



SLOVENSKI STANDARD

SIST EN 13155:2004

01-junij-2004

Dvigala (žerjavi) – Varnost – Snemljiva dvigalna sredstva

Cranes - Safety - Non-fixed load lifting attachments

Krane - Lose Lastaufnahmemittel

Appareils de levage a charge suspendue - Equipements amovibles de prise de charge

Ta slovenski standard je istoveten z: EN 13155:2003

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ICS:

53.020.30	Pribor za dvigalno opremo	Accessories for lifting equipment
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English version

Cranes - Safety - Non-fixed load lifting attachments

Appareils de levage à charge suspendue - Equipements
amovibles de prise de charge

Krane - Sicherheit - Lose Lastaufnahmemittel

This European Standard was approved by CEN on 17 November 2001.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This document (EN 13155:2003) 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of an identical text or by endorsement, at the latest by **January 2004**, and conflicting national standards shall be withdrawn at the latest by January 2004.

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 **EC Directive(s)**.

For relationship with EC Directive, see informative Annex ZA, which is an integral part of this document.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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

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Introduction

This European Standard has been prepared to be a harmonized standard to provide one means for non-fixed load lifting attachments used on cranes to conform with the essential health and safety requirements of the Machinery Directive, as amended.

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

The machinery concerned and the extent to which hazards 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 A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for non-fixed load lifting attachments which have been designed and built according to the provisions of this type C standard.

1 Scope

This European Standard specifies safety requirements for the following non-fixed load lifting attachments for cranes, hoists and manually controlled load manipulating devices:

- plate clamps;
- vacuum lifters;
 - self priming,
 - non-self priming (pump, venturi, turbine);
- electric lifting magnets (battery fed and main-fed);
- permanent lifting magnets;
- electro-permanent lifting magnets;
- lifting beams;
- C-hooks;
- lifting forks;
- clamps;

defined in clause 3.

This standard does not specify the additional requirements for :

- non fixed load lifting attachments in direct contact with foodstuffs or pharmaceuticals requiring a high level of cleanliness for hygiene reasons;
- hazards resulting from handling specific hazardous materials (e.g. explosives, hot molten masses, radiating materials);

- hazards caused by operation in an explosive atmosphere;
- hazards caused by noise;
- electrical hazards;
- hazards due to hydraulic and pneumatic components.

This standard does not cover the hazards related to mechanical strength of structural elements of attachments designed for more than 20 000 lifting cycles.

NOTE The coefficient of utilization specified in clause 5.1.1 ensures that no fatigue verification is needed for less than 20 000 cycles. This is in accordance with the well accepted calculation codes e.g. FEM 1001.

This standard does not cover attachments intended to lift above people.

This standard does not cover slings, ladles, expanding mandrels, buckets, grabs, or grab buckets.

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

This European Standard does not cover hazards related to the lifting of persons.

This European Standard is applicable to non-fixed load lifting attachments which are manufactured after the date of approval by CEN of this standard.

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2 Normative references

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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 of revision. For undated references the latest edition of the publication referred to applies.

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 292-2: 1991/A1:1995, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles and specifications (Amendment 1)*

EN 287-1, *Approval testing of welders for fusion welding — Part 1: Steels*

EN 349: 1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 457, *Safety of machinery — Auditory danger signals — General requirements, design and testing*

EN 818-4, *Short link chain for lifting purposes — Safety — Part 4: Chain slings — Grade 8*

EN 818-5, *Short link chain for lifting purposes — Safety — Part 5: Chain slings — Grade 4*

EN 842, *Safety of machinery — Visual danger signals — General requirements, design and testing*

EN 13155:2003 (E)

EN 981, *Safety of machinery - System of auditory and visual danger and information signals*

EN 1070: 1998, *Safety of machinery — Terminology*

EN 1492-1, *Textile slings — Safety — Part 1: Flat woven webbing slings, made of man-made fibres, for general purpose use*

EN 1492-2, *Textile slings — Safety — Part 2: Roundslings, made of man-made fibres, for general purpose use*

ENV 1993-1-1: 1992, *Eurocode 3: Design of steel structures — Part 1-1: General rules and rules for buildings*

EN 10025, *Hot-rolled products of non alloy structural steels — Technical delivery conditions*

EN 10045-1, *Metallic materials — Charpy impact test — Part 1: Test method*

prEN 13414-1, *Steel wire rope slings — Safety — Part 1: Slings for general lifting service*

prEN 13557: 2003, *Cranes — Controls and control stations*

EN 25817, *Arc-welded joints in steel — Guidance on quality levels for imperfections (ISO 5817:1992)*

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3 Terms and definitions

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

3.1

adhesion force

force required to remove the load from a vacuum lifter

3.2

building area

area where buildings, bridges, roads etc are being erected or renovated or demolished

NOTE In these areas the environment is permanently changing. Any risks are higher than in plants or warehouses.

3.3

C-hook

equipment in the form of a 'C' used for lifting hollow loads e.g. coils, pipes



Figure 1 — Example of a C-hook

3.4

coefficient of utilisation

arithmetic ratio between the maximum load held by the lifting attachment and its working load limit

3.5

clamp

equipment used to handle loads by clamping on a specific part of the load.

NOTE Clamps are also known as tongs. For definition of plate clamps see 3.12.

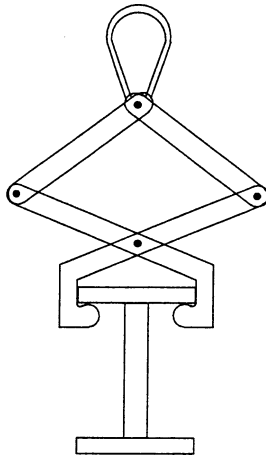


Figure 2 — Example of a clamp

3.6 individual verification

verification carried out on every item produced

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3.7 lifting beam

equipment consisting of one or more members equipped with attachment points to facilitate the handling of loads which require support at several points

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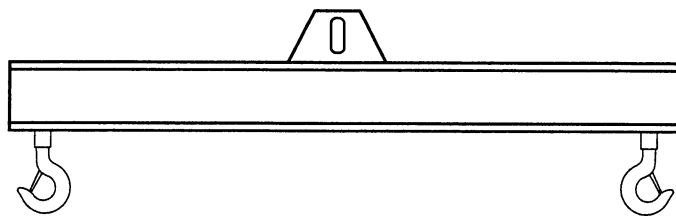


Figure 3 — Example of a lifting beam

3.8 lifting forks

equipment consisting of two or more arms fixed to an upright with an upper arm, essentially to lift palletised or similar loads

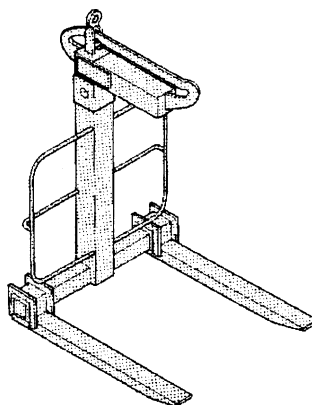


Figure 4 — Example of lifting forks

3.9 lifting magnet

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Figure 5 — Example of a lifting magnet

3.9.1 electric lifting magnet

equipment with a magnetic field generated by an electric current creating sufficient force for gripping, holding and handling loads with ferro-magnetic properties.

3.9.2 permanent lifting magnet

equipment with a permanent magnetic field which creates sufficient force for gripping, holding and handling loads with ferro-magnetic properties. The magnetic field is controlled by mechanical means

3.9.3 electro-permanent lifting magnet

equipment with a permanent magnetic field which creates sufficient force for gripping, holding and handling loads with ferro-magnetic properties. The magnetic field is controlled by an electric current which is not required to sustain the magnetic field

NOTE Electro-permanent lifting magnets can be energized by the mains or by battery or stand-alone generator.

3.10

No-go area

area from which persons are excluded during normal operation

3.11

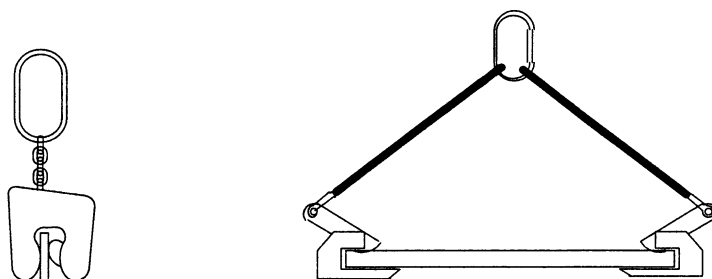
non-fixed load lifting attachment

lifting attachment which can be fitted directly or indirectly to the hook or any other coupling device of a crane, hoist or manually controlled manipulating device by the user without affecting the integrity of the crane, hoist or manually controlled manipulating device

3.12

plate clamps

non powered equipment used to handle steel plates by clamping them between jaws.



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Figure 6 — Example of plate clamps

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3.13

positive holding device

device making a direct mechanical connection to the load and which does not rely solely on friction, suction or magnetic adhesion to the load

3.14

secondary positive holding device

device to hold loads if the primary holding means fails and which does not rely on friction, suction or magnetic adhesion to the load

3.15

tear-off force

force applied at a right angle to the plane of the magnet poles which is required to detach the load from the switched-on magnet

3.16

two-action control

control which, in order to be operative, requires the performance of two separate actions with one or two hands, such as:

- a) operation of two separate hold-to-run controls;
- b) sequential operation of two movements of a control device;
- c) previous unlocking of the control with self-locking in the neutral position.

3.17**type verification**

verification carried out on one or more samples representative of a particular design and size of product before it is first placed on the market

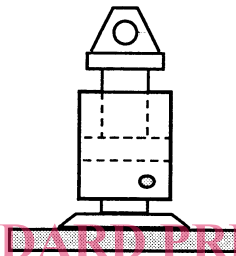
NOTE Although the term "type verification" is normally associated with series produced equipment, for the purpose of this standard it also applies to single unit produced attachment.

3.18**vacuum lifter(suction pad)**

equipment which includes one or several suction pads operating by vacuum

3.18.1**self priming vacuum lifter**

vacuum lifter using the load to create the vacuum



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Figure 7 — Example of a self priming vacuum lifter

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3.18.2**non self priming vacuum lifter**

vacuum lifter using an external source of energy

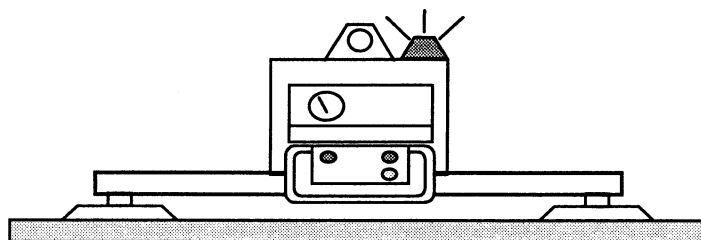


Figure 8 — Example of a non self priming vacuum lifter

3.19**working load limit**

maximum load that the non-fixed load lifting attachment is designed to lift under the conditions specified by the manufacturer

4 List of significant hazards

Tables 1 to 7 show a list of significant hazardous situations and hazardous events that could result in risks to persons during normal use and foreseeable misuse. They also contain the relevant clauses in this standard that are necessary to reduce or eliminate the risks associated with those hazards.

NOTE The numbers in the left hand columns correspond to those in annex A of EN 1050: 1996 'Safety of machinery — Principles for risk assessment'.

Table 1 — Plate clamps - List of significant hazards and associated requirements

	Hazard	Relevant clause(s) in this standard
1	Mechanical hazards Generated by machine parts or workpieces caused, for example, by:	
1 e)	Inadequacy of mechanical strength	5.1.1.1, 5.1.1.2, Fatigue is not dealt with
1 c)	Stability	5.1.5, 7.1.1
1.1	Crushing hazard	5.1.3, 7.1.1, 7.1.2
1.2	Shearing hazard	5.1.3, 7.1.1, 7.1.2
8	Hazards generated by neglecting ergonomic principles	
8.1	Unhealthy postures	5.1.3
8.6	Human errors	5.2.1.2
15	Errors of fitting	5.2.1.4, 5.2.1.6
27	Mechanical hazards and hazardous events	
27.1	From load falls, collisions, machine tipping caused by:	
27.1.1	Lack of stability	5.1.5
27.1.4	Unexpected/unintended movement of loads	5.2.1.1, 5.2.1.2, 5.2.1.3, 5.2.1.4,
27.1.5	Inadequate holding devices/accessories	5.2.1.4, 5.2.1.5, 7.1.1, 7.1.2
27.4	From insufficient mechanical strength of parts	5.1.1.1 Fatigue is not dealt with
27.6	From inadequate selection/integration into the machine of chains, ropes, lifting accessories	5.1.4, 5.2.1.6
27.8	From abnormal conditions of assembly/testing/use maintenance	5.2.1.5, 5.2.1.6, 7.1 to 7.2

Table 2 — Vacuum lifters - List of significant hazards and associated requirements

	Hazard	Relevant clause(s) in this standard
1	Mechanical hazards Generated by machine parts or workpieces caused, for example, by:	
1 e)	Inadequacy of mechanical strength	5.1.1.1, 5.1.1.2, Fatigue is not dealt with
1 c)	Stability	5.1.5, 7.1.1
1 h)	The effect of vacuum	5.2.2
1.1	Crushing hazard	5.1.3, 7.1.1, 7.1.2
1.2	Shearing hazard	5.1.3, 7.1.1, 7.1.2
8	Hazards generated by neglecting ergonomic principles	
8.1	Unhealthy postures	5.1.3
8.2	Inadequate consideration of hand-arm anatomy	5.1.2
8.6	Human errors	5.2.2.1 to 5.2.2.10
8.7	Inadequate design of manual controls	5.1.2
10	Unexpected start-up, unexpected overrun/overspeed	5.1.6
13	Failure of the power supply	5.2.2.5, 5.2.2.6, 5.2.2.7
14	Failure of the control circuit	7.1.1, 7.1.2
15	Errors of fitting	7.1.1, 7.1.2
17	Falling objects	5.2.2.1, 5.2.2.2, 5.2.2.3,, 5.2.2.4
18	Loss of stability of machinery	5.1.5
27	Mechanical hazards and hazardous events	
27.1	From load falls, collisions, machine tipping caused by:	
27.1.1	Lack of stability	5.1.1.2
27.1.2	Uncontrolled loading - overloading - overturning moments exceeded	5.1.1.1, 7.1.1
27.1.3	Uncontrolled amplitude of movements	5.2.2.10
27.1.4	Unexpected/unintended movement of loads	5.2.2.1, 5.2.2.2, 5.2.2.3, 5.2.2.4, 5.2.2.5, 5.2.2.6, 5.2.2.9, 5.2.2.10, 7.2.3
27.1.5	Inadequate holding devices/accessories	5.2.2.1, 7.1.1, 7.1.2
27.4	From insufficient mechanical strength of parts	5.1.1.1 Fatigue is not dealt with
27.6	From inadequate selection/integration into the machine of chains, ropes, lifting accessories	5.1.4
27.8	From abnormal conditions of assembly/testing/use maintenance	5.2.5, 5.2.6, 7.1, 7.2