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Žerjavi - Žerjavi na plavajočih objektih - 1. del: Žerjavi na plavajočih objektih za splošno uporabo

Cranes - Offshore cranes - Part 1: General purpose offshore cranes

Krane - Offshore-Krane - Teil 1: Offshore-Krane für allgemeine Verwendung

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Appareils de levage à charge suspendue - Grues offshore - Partie 1: Grues offshore pour usage général

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EUROPEAN STANDARD
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Supersedes EN 13852-1:2004

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Cranes - Offshore cranes - Part 1: General-purpose offshore cranes

Appareils de levage à charge suspendue - Grues off-shore
- Partie 1: Grues off-shore pour usage général

Krane - Offshore-Krane - Teil 1: Offshore-Krane für
allgemeine Verwendung

This European Standard was approved by CEN on 19 July 2013.

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Contents

	Page
Foreword.....	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	10
4 List of significant hazards	15
5 Safety requirements and/or protective measures	18
5.1 General.....	18
5.2 Strength and stability	18
5.3 Equipment and components	21
5.4 Drive systems.....	25
5.5 Control station, machinery house etc	26
5.6 Noise reduction.....	28
5.7 Access, guards etc	28
5.8 Controls, indicators and limiting devices	29
5.9 Protection systems.....	33
5.10 Lifting of personnel	39
6 Verification of the safety requirements and/or protective measures	40
6.1 General.....	40
6.2 Testing	43
7 Information for use	45
7.1 Documentation.....	45
7.2 Operation	45
7.3 Maintenance	47
7.4 Marking	48
Annex A (informative) Selection of a suitable set of crane standards for a given application	50
Annex B (normative) Determination of factors	51
B.1 Calculation of the dynamic coefficient Φ_n by the simplified method	51
B.2 Calculation of dynamic coefficient Φ_n by motion response analysis	53
B.3 Out of plane influences	53
B.3.1 General.....	53
B.3.2 Offlead load	53
B.3.3 Sidelead load.....	54
B.3.4 Horizontal load combination	55
B.4 Hook velocity.....	55
B.4.1 Hoisting and lowering velocity.....	55
B.4.2 Horizontal hook velocity	55
B.5 Load combinations	56
Annex C (normative) Environmental influences	59
C.1 General.....	59
C.2 Wind	59
C.2.1 Wind velocities.....	59
C.2.2 Boom stalling	60

C.3	Floating units	60
C.4	Thermal effects	60
C.5	Ice	61
C.6	Stowage	61
C.7	Corrosion protection	61
Annex D	(normative) Failure mode analysis	62
D.1	General	62
D.2	Failure mode charts	62
Annex E	(normative) Material selection	64
E.1	General	64
E.2	Verification of material quality	64
E.3	Forged rings for slewing bearings	64
E.4	Slewing bearing fasteners	65
E.5	Welded structures	66
E.6	Non-welded components	66
Annex F	(normative) Control station instrumentation	68
F.1	Minimum control station instrumentation	68
F.2	Optional control station instrumentation	68
Annex G	(normative) Wire rope safety factors	69
G.1	General	69
G.2	Static safety factors	69
G.2.1	General	69
G.2.2	Running rigging	69
G.2.3	Standing rigging	70
G.3	Dynamic safety factors	70
G.3.1	General	70
G.3.2	Load reference factor for running rigging	71
G.3.3	Load reference factor for standing rigging	71
G.4	Lifting of personnel	71
Annex H	(normative) Slewing bearings	72
Annex I	(normative) Requirements for brakes	73
Annex J	(normative) Ranking of safety systems	75
Annex K	(normative) Required performance levels (PLr) for SRP/CS according to EN ISO 13849-1:2008	76
Annex L	(informative) Typical general-purpose offshore cranes and terminology	77
Annex M	(normative) Excursion envelopes	82
Annex N	(normative) Noise test code	83
N.1	Introduction	83
N.2	Sound power level determination	83
N.2.1	Basic standard to be used	83
N.2.2	Measurement and calculation procedure	83
N.3	Emission sound pressure level determination	84

EN 13852-1:2013 (E)

N.3.1	Basic standard to be used	84
N.3.2	Crane operator and microphone positions	84
N.3.3	Specifications concerning the crane operating cabin	84
N.3.4	Specification relating to wind speed	84
N.3.5	Measurement and calculation procedure.....	84
N.4	Operating conditions.....	85
N.4.1	General.....	85
N.4.2	Test procedure	86
N.5	Information on measurement uncertainties.....	87
N.6	Information to be recorded	87
N.7	Information to be reported	87
N.8	Declaration and verification of noise emission values.....	87
N.9	Noise measurement — test report	88
Annex O	(normative) Equipment for use in a hazardous area	92
O.1	General.....	92
O.2	Avoidance or reduction of ignition sources	92
O.3	Electrical equipment.....	92
O.4	Non-electrical equipment.....	92
O.5	Electrostatic discharge	92
Annex ZA	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC	94
Annex ZB	(informative) Relationship between this European Standard and the Essential Requirements of EU Directive 94/9/EC	95
Bibliography	96

Foreword

This document (EN 13852-1:2013) 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 March 2014, and conflicting national standards shall be withdrawn at the latest by March 2014.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13852-1:2004.

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 EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA and Annex ZB which are integral parts of this document.

Since the previous version, major changes have been made including the scope. New requirements are introduced on load chart, electrotechnical and non electrical equipment, mode and rigging selector, back-up brake on luffing winches, wire ropes, lighting, dropped object protection, controls, data recorder, motion limiters, rated capacity limiter, boom backstop, emergency operation system, fire protection and protective earthing, etc. Major changes have also been made to Annexes B, F, G, K, M and O.

There are several updates in standard references, and a number of clauses have been redrafted for reasons of clarity and technical and editorial accuracy.

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EN 13852, *Cranes — Offshore cranes*, is composed of the following parts:

- *Part 1: General-purpose offshore cranes* (the present document);
- *Part 2: Floating cranes*.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 13852-1:2013 (E)**Introduction**

This European Standard has been prepared to be a harmonised standard to provide one means for general purpose offshore cranes to conform to the essential health and safety requirements of the Machinery Directive, as mentioned in Annex ZA.

Absolute safety of cranes cannot be ensured by design alone, as their operation depends on the skill of operators, maintenance personnel and inspectors as well as on the numerous technical parameters relating to the crane and its operating environment, which can have large scatter.

As many of the hazards related to general-purpose offshore cranes relate to their operating environment and use, it is assumed in the preparation of this European Standard that all the relevant information relating to the use and operating environment of the crane has been exchanged between the manufacturer and user (as recommended in ISO 9374-1:1989 and ISO 9374-4:1989) covering such issues as, for example:

- clearances;
- requirements concerning protection against hazardous environments;
- processed materials, such as potentially flammable or explosive material (e.g. hydrocarbons, combustible dust, etc).

This European Standard is a type C standard as stated in EN ISO 12100:2010.

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered and indicated in the scope of this European 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 machines that have been designed and built according to the provisions of this type C standard.

NOTE 1 A floating crane is a crane mounted on a vessel or barge designed for its support and transport, primarily intended for construction/deconstruction operations in a marine environment.

NOTE 2 EN 13852-2 is not a harmonised standard.

1 Scope

This European Standard specifies the requirements for general-purpose offshore cranes including their supporting pedestals or structures.

The standard is applicable to general-purpose offshore cranes covered by the scope of this European Standard which are manufactured after the date of its publication as EN.

This European Standard is not applicable to general-purpose offshore cranes which are manufactured before the date of its publication as an EN.

This European Standard does not cover use of - or hazards relating to the following:

- a) fabrication, transportation, assembly, dismantling, disabling, scrapping or changing the configuration of the crane;
- b) lifting accessories, i.e. any item between the hook and the load;
- c) minimum design temperature below -20 °C ;
- d) operations at an ambient temperature above 45 °C ;

NOTE: For equipment designed for operation in explosive atmospheres, the normal ambient temperature range is -20 °C to $+40\text{ °C}$, unless otherwise specified and marked. See Annex O and relevant standards indicated for complete information.

- e) lifting operations involving more than one crane;
- f) accidental loads due to collisions;
- g) hand powered cranes and other cranes with a rated capacity less than 2 t or outreach less than 8 m;
- h) emergency rescue operations; (except training)
- i) subsea lifting operations.

The significant hazards covered by this European standard are identified in Clause 4.

This European Standard includes requirements for the lifting of personnel by a general-purpose offshore crane.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 614-1:2006+A1:2009, *Safety of machinery — Ergonomic design principles — Part 1: Terminology and general principles*

EN 842:1996+A1:2008, *Safety of machinery — Visual danger signals — General requirements, design and testing*

EN 953:1997+A1:2009, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 1127-1:2011, *Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology*

EN 13852-1:2013 (E)

- EN 10025-1:2004, *Hot rolled products of structural steels — Part 1: General technical delivery conditions*
- EN 10025-2:2004, *Hot rolled products of structural steels — Part 2: Technical delivery conditions for non-alloy structural steels*
- EN 10025-3:2004, *Hot rolled products of structural steels — Part 3: Technical delivery conditions for normalized/normalized rolled weldable fine grain structural steels*
- EN 10025-4:2004, *Hot rolled products of structural steels — Part 4: Technical delivery conditions for thermomechanical rolled weldable fine grain structural steels*
- EN 10025-5:2004, *Hot rolled products of structural steels — Part 5: Technical delivery conditions for structural steels with improved atmospheric corrosion resistance*
- EN 10025-6:2004+A1:2009, *Hot rolled products of structural steels — Part 6: Technical delivery conditions for flat products of high yield strength structural steels in the quenched and tempered condition*
- EN 10083-1:2006, *Steels for quenching and tempering — Part 1: General technical delivery conditions*
- EN 10083-2:2006, *Steels for quenching and tempering — Part 2: Technical delivery conditions for non alloy steels*
- EN 10204:2004, *Metallic products — Types of inspection documents*
- EN 12077-2:1998+A1:2008, *Cranes safety — Requirements for health and safety — Part 2: Limiting and indicating devices*
- EN 12385-1:2002+A1:2008, *Steel wire ropes — Safety — Part 1: General requirements*
- EN 12385-2:2002+A1:2008, *Steel wire ropes — Safety — Part 2: Definitions, designation and classification*
- EN 12385-3:2004+A1:2008, *Steel wire ropes — Safety — Part 3: Information for use and maintenance*
- EN 12385-4:2002+A1:2008, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications*
- 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 13001-1:2004+A1:2009, *Cranes — General design — Part 1: General principles and requirements*
- EN 13001-2:2011¹⁾, *Crane safety — General design — Part 2: Load actions*
- CEN/TS 13001-3-1:2004, *Cranes — General design — Part 3-1: Limit states and proof of competence of steel structures*
- CEN/TS 13001-3-2:2008, *Cranes — General design — Part 3-2: Limit states and proof of competence of wire ropes in reeving systems*
- CEN/TS 13001-3-5:2010, *Cranes — General design — Part 3-5: Limit states and proof of competence of forged hooks*
- EN 13135:2013, *Cranes — Safety — Design — Requirements for equipment*

1) This standard is impacted by the corrigendum EN 13001-2:2011/AC:2012.

- EN 13411-3:2004+A1:2008, *Terminations for steel wire ropes — Safety — Part 3: Ferrules and ferrule-securing*
- EN 13411-4:2011, *Terminations for steel wire ropes — Safety — Part 4: Metal and resin socketing*
- EN 13411-6:2004+A1:2008, *Terminations for steel wire ropes — Safety — Part 6: Asymmetric wedge socket*
- EN 13411-7:2006+A1:2008, *Terminations for steel wire ropes — Safety — Part 7: Symmetric wedge socket*
- EN 13463-1:2009, *Non-electrical equipment for use in potentially explosive atmospheres — Part 1: Basic method and requirements*
- EN 13478:2001+A1:2008, *Safety of machinery — Fire prevention and protection*
- EN 13557:2003+A2:2008, *Cranes — Controls and control stations*
- EN 13586:2004+A1:2008, *Cranes — Access*
- EN 14502-1:2010, *Cranes — Equipment for the lifting of persons — Part 1: Suspended baskets*
- EN 60079-0:2009, *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2007 + corrigendum Dec. 2010)*
- EN 60079-14:2008, *Explosive atmospheres — Part 14: Electrical installations design, selection and erection (IEC 60079-14:2007)*
- EN 60079-15:2010, *Explosive atmospheres — Part 15: Equipment protection by type of protection “n” (IEC 60079-15:2010)*
- EN 60204-32:2008, *Safety of machinery — Electrical equipment of machines — Part 32: Requirements for hoisting machines (IEC 60204-32:2008)*
- EN 61000-6-2:2005, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity for industrial environments (IEC 61000-6-2:2005)*
- EN 61000-6-4:2007²⁾, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4:2006)*
- EN 61508 (all parts), *Functional safety of electrical/electronic/programmable electronic safety-related systems (IEC 61508)*
- EN ISO 898-1:2013, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs specified property classes — Coarse thread and fine pitch thread (ISO 899-1:2013)*
- 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 4413:2010, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413:2010)*
- EN ISO 4414:2010, *Pneumatic fluid power — General rules and safety requirements for systems and their components (ISO 4414:2010)*

2) This text is impacted by the stand-alone amendment EN 61000-6-4:2007/A1:2011 (IEC 61000-6-4:2006/A1:2010).

EN 13852-1:2013 (E)

EN ISO 4871:2009, *Acoustics — Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)*

EN ISO 7731:2008, *Ergonomics — Danger signals for public and work areas — Auditory danger signals (ISO 7731:2003)*

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 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13850:2008, *Safety of machinery — Emergency stop — Principles for design (ISO 13850:2006)*

IEC 60529 ed2.1 (2001)³⁾, *Degrees of protection provided by enclosures (IP Code)*

ISO 8566-1:2010, *Cranes — Cabins and control stations — Part 1: General*

ISO 9927-1:2013, *Cranes — Inspections — Part 1: General*

ISO 12478-1:1997, *Cranes — Maintenance manual — Part 1: General*

ISO 12480-1:1997, *Cranes — Safe use — Part 1: General*

ISO 12482-1:1995, *Cranes — Condition monitoring — Part 1: General*

ISO 20332:2008, *Cranes — Proof of competence of steel structures*

FEM 1.001 (10.1998), *Rules for the design of hoisting appliances*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

NOTE Additional terms and definitions specifically addressed in this document are added below.

3.1

actual hook load

total static weight of the load including any equipment placed between the load and the hook

3.2

automatic overload protection system

AOPS

system that automatically safeguards and protects the crane against the effects of a gross overload during operation by allowing the hook to be pulled away from the crane in downwards direction within specified offlead and sidelead angles, without causing significant damage to the crane

3) This standard is impacted by IEC Corrigenda 1 (2003) and 2 (2007).

3.3

component

single part or assembly of parts of a crane, which is subjected to load effects (wire ropes, stationary or running, traverse beams, pendant bars, rope sheaves, axles, gears, couplings, brakes, hoists, hydraulic cylinders, shafts, shackles, swivels and pins, etc.)

3.3.1

primary component

component which is essential for the mechanical and structural integrity of the crane, e.g. boom and a-frame lacing members

3.3.2

secondary component

component that is not a primary component

3.4

crane stiffness

vertical static force applied at the hook required to produce unit vertical deflection assuming the pedestal support structure to be rigid

3.5

design load

maximum theoretical load ($R_0 \times \Phi_0$) that can be safely lifted by the crane at any given radius in the design condition such that the acceptance criteria are not exceeded

Note 1 to entry: See Figure 1.

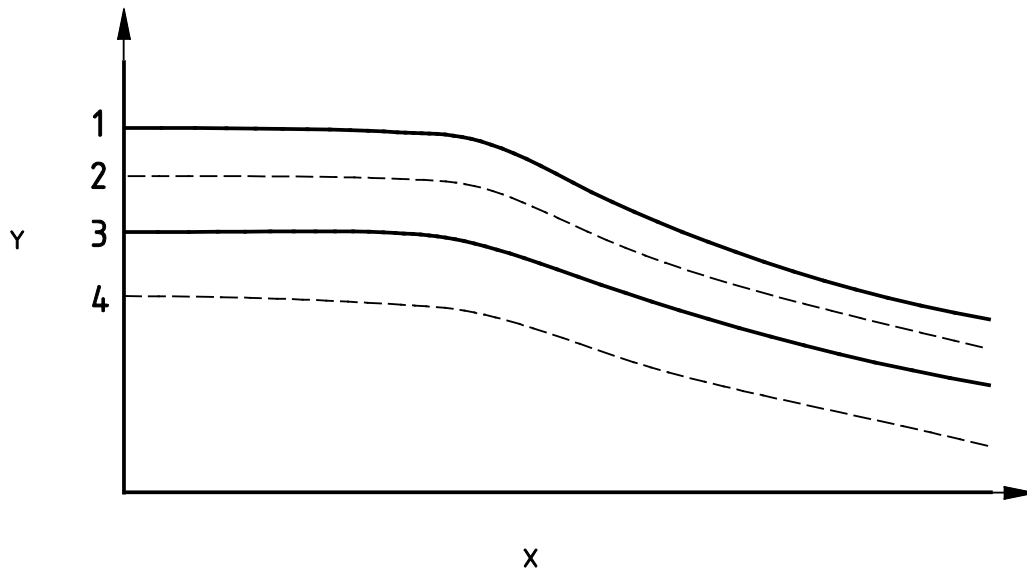
3.6

design moment

maximum moment caused by the design ~~load multiplied by~~ radius

Note 1 to entry: See Figure 1. <https://standards.iteh.ai/catalog/standards/sist/34e9013a-b814-4ec5-b574-99af74f7ea46/sist-en-13852-1-2013>

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$$R_0 \times \Phi_0 \geq R_n \times \Phi_n + \text{"Loss"}$$

Key

X radius

Y load

1 design load $R_0 \times \Phi_0$ 2 operational load $R_n \times \Phi_n$ 3 on-board lift R_0 4 off-board lift R_n

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Figure 1 — Design load and design moment

3.7**design temperature** T_d

lowest mean daily temperature

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Note 1 to entry: The design temperature is a reference temperature used as a criterion for the selection of materials.

3.8**dynamic coefficient** Φ_n

ratio between the maximum dynamic load at the hook and the actual hook load for any given configuration or operating condition

3.9**emergency operation system**

EOS

back-up system for limited operation of the crane, if the normal system of operation is inoperative

3.10**folding**

motion from a mechanical system, which enable the knuckle boom assembly to be folded or unfolded

3.11**general-purpose offshore crane**

multipurpose slewing jib type offshore crane

3.12**hazardous area**

area in which an explosive gas atmosphere is or may be expected to be present, in quantities such as to require special precautions for the construction, installation and use of the equipment

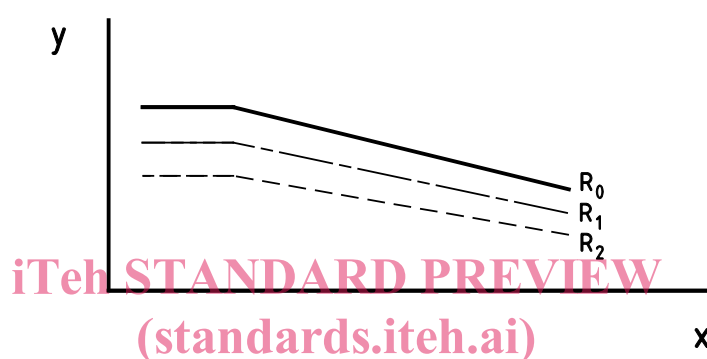
3.13**hoisting**

motion from a mechanical system, which enables the hook to be raised and lowered

3.14**load chart**

diagram or table showing the rated capacity relative to the radius, environmental conditions, out of plane influences and type of operation

Note 1 to entry: An example is given in Figure 2 showing rated capacity for off-board lifts to and from the deck of supply vessels at 3 fall hoist reeving. Maximum 1° trim and 2° heel, maximum wind speed 25 m/s.

**Key**

X radius

Y rated capacity

R₀ rated capacity for on-board lifts

R₁ rated capacity for off-board lifts with wave height $H_{1/3} = 1$ m

R₂ rated capacity for off-board lifts with wave height $H_{1/3} = 2$ m

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Figure 2 — Load chart

3.15**lowest mean daily temperature**

lowest value on the annual mean daily temperature curve for a specific area

3.16**luffing**

motion from a mechanical system which enables the boom to be raised or lowered

3.17**manual overload protection system**

MOPS

system activated by the crane operator, that protects the crane against possible overload by limiting the hoist rope pull to a low value and allowing the hook to be pulled away from the crane in any direction

3.18**mean daily temperature**

statistical 24 hour mean temperature for a specific calendar day, averaged over a number of years of operation