



**SLOVENSKI STANDARD**  
**SIST EN 13557:2004+A2:2008**  
**01-julij-2008**

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**Dvigala (žerjavi) - Upravljalna in upravljalna mesta**

Cranes - Controls and control stations

Krane - Stellteile und Steuerstände

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

**Ta slovenski standard je istoveten z: EN 13557:2003+A2:2008**

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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 European Standard was approved by CEN on 1 September 2003 and includes Amendment 1 approved by CEN on 26 September 2005 and Amendment 2 approved by CEN on 4 March 2008.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

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 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

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## Foreword

This document (EN 13557:2003+A2:2008) 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of an identical text or by endorsement, at the latest by October 2008, and conflicting national standards shall be withdrawn at the latest by October 2008.

This document supersedes EN 13557:2003.

This document includes Amendment 1, approved by CEN on 2005-09-26 and Amendment 2 approved by CEN on 2008-03-04.

The start and finish of text introduced or altered by amendment is indicated in the text by tags  $\boxed{A_1}$ ,  $\boxed{A_1}$  and  $\boxed{A_3}$ ,  $\boxed{A_2}$ .

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).

$\boxed{A_2}$  For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document.  $\boxed{A_2}$

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, 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 the United Kingdom.

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## Introduction

This European Standard has been prepared to be a harmonised standard to provide one means for crane controls and control stations to conform to the relevant essential health and safety requirements of the Machinery Directive 98/37/EC.

This European Standard is a type C standard as stated in EN 1070.

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

When provisions of this type C standard are different from those which are stated in type B standard, 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 European Standard specifies health and safety design requirements for controls and control stations for all types of crane.

NOTE 1 Control systems are covered by other standards e.g. EN 60204-32, EN 13135-1 and prEN 13135-2.

Annex C provides additional value to the requirements for cableless control systems as specified in EN 60204-32.

NOTE 2 Annex C will be deleted after WG 3 agreed to introduce it into their document EN 13135-1.

NOTE 3 Specific requirements for particular types of crane are given in the appropriate European Standard for the particular crane type.

This standard 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 European Standard covers specific hazards which could occur during the use of controls and control stations. It does not cover hazards which could occur during transport, construction, commissioning, modification, maintenance, de-commissioning or disposal.

The hazards covered by this standard are identified in clause 4.

This European Standard is applicable after the date of approval by CEN of this standard.

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## 2 Normative references

[SIST EN 13557:2004+A2:2008](https://standards.iteh.ai/catalog/standards/sist/4660285c-d560-4f2e-b9c7-590dab6a1e55/en-13557-2003-a2-2008)

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This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 292-1:1991, *Safety of machinery – Basic concepts, general principles for design - Part 1: Basic terminology, methodology.*

EN 292-2:1991, *Safety of machinery – Basic concepts, general principles for design - Part 2: Technical principles and specifications.*

EN 418, *Safety of machinery - Emergency stop equipment, functional aspects - Principles for design.*

EN 954-1:1996, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design.*

EN 1070:1998, *Safety of machinery – Terminology.*

EN ISO 5353:1998, *Earth-moving machinery and tractors and machinery for agriculture and forestry - Seat index point (ISO 5353:1995).*

EN 60068-2-27, *Basic environmental testing procedures - Part 2: Tests; test Ea and guidance: Shock (IEC 60068-2-27:1987).*

EN 60068-2-32, *Basic environmental testing procedures – Part 2: Tests; test Ed: Free fall (IEC 60068-2-32:1975).*

EN 60068-2-64, *Environmental testing - Part 2: Test methods; test Fh. Vibration, broad-band random (digital control) and guidance (IEC 60068-2-64:1993).*

EN 60204-32:1998, *Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines (IEC 60204-32:1998)*.

ISO 3795:1989, *Road vehicles, and tractors and machinery for agriculture and forestry – Determination of burning behaviour of interior materials* <sup>(A1)</sup>

ISO 5006-1:1991, *Earth-moving machinery - Operator's field of view - Part 1: Test method*.

ISO 11112:1995, *Earth-moving machinery – Operator's seat - Dimensions and requirements*.

### 3 Definitions

For the purposes of this European Standard, the definitions given in EN 1070: 1998, EN 60204-32:1998 and the following apply:

#### 3.1

##### **address code**

number which is used by the receiver to differentiate the frames sent by its respective transmitter

NOTE The receiver only carries out the commands received from a transmitter having the same address code.

#### 3.2

##### **cabin**

control station with protective enclosure

#### 3.3

##### **cableless control**

means by which the crane driver's commands are transmitted without any physical connection for at least a part of the distance between the console and the crane

#### 3.4

##### **console**

fixed or moveable arrangement of controls

#### 3.5

##### **control**

actuating device which forms an interface between the crane driver and a crane control system

#### 3.6

##### **control station**

permanent position of controls on or off the crane

#### 3.7

##### **error detection code**

number added to each frame to enable the receiver to detect transmission errors

NOTE The receiver re-defines the error detection code using similar algorithm as is used in the transmitter. The commands are only carried out if the error detection code so defined by the receiver is identical to the error detection code it received with the frame.

#### 3.8

##### **frame**

“package” of bits which the transmitter sends to the receiver, for example:

- a) address code;
- b) operating command signals;
- c) other control signals;
- d) error detection (and correction) code.



NOTE The frame is formed out of the above mentioned parts by coding them into a serial form. After this coding the frame is sent to a circuit called a modulator which transforms it into a suitable form for sending.

### 3.9

#### hamming distance

number of positions in which two code words of the same length differ from each other (IEC/TR3 60870-1-3)

### 3.10

#### hatch

aperture fitted with a cover and used for access purposes

### 3.11

#### operating command

control signal which is intended to initiate, modify or maintain a crane function / movement

### 3.12

#### operative temperature ( $t_0$ )

uniform temperature of an imaginary black enclosure in which an occupant would exchange the same amount of heat by radiation plus convection as in the actual non-uniform environment (see annex A)

### 3.13

#### receiver

part of a cable-less control system which receives the commands from the transmitter

### 3.14

#### transmitter

part of a cable-less control system which sends the crane driver's commands to the receiver

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## 4 Significant hazards

[SIST EN 13557:2004+A2:2008](https://standards.itteh.ai/catalog/standards/sist/4660285c-d560-4f2e-b9c7-2c760ceb0eb6/sist-en-13557-2004a2-2008)  
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Table 1 contains all the significant hazards, hazardous situations and events, as far as they are dealt with in this standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.

NOTE Numbering of hazards follows annex A of EN 1050: 1996.

**Table 1 — List of significant hazards and associated requirements**

N°	Hazards	EN 292-1 : 1991	EN 292-2 : 1991	Annex A of EN 292-2:1991 A1 : 1995	Relevant clause(s) in this standard
<b>1</b>	<b>Mechanical hazards</b>				
1.1	Generated by machine parts of workpieces caused, for example, by	4.2	3.1, 3.2, 4	1.3	
1.1.1	Shape				5.2.1.9, 5.2.2.3.1.5 / 6

Table 1 — List of significant hazards and associated requirements (Continued)

N°	Hazards	EN 292-1 : 1991	EN 292-2 : 1991	Annex A of EN 292-2:1991 A1 : 1995	Relevant clause(s) in this standard
1.1.5	Inadequacy of mechanical strength				5.2.1.4 / 5 / 8 5.2.2.2.1 / 3 5.2.2.2.2, 5.2.2.2.4, 5.2.3.1.4
1.3	Elementary forms of mechanical hazards	4.2		1.3	
1.3.1	Crushing hazard				5.2.2.3.1.1,
1.3.3	Cutting or severing hazard				5.2.1.9
1.4	Entanglement				5.2.2.3.1.10
1.6	Impact hazard				5.2.2.2.5, 5.2.2.3.1.7
<b>2</b>	<b>Electrical hazards</b>				
2.1	Contact of persons with live parts (direct contact)	4.3	3.9, 6.2.2	1.5.1, 1.6.3	5.2.1.10, 5.1.8
2.2	Contact of persons with live parts (indirect contact)	4.3	3.9	1.5.1	5.2.1.10, 5.1.8
<b>3</b>	<b>Thermal hazards</b>				
3.1	Burns and scalds by contact with objects/materials with an extreme temperature	4.4		1.5.5, 1.5.6, 1.5.7	5.1.5
3.2	Health damaging effects by hot or cold environment	4.4		1.5.5	5.2.2.6, 5.2.2.6.3
<b>7</b>	<b>Hazards generated by materials and substances processed</b>				
7.1	Hazards from contact with or inhalation of harmful fluids, gases, mists, fumes and dusts	4.8	3.3b, 3.4	1.1.3, 1.5.13, 1.6.5	5.2.2.6.4
7.2	Fire or explosion hazard	4.8	3.4	1.5.6, 1.5.7	5.2.2.3.2.1

Table 1 — List of significant hazards and associated requirements (Continued)

N°	Hazards	EN 292-1 : 1991	EN 292-2 : 1991	Annex A of EN 292-2:1991 A1 : 1995	Relevant clause(s) in this standard
<b>8</b>	<b>Hazards generated by neglecting ergonomic principles in machinery design as, e.g. hazards from :</b>				
8.1	Unhealthy postures or excessive effort	4.9	3.6.1, 6.2.1, 6.2.3, 6.2.4, 6.2.6	1.1.2d, 1.1.5, 1.6.2, 1.6.4	5.1.3, 5.1.4, 5.1.9, 5.2.1.2, 5.2.1.3, 5.2.2.5, 5.2.2.3.1.8, 5.2.3.1.4, 5.2.3.2.4
8.2	Inadequate consideration of hand-arm or foot-leg anatomy	4.9	3.6.2	1.1.2d, 2.2	5.1.4, 5.2.2.5, 5.2.2.3.1.2
8.6	Human error, human behaviour		3.6, 3.7.8, 3.7.9, 6.1.1	1.1.2d, 1.2.2, 1.2.5, 1.2.8, 1.5.4, 1.7	5.1.2, 5.1.3, 5.2.3.1.1, 5.2.3.1.2, 5.2.3.2.1, C1
8.7	Inadequate design, location or identification of manual controls		3.6.6, 3.7.8	1.2.2	5.1.3, 5.2.3.1.1, 5.2.3.1.2, 5.2.3.2.1, 5.2.3.2.3
<b>10</b>	<b>Unexpected start-up unexpected overrun/overspeed</b>				
10.1	Failure/disorder of control system		3.7, 6.2.2	1.2.7, 1.6.3	5.2.3.1.2, 5.2.3.1.5, 5.2.3.2.2, C1
10.2	Restoration of energy supply after an interruption		3.7.2	1.2.6	C2
10.3	External influences on electrical equipment		3.7.11	1.2.1, 1.5.11, 4.1.2.8	C2
10.4	Other external influences (gravity wind etc)		3.7.3	1.2.1	C7
10.5	Errors in the software		3.7.7	1.2.1	C2, C3, C4
<b>11</b>	<b>Impossibility of stopping machine in the best possible conditions</b>		3.7, 6.1.1, 3.7.1	1.2.4, 1.2.6, 1.2.7	5.1.7, C3
<b>13</b>	<b>Failure of the power supply</b>		3.7, 3.7.2	1.2.6	5.2.3.2.5, C2
<b>14</b>	<b>Failure of the control circuit</b>		3.7, 6.2.2	1.2.1, 1.2.3, 1.2.4, 1.2.5, 1.2.7, 1.6.3	5.2.3.1.2, 5.2.3.2.2, 5.2.3.2.5, C6, C7

Table 1 — List of significant hazards and associated requirements (Concluded)

N°	Hazards	EN 292-1 : 1991	EN 292-2 : 1991	Annex A of EN 292-2:1991 A1 : 1995	Relevant clause(s) in this standard
19	Slip, trip and fall of persons (related to machinery)	4.2.3	6.2.4	1.5.15	5.2.1.6, 5.2.1.7, 5.2.2.3, 5.2.2.4
20	<b>Additional hazards due to mobility</b>				
20.4	Excessive speed of pedestrian controlled machinery			3.3.4	5.1.9
20.6	Insufficient ability of machine to be stopped, immobilised			3.3.3, 3.3.5	5.1.6, 5.1.7, C3
21	<b>Additional hazards linked to the work position (including driving station) on the machine</b>				
21.2	Exhaust gases/lack of oxygen at the work position			3.2.1	5.2.2.6.1, 5.2.2.6.4
<sup>A1</sup> 21.3	Fire (flammability of the cab, lack of extinguishing Means)			3.2.1 3.5.2	5.2.1.5 5.2.2.7 <sup>A1</sup>
21.5	Insufficient visibility from the work position			3.2.1	5.2.1.1, 5.2.2.1, 5.2.2.2.2, 5.2.2.2.6, 5.2.2.2.7
21.10	Insufficient means for evacuation/emergency exit			3.2.1	5.2.2.3.2, 5.2.3.2.3, 5.2.2.3.1.3, 5.2.2.3.1.4
25	<b>From / to third parties</b>				
25.1	Unauthorised start up / use			3.3.2	5.1.6, C2
25.3	Lack or inadequacy of visual or acoustic warning means			1.7.4, 3.6.1	5.2.3.1.3, C8
26	<b>Insufficient instructions for the driver / operator</b>			3.6	5.2.3.1, 5.1.2, 5.1.3, C.2.1, C8, C9