

SLOVENSKI STANDARD SIST EN 15011:2021

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SIST EN 15011:2011+A1:2014

Žerjavi - Mostni in portalni (kozičasti) žerjavi

Cranes - Bridge and gantry cranes

Krane - Brücken- und Portalkrane

Appareils de levage à charge suspendue - Ponts roulants et portiques (standards.iteh.ai)

Ta slovenski standard je istoveten z:sten EN 15011:2020

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Cranes - Bridge and gantry cranes

Appareils de levage à charge suspendue - Ponts roulants et portiques

Krane - Brücken- und Portalkrane

This European Standard was approved by CEN on 9 November 2020.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 15011:2020) 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of an identical text or by endorsement, at the latest by June 2021, and conflicting national standards shall be withdrawn at the latest by June 2021.

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 15011:2011+A1:2014.

The major technical changes in this edition compared to EN 15011:2011+A1:2014 are in 5.1, 5.2.1.3.2, 5.2.1.5, 5.2.2.2 and 6.3.2. Moreover, the status of Annex D has been changed from normative to informative.

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.

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

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

Introduction

This document has been prepared to be a harmonized standard to provide one means for bridge and gantry cranes to conform with the essential health and safety requirements of the Machinery Directive, as mentioned in Annex ZA.

As many of the hazards related to bridge and gantry cranes relate to their operating environment and use, it is assumed in the preparation of this document that all the relevant information relating to the use and operating environment of the crane has been exchanged between the manufacturer and the user (as recommended in ISO 9374, Parts 1 and 5), covering such issues as, for example:

- clearances;
- requirements concerning protection against hazardous environments;
- processed materials, such as potentially flammable or explosive material (e.g. coal, powder type materials).

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

The machinery concerned and the extent to which hazards, hazardous situations and hazardous 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.

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1 Scope

This document applies to bridge and gantry cranes able to travel by wheels on rails, runways or roadway surfaces, and to gantry cranes without wheels mounted in a stationary position.

NOTE Light crane systems (assembly of lifting devices, crane bridges, trolleys and tracks; wall-mounted, pillar and workshop jib cranes) are covered by EN 16851.

This document specifies requirements for all significant hazards, hazardous situations and events relevant to bridge and gantry cranes when used as intended and under conditions foreseen by the manufacturer (see Clause 4).

This document does not include requirements for the lifting of persons.

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

This document is applicable to bridge and gantry cranes manufactured after the date of its publication as a European standard.

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 81-43:2009, Safety rules for the construction and installation of lifts - Special lifts for the transport of persons and goods - Part 43: Lifts for cranes and goods - Part 43: Lifts

EN 363:2018, Personal fall protection equipment - Personal fall protection systems

EN 894-1:1997+A1:2008, Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 1: General principles for human interactions with displays and control actuators

EN 894-2:1997+A1:2008, Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays

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 13001-1:2015, Cranes - General design - Part 1: General principles and requirements

EN 13001-2:2014, Crane safety - General design - Part 2: Load actions

EN 13001-3-1:2012+A2:2018, 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

EN 13001-3-3:2014, Cranes - General design - Part 3-3: Limit states and proof of competence of wheel/rail contacts

EN 13001-3-4:2018, Cranes - General design - Part 3-4: Limit states and proof of competence of machinery - Bearings

EN 13001-3-5:2016, Cranes - General design - Part 3-5: Limit states and proof of competence of forged hooks

EN 13001-3-6:2018, Cranes - General design - Part 3-6: Limit states and proof of competence of machinery - Hydraulic cylinders

EN 13135:2013+A1:2018, Cranes - Safety - Design - Requirements for equipment

EN 13157:2004+A1:2009, Cranes - Safety - Hand powered cranes

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

EN 13586:2004+A1:2008, Cranes - Access

EN 14492-2:2019, Cranes - Power driven winches and hoists - Part 2: Power driven hoists

EN IEC 60204-11:2019, Safety of machinery - Electrical equipment of machines - Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV (IEC 60204-11:2018)

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

HD 60364-4-41:2017, Low-voltage electrical installations - Part 4-41: Protection for safety - Protection against electric shock (IEC 60364-4-41:2005/A1:2017, modified)

EN 60825-1:2014, Safety of laser products - Part 1: Equipment classification and requirements (IEC 60825-1:2014) 344ebf078f2f/sist-en-15011-2021

EN 60947-5-5:1997, Low-voltage switchgear and controlgear - Part 5-5: Control circuit devices and switching elements - Electrical emergency stop device with mechanical latching function (IEC 60947-5-5:1997)

EN 62745:2017, Safety of machinery - Requirements for cableless control systems of machinery (IEC 62745:2017)

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 4871:2009, 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 11688-1:2009, 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 13732-1:2008, Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)

EN ISO 13849-1:2015, Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)

EN ISO 13854:2019, Safety of machinery - Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)

EN ISO 13857:2019, Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)

EN ISO 14120:2015, Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)

ISO 2631-1:1997, Mechanical vibration and shock - Evaluation of human exposure to whole-body vibration - Part 1: General requirements

ISO 3864-1:2011, Graphical symbols - Safety colours and safety signs - Part 1: Design principles for safety signs and safety markings

ISO 3864-2:2016, Graphical symbols - Safety colours and safety signs - Part 2: Design principles for product safety labels

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ISO 3864-3:2012, Graphical symbols - Safety colours and safety signs - Part 3: Design principles for graphical symbols for use in safety signs ndards iteh ai

ISO 3864-4:2011, Graphical symbols - Safety colours and safety signs - Part 4: Colorimetric and photometric properties of safety sign materials teh.ai/catalog/standards/sist/a02fa13d-4492-4ef6-bda4-344ebf078f2f/sist-en-15011-2021

ISO 4306-1:2007, Cranes - Vocabulary - Part 1: General

ISO 6336-1:2019, Calculation of load capacity of spur and helical gears - Part 1: Basic principles, introduction and general influence factors

ISO 7752-5:1985, Lifting appliances - Controls - Layout and characteristics - Part 5: Overhead travelling cranes and portal bridge cranes

ISO 12488-1:2012, Cranes - Tolerances for wheels and travel and traversing tracks - Part 1: General

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010, EN ISO 3744:2010, EN ISO 11201:2010, ISO 4306-1:2007 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 https://www.iso.org/obp

3.1

bridge crane

crane able to move along rails or runways having at least one primarily horizontal girder and equipped with at least one hoisting mechanism

Note 1 to entry: Light crane systems are defined in EN 16851.

Note 2 to entry: Building structures, where hoists are mounted, are not regarded as bridge cranes.

3.2

gantry crane

crane able to travel by wheels on rails, runways or roadway surfaces, or crane without wheels mounted in a stationary position, having at least one primarily horizontal girder supported by at least one leg and equipped with at least one hoisting mechanism

Note 1 to entry: Building structures, where hoists are mounted, are not regarded as gantry cranes.

3.3

rated capacity

m_R

maximum net load (the sum of the payload and non-fixed load-lifting attachment) that the crane is designed to lift for a given crane configuration and load location during normal operation

Note 1 to entry: The term Safe Working Load (SWL) can differ from rated capacity.

[SOURCE: ISO 4306-1:2007, 6.1.8, modified] and ards.iteh.ai)

3.4

hoist load

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тн

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sum of the masses of the load equal to the rated capacity, the fixed lifting attachment and the hoist medium

Note 1 to entry: This is equivalent to gross load defined ISO 4306-1:2007.

3.5

hoist medium

тнм

part of the hoisting mechanism, either rope, belt or chain, by which the fixed load lifting attachment is suspended

[SOURCE: ISO 4306-1:2007, 6.1.6, modified]

3.6

underhung crane

bridge crane suspended from the lower flange of the crane track

3.7

directly acting lifting force limiter

limiter acting directly in the chain of drive elements and limiting the transmitted force

Note 1 to entry: Those limiters can be, for example, friction torque limiters, pressure limiting valves. Directing acting rated capacity limiters generally have no response delay.

3.8 indirectly acting lifting force limiter

limiter determining the transmitted force by measured signals and switching off the energy supply for the operation and, if required, triggering application of the brake torque

4 List of significant hazards

Table 1 of this clause contains all the significant hazards as listed in CEN Guide 414, hazardous situations and events, as far as they are dealt with in this document, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

Table 1 — List of significant hazards and associated requirements

No.	Hazard	Relevant clause(s) in this document
1	Mechanical hazards	
1.1	Inadequacy of mechanical strength of the crane and its parts	5.1, 5.2.1, 5.2.2, 5.4.2, 5.4.3, 5.4.4, 5.4.5, 5.4.6, 5.4.7
1.2	Due to kinetic energy of machine parts or work pieces	5.1, 5.4.4.7, 5.5.3
1.3	Due to potential energy of machine parts or work pieces	5.1
1.4	Due to stored energy, fluids under pressure	5.1
1.5	Crushing hazard ANDARD PREVIE	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.6	Shearing hazard (standards.iteh.ai)	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.7	Cutting or severing hazard _{SIST EN 150112021}	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.8	Entanglement hazard hai/catalog/standards/sist/a02fa13d-4492-4efd	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.9	Drawing-in or trapping hazard	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.10	Impact hazard	5.5.3.1, 5.5.3.3
1.11	Stabbing or puncture hazard	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.12	Friction or abrasion hazard	5.1, 5.6.2.4, 5.6.2.5, 5.6.2.6
1.13	Slipping, tripping and falling	5.6.2
1.14	Ejection of parts or objects	5.1
1.15	Loss of stability	5.1, 5.2.3
2	Electrical hazards	
2.1	Contact of persons with live parts (direct contact)	5.1, 5.3.2, 5.3.3
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	5.1
2.3	Approach to live parts under high voltage	5.1, 5.3
2.4	Electrostatic phenomena	5.1, 5.3
2.5	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short-circuits, overloads, etc.	5.1, 5.3
2.6	Short-circuit	5.1, 5.3

No.	Hazard	Relevant clause(s) in this document
2.7	Batteries	5.3.7
3	Thermal hazards	
3.1	Burns, scalds and other injuries by possible contact of persons with objects or materials with an extreme high or low temperature, by flames or explosions and also by radiation of heat sources	5.1, 5.4.8.1, 7.3.3
3.2	Damage to health by hot or cold working environment	5.6.1
4	Noise hazards	5.6.4
5	Vibration hazards	
5.1	Vibrations transmitted to the operator when sitting during operation	5.2.2.6, 5.6.1, 7.3.1
6	Radiation hazards	
6.1	Low frequency electromagnetic radiation	
6.2	Radio frequency electromagnetic radiation	
6.3	Optical radiation (infrared, visible and ultraviolet)	
6.4	Lasers	5.4.8.2
7	Material/substance hazards	
7.1	Hazards from contact with harmful fluids, gases, mists, fumes and dustsps://standards.iteh.ai/catalog/standards/sist/a02fa13d-4	5.4.8.4 492-4ef6-bda4-
7.2	Fire or explosion hazard 344ebf0/8f2f/sist-en-15011-2021	5.4.8.3
8	Ergonomic hazards	
8.1	Unhealthy postures or excessive efforts	5.4.4.2
8.2	Inadequate consideration of hand-arm or foot-leg anatomy	5.6.1
8.3	Insufficient means for evacuation/emergency exit	5.4.8.3, 5.6.1, 5.6.2
8.4	Neglected use of personal protection equipment	5.6.2.3, 7.3.3
8.5	Inadequate lighting of working areas	5.6.3
8.6	Human error during operation	5.3.5.3, 5.4.2, 5.4.8.5, 5.5.2, 7.2
8.7	Inadequate design, location or identification of manual controls	5.3.5, 5.6.1
8.8	Inadequate design or location of visual display units	5.6.1, 5.7
8.9	Insufficient visibility from the driving position	5.6.1, 5.6.3
9	Hazards associated with the environment in which the machine is used	
9.1	Lightning	5.3, 7.3.3
9.2	Snow, water, wind, temperature	5.2, 5.3.1, 5.2.1.1, 5.5.2.2

10 Hazards from malfunction of control system and control circuit 5.3.4, 5.4.2, 5.7.4 10.1 Failure/disorder of control system and control circuit 5.3.4, 5.4.2, 5.7.4 10.2 Restoration of energy supply after an interruption 5.1, 5.3.5.3 10.3 External influences on electrical equipment 5.3.5.3, 5.4.2 10.4 Errors in the software 5.3.4, 5.3.5.3, 5.4.2 10.5 Failure of the power supply 5.3, 5.3.2, 5.4.2 10.6 Overspeed during operation 5.3.6, 5.4.2 11 Hazards caused by missing and/or incorrectly positioned safety related measures/ means 5.6.2 11.1 Guards 5.6.2 11.2 Safety signs, signals, symbols 5.7, 7.1, 7.4 11.4 Information or warning devices 5.7, 7 11.5 Visibility 5.6.1, 5.6.3 12.1 Movement when starting the engine position 5.3.5.3 12.1 Movement when starting the engine position 5.4.2, 5.5 12.2 Movement without an operator at the driving position 5.4.2, 5.5 12.4 Excessive speed of pedestrian controlled machinery 5.3.5, 3.6, 5.6.1 12.5 Excessive ascillations when moving 5.2.2, 6, 5.6.1, 7.2 12.5 Excessive oscillations when moving 5.4.2, 5.4.4.6 12	No.	Hazard	Relevant clause(s) in this document
10.2 Restoration of energy supply after an interruption 10.3 External influences on electrical equipment 10.4 Errors in the software 10.5 Failure of the power supply 10.6 Overspeed during operation 10.7 Sa.6, 5.4.2 10.8 Hazards caused by missing and/or incorrectly positioned safety related measures/ means 10.1 Guards 10.2 Safety signs, signals, symbols 10.3 Safety signs, signals, symbols 10.4 Information or warning devices 10.5 Visibility 10.6 Emergency devices 10.7 Visibility 10.6 Emergency devices 10.7 Sa.5, 5.3.5 10.6 Emergency devices 10.7 Movement when starting the engine oil 2021 10.8 Movement without an operator at the driving position 10.9 Excessive speed of pedestrian controlled machinery 10.9 Excessive speed of pedestrian controlled machinery 10.0 Excessive oscillations when moving 10.1 Insufficient ability of machinery to be slowed down, stopped and immobilized 10.1 Evaluation of the action of the controlled machinery 10.1 Evaluation of the machine 10.1 Evaluation of the cab, lack of extinguishing means 10.1 Fall of persons during access to (or at/from) the work position 10.2 Fire (flammability of the cab, lack of extinguishing flal of objects, penetration by object contact of persons with machine parts or tools (pedestrian control)	10	Hazards from malfunction of control systems	
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