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**Cranes - Bridge and gantry cranes**

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September 2004

ICS

English version

## Cranes - Bridge and gantry cranes

Appareils de levage à charge suspendue - Portiques et  
ponts roulants

Kräne - Brücken und Portalkräne

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This document (prEN 15011:2004) has been prepared by Technical Committee CEN/TC 147 “Cranes - Safety”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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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## Introduction

This document is a harmonized European Standard to provide one means for bridge and gantry cranes to conform with the Essential Health and Safety Requirements of the Machinery Directive 98/37/EEC .

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 document.

When provisions of this type C standard are different from those which are stated in a 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.

Absolute safety of the crane cannot be ensured by design, as operation depends on the skills of the operators, maintenance personnel and inspectors as well as on numerous technical parameters in the crane or its environment which may have large scatter. Therefore selections provided by this standard reflect only the state of the art at the time of writing.

As many hazards related to bridge and gantry cranes depend on the place and use of the crane, it is assumed that the correct information has been exchanged between the manufacturer and user (as suggested in the ISO 9374-1 and 5), e.g.:

- Clearances
- Requirements concerning protection against hazardous environment
- Processed materials, such as potentially flammable or explosive material (e.g. coal, powder type materials).





EN 953, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

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

prEN 1005-3, *Safety of machinery — Human physical performance — Part 3: Recommended force limits for machinery operation*

EN 1070, *Safety of machinery — Terminology*

EN 10002-1:1990, *Metallic materials — Tensile testing — Part 1: Method of test (at ambient temperature)*

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

EN 12644-1: 2001, *Cranes — Information for use and testing — Part 1: Instructions*

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

prEN 13001-1, *Cranes — General Design — Part 1: General principles and requirements*

prEN 13001-2, *Cranes — General Design — Part 2: Load actions*

prCEN/TS 13001-3.1, *Cranes — General Design — Part 3.1: Limit States and Proof of Competence of Steel Structures*

prEN 13135-1, *Cranes — Equipment — Part 1: Electrotechnical equipment*

prEN 13135-2, *Cranes — Equipment — Part 2: Non-electrotechnical equipment*

EN 13202, *Ergonomics of the thermal environment — Temperatures of touchable hot surfaces — Guidance for establishing surface temperature limit values in production standards with the aid of EN 563*

prEN 13557, *Cranes — Controls and control stations*

prEN 13586, *Cranes — Access*

prEN 14492-2, *Cranes — Power driven winches and hoists — Part 2: Power driven hoists*

EN 60073, *Basic and safety principles for man-machine interface, marking and identification — Coding principles for indication devices and actuators*

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

EN 60825-1, *Safety of laser products — Part 1: Equipment classification, requirements and user's guide*

EN 61310-2, *Safety of machinery — Indicating, marking and actuation — Part 2: Requirements for marking*

ISO 3864, *Safety colours and safety signs*

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

ISO 8566-5, *Lifting appliances — Cabin — Part 5: Overhead travelling cranes and portal bridge cranes*

ISO 10245-5, *Cranes — Limiting and indicating devices — Part 5: Overhead travelling and portal bridge cranes*

ISO/FDIS 11660-5, *Cranes — Access, guards and restraints — Part 5: Bridge and Gantry Cranes*

ISO/CD 12488-1, *Cranes — Tolerances of cranes and tracks — Travel and Traverse — Part 1: General*

ISO 1680: 1999, *Acoustics — Test code for the measurement of airborne noise emitted by rotating electrical machines*

EN ISO 3744: 1995, *Acoustics — Determination of sound power levels of noise sources using sound pressure — Engineering method in an essentially free field over a reflecting plane*

EN ISO 11202: 1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Survey method in situ*

EN ISO 11203: 1995, *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions from the sound power level*

EN ISO 11204: 1995, *Acoustics — Noise emitted by machinery and equipment — Measurement of emission sound pressure levels at a work station and at other specified positions — Method requiring environmental*

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### 3 Definitions <https://standards.iteh.ai/catalog/standards/sist/299caa4c-304e-4768-9cb0-fc4c9208f0cb/osist-pren-15011-2007>

For the purposes of this document, the terms and definitions of EN 1070, ISO 1680, EN ISO 3744, EN ISO 11202, EN ISO 11203, and EN ISO 11204 apply together with the following.

#### 3.1

##### **bridge crane**

a crane having at least one primarily horizontal girder moving along tracks on which is mounted at least one hand, or power driven, hoist

#### 3.2

##### **gantry crane**

a crane having at least one essentially horizontal girder supported by at least one leg moving along tracks and equipped with at least one hand, or power driven, hoist

#### 3.3

##### **limit of the crane**

the contact point between the crane and fixed environment

## 4 List of hazards

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.

Table 1 — List of significant hazards and associated requirements

No.	Hazard (as listed in EN 1050:1997)	EN 292-1	EN 292-2	Other EN-standards and ISO-standards	Relevant clause(s) in this standard
1	Mechanical hazards	4.2			
1.1	Generated by machine parts or workpieces, e.g. by:	4.2	3.1, 3.2, 4		
1.1.1	Shape				
1.1.2	relative location				5.4.2
1.1.3	mass and stability			EN 13001	5.2
1.1.4	mass and velocity			EN 13135-2	5.3.3, 5.4.2.5
1.1.5	inadequacy of mechanical strength			EN 13001	5.2
1.2	Accumulation of energy inside the machinery, e.g. by:	4.2	3.8, 6.2.2		
1.2.1	elastic elements (springs)				
1.2.2	fluids under pressure			EN 13135-2 5.7	5.3.1
1.2.3	the effect of vacuum				
1.3	Elementary forms of mechanical hazards	4.2.1			
1.3.1	Crushing	4.2.1, 4.2.2	3.2	EN 294, EN 349	5.1, 5.4.2, 7.1.1.1
1.3.2	Shearing	4.2.1, 4.2.2	3.2, 4.1.1	EN 13586	5.4.2.4, 5.4.2.6
1.3.3	Cutting or severing	4.2.1, 4.2.2	3.2	ISO 8566-1 6.3, EN 13557	
1.3.4	Entanglement hazard	4.2.1, 4.2.2			
1.3.5	Drawing-in or trapping hazard - moving transmission parts	4.2.1	3.11, 4.1.1, 6.1.2	EN 953 EN 294	5.4.2.7 to 5.4.2.9
1.3.6	Impact	4.2.1			5.3.3.5, 5.4.1.5 7.2.1.1.4
1.3.7	Stabbing or puncture hazard	4.2.1			
1.3.8	Friction or abrasion hazard	4.2.1	3.3.b		
1.3.9	High pressure fluid injection or ejection hazard	4.2.1	3.3.a	EN 13135-2	7.2.2.2
2	<b>Electrical hazards</b> due to:			EN 13135-1	5.1
2.1	Contact of persons with live parts (direct contact)	4.3		EN 60204-32	
2.2	Contact of persons with parts which have become live under faulty conditions (indirect contact)	4.3		EN 60204-32	
2.3	Approach to live parts under high voltage			EN 60204-32	
2.4	Electrostatic phenomena	4.3		EN 60204-32	
2.5	Thermal radiation or other phenomena such as the projection of molten particles and chemical effects from short-circuits, overloads, etc.	4.3		EN 60204-32	

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

No.	Hazard (as listed in EN 1050:1997)	EN 292-1	EN 292-2	Other EN-standards and ISO-standards	Relevant clause(s) in this standard
<b>3</b>	<b>Thermal hazards</b> , resulting in:				
3.1	burns and scalds, by possible contact of persons with objects or materials with an extreme temperature, by flames, by radiation, etc.	4.4	3.6.3	EN 563, EN 13135-2	5.3.5.1, 7.2.3.3.
3.2	Hot or cold working environment.	4.4		EN 13557	
<b>4</b>	<b>Hazards generated by noise</b> , resulting in:	4.5	3.2, 3.6.3, 4		
4.1	Hearing losses				5.4.4
4.2	Interference with speech communication, signals,...				5.4.4, 7.2.1.2.2
<b>5</b>	<b>Hazards generated by vibration</b>	4.6	3.2, 3.6.3		
5.1	Use of hand-held machines.				-
5.2	Whole body vibration, particularly when combined with poor postures				5.2.2.6
<b>6</b>	<b>Radiation</b>				
6.0	External radiation				See introduction
6.1	Low frequency , radio frequency radiation, micro waves	4.7			5.3.5.2.1
6.2	Infrared, visible, UV-light				5.3.5.2.2
6.3	X and gamma rays				-
6.4	Alpha, beta rays, electron or ion beams; neutrons	4.7	3.7.3, 3.7.11		
6.5	Lasers	4.7		EN 60825-1	5.3.5.2.3
<b>7</b>	<b>Processed materials and substances, used materials, fuels</b>				
7.1	Hazards from contact with harmful fluids, gases, mists, fumes and dusts	4.8	3.3.b, 3.4	EN 60204-1: cl. 14.3	5.3.5.3 See Introduction
7.2	Fire or explosion hazard	4.8	3.4		See Introduction
7.3	Biological and micro-biological hazards.	4.8			-
<b>8</b>	<b>Neglected ergonomic principles in machine design</b> e.g. hazards from:	4.9	3.6		
8.1	Unhealthy postures or excessive efforts	4.9	3.6.1, 3.6.4, 6.2.1-6	EN 547-1. -2	5.4.1.6 to 5.4.1.7
8.2	Inadequate consideration of hand-arm or foot-leg anatomy	4.9	3.6.2, 3.6.9	EN 614-1	
8.3	Neglected use of personal protection equipment	5.5	3.6.6, 5.4, 5.5.1d		5.5.3.1.3
8.4	Inadequate local lighting		3.6.5		5.4.3
8.5	Mental overload or underload, stress	4.9	3.6.4		5.4.1.3, 7.2.1.2.7

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

No.	Hazard (as listed in EN 1050:1997)	EN 292-1	EN 292-2	Other EN-standards and ISO-standards	Relevant clause(s) in this standard
8.6	Human errors, human behaviour	4.9	3.6, 3.7.8, 3.7.9, 5, 6.1.1		5.3.3.4, 5.4.1, 7.2.1
8.7	Inadequate design, location or identification of manual controls		3.6.6, 3.7.8	ISO 7752-5	5.4.1
8.8	Inadequate design or location of visual display units		3.6.7, 5.2	EN 894-1, -2, -3	5.5.2
9	<b>Combination of hazards</b>	4.10		EN 13001-2	5.6
<b>Hazardous events (Events which may result in risk from one or several of the basic hazards)</b>					
10	<b>Unexpected start-up, unexpected overrun/overspeed</b> (or any similar malfunction) from:				
10.1	Failure/ disorder of control systems	3.17, 3.15, 3.16	3.7, 6.2.2	EN 60204-32 EN 954, EN 418	5.4.1
10.2	Restoration of energy supply after an interruption		3.7.2		
10.3	External influences on electrical equipment	4.3	3.4, 3.7.11		
10.4	Other external influences (gravity, wind, etc.)		3.7.3		
10.5	Errors in the software		3.7.7		
10.6	Errors made by the operator (due to mismatch of machinery with human characteristics and abilities, see No. 8.6)	4.9	3.6, 3.7.8, 3.7.9, 5, 6.1.1		
11	<b>Impossibility of stopping the machine in the best possible conditions</b>		3.7, 3.7.1, 6.1.1		5.3.3.1
12	<b>Variation in the rotational speed of tools</b>		3.2, 3.3		-
13	<b>Failure of the power supply</b>	3.16	3.7, 3.7.2	EN 60204-32	5.3.1.1
14	<b>Failure of the control circuit</b>		3.7, 6.2.2	EN 60204-32	5.3.1.1
15	<b>Errors of fitting</b>	4.9	5.5, 6.2.1		
16	<b>Break-up during operation</b>	4.2.2	3.3		5.2, 7.2.2, 7.2.3.1-to 7.2.3.2
16.1	Thermal effect on the crane				5.3.1.1
17	<b>Falling or ejected object. or fluid</b>	1.3.6, 1.3.9, 4.2.2	3.3, 3.8	EN 13586	5.3.1.1, 5.4.2.1, 7.2.2.2
18	<b>Loss of stability / overturning of machinery</b>	4.2.2	6.2.5		
	Loss of rigid body stability	4.2.2	3.3, 6.2.5	EN13001-2	5.2.3
19	<b>Slip, trip and falling of persons</b> (related to machinery)	4.2.3	6.2.4	EN 13586	5.4.2

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

No.	Hazard (as listed in EN 1050:1997)	EN 292-1	EN 292-2	Other EN-standards and ISO-standards	Relevant clause(s) in this standard
<b>Additional hazards and hazardous events due to mobility</b>					
<b>20</b>	<b>Relating to the travelling function</b>				
20.1	Uncontrolled movement of crane when starting the engine		A1:Annex.A, 3.3.2, 3.3.4		
20.2	Movement without a driver at the driving position		A1:Annex.A, 3.3.2		5.3.1.1
20.3	Movement without all parts in a safe position		A1:Annex.A, 3.3.2		
20.4	Excessive speed of pedestrian controlled machinery		A1:Annex.A, 3.3.4	EN 13557	
20.5	Excessive oscillations when moving				5.3.3.2, 5.4.1.4
20.6	Insufficient ability of machinery to be slowed down, stopped and immobilized				5.3.1.1, 5.3.3.1, 5.3.3.3, 7.2.1.2.3, 7.2.1.2.6
<b>21</b>	<b>Linked to the work position (including driving station) on the machine</b>				
21.1	Fall of persons during access to (or at/from) the work position			EN 13586, ISO 11660-5	5.4.2.1
21.2	Exhaust gases / lack of oxygen at the work position				5.3.5.3.2
21.3	Fire (flammability of the cab, lack of extinguishing means)			EN 13557	
21.4	Mechanical hazards at the work position - contact with the wheels - fall of objects, penetration by object - contact of persons with machine parts or tools (pedestrian control.)				5.4.2.5, 5.4.2.7
21.5	Insufficient visibility from the working position			EN 13557	5.4.1.1, 5.4.1.6
21.6	Inadequate lighting				5.4.3
21.7	Inadequate seating		A1:Annex.A, 3.2.2	EN 13557, ISO 8566-5	
21.8	Noise at the driving position				See item 4. 5.4.4.2
21.9	Vibration at the driving position				See item 5. 5.2.2.6
21.10	Insufficient means of evacuation/emergency exit		A1:Annex.A, 3.2.1	EN 13586, EN 60204-32	5.3.5.3.1
<b>22</b>	<b>Due to the control system</b>				5.4.1
22.1	Inadequate location of controls /control devices				See 8.1, 8.2
22.2	Inadequate design of the actuation mode and/or action mode of controls			ISO 7752-1, -5	5.3.1.1, 5.4.1.1-2
<b>23</b>	<b>From handling the machine (lack of stability)</b>		A1:Annex.A, 3.1.3		5.3.3.3
<b>24</b>	<b>Due to the power source and to the transmission of power</b>				
24.1	Hazards from the engine and the batteries		A1:Annex.A, 3.4.8, 3.5.1		