1 to entry: In case of variable frequency drives, the breakdown torque can be defined in a similar manner for each combination of voltage and frequency.

[SOURCE: EN 60034-1:2010, 3.15]