SLOVENSKI STANDARD
oSIST prEN 13557:2021

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Dvigala (žerjavi) - Upravljala in upravljalna mesta

Cranes - Controls and control stations

Krane - Stellteile und Steuerstände

Appareils de levage à charge suspendue - Commandes et postes de commande

Ta slovenski standard je istoveten z: **prEN 13557**

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53.020.20	Dvigala	Cranes

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English Version

Cranes - Controls and control stations

Appareils de levage à charge suspendue - Commandes et postes de conduite

Krane - Stellteile und Steuerstände

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

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 13557:2021) has been prepared by Technical Committee CEN/TC 147 “Cranes - Safety”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13557:2003+A2:2008.

In comparison with the previous edition, the following technical modifications have been made:

— Normative references updated;

— Table 1 “List of significant hazards and associated requirements” revised;

— Annexes A, B, and C deleted;

— new Annex A “Selection of suitable set of crane standards for a given application” added;

— the whole document revised to accommodate the latest technology and practices available and to be consistent with other relevant Safety standards such as EN 62745.

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.

Introduction

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

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

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate at the drafting process of this document.

The machinery concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the Scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

1 Scope

This document specifies health and safety design requirements for control devices and control stations for all types of cranes.

Specific requirements for particular types of crane are given in the appropriate European standard for the particular crane type.

Control systems are covered by other standards, e.g. EN 60204-32:2008 and EN 13135:2013+A1:2018.

This document does not deal with noise hazards because these are dealt with in safety standards for specific types of cranes. It also does not address the design of the cabin with regard to its sound insulation properties.

This document covers specific hazards, which could occur during the use of control devices and control stations. It does not cover hazards, which could occur during transport, construction, modification, de-commissioning or disposal. The hazards covered by this standard are identified in Clause 4.

This document is applicable after the date of approval by CEN of this 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 14502-2:2005+A1:2008, *Cranes — Equipment for the lifting of persons — Part 2: Elevating control stations*

EN 60068-2-27:2009, *Environmental testing — Part 2-27: Tests — Test Ea and guidance: Shock*

EN 60068-2-31:2008, *Environmental testing — Part 2-31: Tests — Test Ec: Rough handling shocks, primarily for equipment-type specimens*

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

EN 62745:2017, *Safety of machinery — Requirements for cableless control systems of machinery*

EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*

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

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry — Determination of burning behaviour of interior materials*

ISO 11112:1995,[1] *Earth-moving machinery — Operator's seat — Dimensions and requirements*

[1] As impacted by ISO 11112:1995/AMD 1:2001.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 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
cabin
protective enclosure of an operating position

3.2
cableless control
means by which the crane operator's commands are transmitted without any physical connection for at least a part of the distance between the control station and the crane

3.3
control station
an assembly of one or more control devices fixed on the same panel or located in the same enclosure

[SOURCE: IEV 441-12-08, modified]

3.4
console
table-mounted or floor-standing enclosure having horizontal, vertical and/or sloping faces to accommodate control, information and monitoring equipment

Note 1 to entry: Console is also a control station.

[SOURCE: IEV 581-25-09]

3.5
control device
physical unit than can combine – in a module/subassembly or device – a mode selector, an adjuster for manual control of the actuating drive and, if necessary, a reference-variable adjuster for the controller

[SOURCE: IEV 351-56-07]

3.6
control
purposeful action on or in process to meet specified objectives

[SOURCE: IEV 351-42-19]

3.7
hatch
aperture fitted with a cover and used for access purposes

3.8
operating position
place where the operators carry out their tasks

4 Significant hazards

Table 1 — List of significant hazards and associated requirements

No.	Hazard	Relevant clause(s) in this European Standard
1	Mechanical hazards	
1.1	due to machine parts or workpieces inadequate mechanical strength	5.2.2.1, 5.2.3.1
1.2	crushing	5.1.1, 5.1.2, 5.1.3, 5.1.5, 5.1.6, 5.2.3.2
1.3	shearing	5.1.1, 5.1.2, 5.1.3, 5.1.5, 5.1.6, 5.2.3.2
1.4	cutting or severing	5.1.1, 5.1.2, 5.1.3, 5.1.5, 5.1.6, 5.2.3.2
1.5	slipping tripping, falling	5.2.2.1, 5.2.2.2, 5.3.2, 5.3.3
1.6	Instability	5.2.3.1, 5.2.4, 5.3.4
2	Electrical hazards	
2.1	Touching live parts	5.1.1
4	Noise hazards	
4.1	Permanent hearing loss, tinnitus	5.3.1
5	Vibration hazards	
5.1	Vibrations transmitted to the operator when sitting during operation	5.2.2.1, 5.3.6
5.2	Portable hand-held and/or hand-guided machinery (e.g. vascular disorder, neurological disorder)	5.2.3.1, 5.2.3.2
5.3	In conjunction with a rigid position (e.g. trauma of the spine, osteo-articular disorder, low-back morbidity)	5.2.2.1
7	Material/substance hazards	
7.1	breathing difficulties, suffocation	5.3.7
7.2	fire	5.3.4, 5.3.5, 5.3.8, 5.3.9
8.	Ergonomic Hazards	
8.1	unhealthy postures or excessive effort	5.1.2, 5.1.3, 5.1.4, 5.2.2.1
8.2	inadequate consideration of anatomy	5.1.2, 5.1.3, 5.1.4, 5.2.2.1
8.3	insufficient means for evacuation/emergency exit	5.2.2.1, 5.3.2, 5.3.3, 5.3.4, 5.3.5
8.4	design or location of indicators and visual displays units	5.1.5. 5.1.6
8.5	design, location or identification of control devices	5.1

No.	Hazard	Relevant clause(s) in this European Standard
8.6	flicker, dazzling, shadow, stroboscopic effect	5.1.5, 5.3.2
9	Hazards associated with the environment in which the machine is used	
9.1	moisture	5.3.7
9.2	pollution	5.3.7
9.3	snow, water, wind, temperature	5.3.2, 5.3.7
9.4	exhaust gas/lack of oxygen at workplace	5.3.7
9.5	dust and fog	5.1.5, 5.3.2

5 Requirements

5.1 Control devices and control stations

5.1.1 General

Control devices and control stations shall conform to the safety requirements and/or protective measures of this clause. In addition, control devices and control stations shall be designed in accordance with the principles of EN ISO 12100:2010, for hazards relevant but not significant which are not dealt with by this document.

In order to prevent unintended movement of a crane motion, the motion shall only be able to be initiated from the neutral position of the control device. Where this is not practicable, other means shall be provided as specified in the European standards for particular crane types.

The arrangement of the control devices for a particular crane type shall be as specified in the appropriate European standards for particular crane types. The logic of the control device arrangement shall be the same at each control station associated with operating the crane.

Where a crane has more than one control station, measures shall be taken to ensure that only one control station is operational at a given time. Exception: an emergency stop command from any control station shall be effective at all times for safety reasons.

Protection against electric shock for direct or indirect contact shall be as specified in EN 60204-32:2008, Clause 6.

The temperature of control devices, as generated by the crane's operation, shall not exceed 43 °C.

5.1.2 Control levers and joysticks

The direction of movement of control levers and joysticks shall where possible be consistent with crane motion. Symbols shall be fixed in such positions that there is a clear and unambiguous relationship between the movement of the control lever or joystick in the control station and the corresponding direction of motion. Control levers and joysticks for crane movements, when released, shall automatically return to the neutral position.

The force required to actuate the control levers and joysticks should be between the following values:

— forwards or backwards: between 2 N and 20 N;

— sideways, to the left or to the right: between 2 N and 20 N.

A higher actuating force can be accepted for levers and joysticks, which are subjected to occasional use.

An actuating force shall be selected to prevent unintended actuation of control levers or joysticks e.g. by acceleration or vibration.

5.1.3 Push buttons

For push buttons actuated by finger or thumb, the force shall not exceed a value of 10 N.

For push buttons actuated by the foot the force shall not exceed a value of 100 N.

Push buttons for crane movements, when released, shall automatically return to the off position.

The emergency stop actuator installed on the control station, shall be in accordance with the specification for emergency stop actuators given in EN ISO 13850:2015.

5.1.4 Pedals

For the pedals, the actuating force shall not exceed the following values:

— pedals actuated by a movement of the ankle: 50 N;

— pedals actuated by a movement of the leg: 100 N.

5.1.5 Touch screen controls

Where touch screens are used, protection against environmental influence e.g. rain, snow, waist, dust shall be provided. Proper visibility of the display and the touch points shall be provided to ensure correct control commands. Touch screens shall not be used to control crane movements.

Touch screens may be used for user identification (access control), settings, diagnostics, information share and enabling or activating other than main movement functions. Starting of sequential functions by touch screens should be easily differentiated from alarms or other display signals.

5.1.6 Consoles

Where the position or orientation of a console is variable with regard to the movement of the crane or a part of the crane there shall be unambiguous means of showing the relationship between operating the control devices and the resultant movements of the crane. Respective symbols shall be fixed in such positions that there is a clear and unambiguous relationship between the actuating movement of the control lever and the corresponding direction of the crane movements.

Consoles and control devices shall be designed and protected so that the desired effect can only occur by an intentional operation.

This can be achieved by:

— recessing the actuator (lever, push buttons);

— mechanical interlock of the neutral position of the control lever;

— use of a set of actuators requiring sequential or simultaneous actions;

— surrounding the control levers on a panel by a guard rail;

— locating the actuator where it is unlikely to be accidentally knocked.

The free space between each control device and its surroundings should be enough to avoid unintended movements. The free space should be enough where either bare hands or gloves are used.