



SLOVENSKI STANDARD
SIST EN ISO 13535:2001
01-junij-2001

**Petroleum and natural gas industries - Drilling and production equipment -
Hoisting equipment (ISO 13535:2000)**

Petroleum and natural gas industries - Drilling and production equipment - Hoisting
equipment (ISO 13535:2000)

Erdöl- und Erdgasindustrien - Bohr- und Fördereinrichtungen - Hebegerät (ISO
13535:2000)

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Industries du pétrole et du gaz naturel - Equipements de forage et de production -
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ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment
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EUROPEAN STANDARD
NORME EUROPÉENNE
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Petroleum and natural gas industries - Drilling and production
equipment - Hoisting equipment (ISO 13535:2000)

Industries du pétrole et du gaz naturel - Equipements de
forage et de production - Equipement de levage (ISO
13535:2000)

This European Standard was approved by CEN on 9 December 2000.

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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.

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

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EN ISO 13535:2000

Foreword

The text of the International Standard ISO 13535:2000 has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum and natural gas industries", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2001, and conflicting national standards shall be withdrawn at the latest by June 2001.

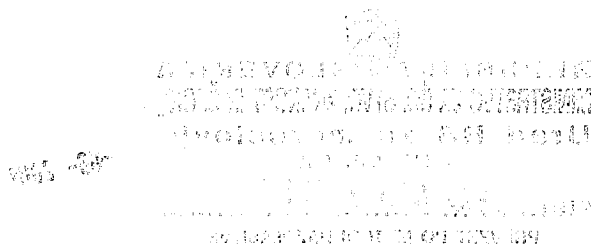
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NOTE FROM CMC: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

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Endorsement notice

The text of the International Standard ISO 13535:2000 was approved by CEN as a European Standard without any modification.
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INTERNATIONAL STANDARD

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Petroleum and natural gas industries — Drilling and production equipment — Hoisting equipment

*Industries du pétrole et du gaz naturel — Équipements de forage et de
production — Équipement de levage*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13535 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 4, *Drilling and production equipment*.

Annexes A and B form a normative part of this International Standard. Annex C is for information only.

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ISO 13535:2000(E)**Introduction**

This International Standard is based upon API Spec 8C [2], 3rd edition, December 1997.

Users of this International Standard should be aware that further or differing requirements may be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this International Standard and provide details.

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Petroleum and natural gas industries — Drilling and production equipment — Hoisting equipment

1 Scope

This International Standard provides requirements for the design, manufacture and testing of hoisting equipment suitable for use in drilling and production operations.

This International Standard is applicable to the following drilling and production hoisting equipment:

- a) hoisting sheaves;
- b) travelling blocks and hook blocks;
- c) block-to-hook adapters;
- d) connectors and link adapters;
- e) drilling hooks;
- f) tubing hooks and sucker-rod hooks;
- g) elevator links;
- h) casing elevators, tubing elevators, drill-pipe elevators and drill-collar elevators;
- i) sucker-rod elevators;
- j) rotary swivel-bail adapters;
- k) rotary swivels;
- l) power swivels;
- m) power subs;
- n) spiders, if capable of being used as elevators;
- o) wire-line anchors;
- p) drill-string motion compensators;
- q) kelly spinners, if capable of being used as hoisting equipment;
- r) pressure vessels and piping mounted onto hoisting equipment;
- s) safety clamps, if capable of being used as hoisting equipment;
- t) guide dollies (annex B).

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This International Standard establishes requirements for two product specification levels (PSLs). These two PSL designations define different levels of technical requirements. All the requirements of clause 4 through clause 11 are applicable to PSL 1 unless specifically identified as PSL 2. PSL 2 includes all the requirements of PSL 1 plus the additional practices as stated herein.

Supplementary requirements apply only when specified. Annex A gives a number of standardized supplementary requirements.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 10422, *Petroleum and natural gas industries – Threading, gauging and thread inspection of casing, tubing and line pipe threads – Specifications.*

ISO 11960, *Petroleum and natural gas industries – Steel pipes for use as casing or tubing for wells.*

API¹⁾ RP 9B, *Application, Care, and Use of Wire Rope for Oil Field Service.*

API Spec 7, *Rotary Drill Stem Elements.*

ASME²⁾ B31.3, *Chemical Plant and Petroleum Refinery Piping.*

ASME V BPVC Section 5, 1998, *Non-destructive Examination.*

ASME VIII, DIV 1, *Rules for Construction of Pressure Vessels.*

ASME IX, *Welding and Brazing specification.*

ASTM³⁾ A 370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products.*

ASTM A 388, *Standard Practice for Ultrasonic Examination of Heavy Steel Forgings.*

ASTM A 488, *Standard Practice for Steel Castings, Welding, Qualifications of Procedures and Personnel.*

ASTM A 770, *Standard Specification for Through-Thickness Tension Testing of Steel Plates for Special Applications.*

ASTM E 4, *Load Verification of Testing Machines.*

ASTM E 125, *Standard Reference Photographs for Magnetic Particle Indications on Ferrous Castings.*

ASTM E 165, *Standard Test Method for Liquid Penetrant Examination.*

ASTM E 186, *Standard Reference Radiographs for Heavy-Walled (2 to 4 1/2-in. (51 to 114-mm)) Steel Castings.*

ASTM E 280, *Standard Reference Radiographs for Heavy-Walled (4 1/2 to 12-in. (114 to 305-mm)) Steel Castings.*

1) American Petroleum Institute; 1220 L St N.W.; Washington DC, 20005; USA.

2) American Society of Mechanical Engineers; 345 East 47th Street; New York, NY 10017; USA.

3) American Society for Testing and Materials; 100 Barr Harbor Drive; West Conshohocken, PA 19428; USA.

ASTM E 428, *Standard Practice for Fabrication and Control of Steel Reference Blocks Used in Ultrasonic Inspection.*

ASTM E 446, *Standard Reference Radiographs for Steel Castings Up to 2 in. (51 mm) in Thickness.*

ASTM E 709, *Standard Guide for Magnetic Particle Examination.*

ASNT-TC-IA⁴⁾, *Recommended practice for personnel qualification and certification in non-destructive testing.*

AWS D1.1, *Structural welding code.*

AWS QC1, *Standard for AWS Certification of Welding Inspectors.*

EN 287 (all parts), *Approval testing of welders – Fusion welding.*

EN 288 (all parts), *Specification and qualification of welding procedures for metallic materials.*

MSS⁵⁾ SP-55, *Quality standard for steel castings for valves, flanges and fittings and other piping components – Visual method for evaluation of surface irregularities.*

3 Terms, definitions and abbreviated terms

For the purposes of this International Standard, the following terms, definitions and abbreviated terms apply.

3.1 Terms and definitions

3.1.1

bearing-load rating

calculated maximum load for bearings subjected to the primary load

3.1.2

design load

sum of static and dynamic loads that would induce the maximum allowable stress in an item

3.1.3

design safety factor

factor to account for a certain safety margin between the maximum allowable stress and the specified minimum yield strength of a material

3.1.4

design verification test

test performed to validate the integrity of the design calculations used

3.1.5

dynamic load

load applied to the equipment due to acceleration effects

3.1.6

equivalent-round

standard for comparing various shaped sections to round bars, used for determining the response to hardening characteristics when heat-treating low-alloy and martensitic corrosion-resistant steels

4) American Society for Nondestructive Testing; 4153 Arlingate Plaza; Box 28518; Columbus, OH 43228; USA.

5) Manufacturers' Standardization Society of the Valve and Fittings Industry; 127 Park Street NE; Vienna, VA 22180; USA.

ISO 13535:2000(E)**3.1.7****linear indication**

indication revealed by NDE, having a length of at least three times the width

3.1.8**load rating**

maximum operating load, both static and dynamic, to be applied to the equipment

NOTE The load rating is numerically equivalent to the design load.

3.1.9**maximum allowable stress**

specified minimum yield strength divided by the design safety factor

3.1.10**primary load**

axial load which equipment is subjected to in operations

3.1.11**primary-load-carrying component**

component of the equipment through which the primary load is carried

3.1.12**product specification level**

degree of controls applied on materials and processes for the primary-load-carrying components of the equipment

NOTE The two product specification levels are identified by the code PSL 1 or PSL 2.

3.1.13**proof load test**

production load test performed to validate the load rating of a unit

3.1.14**repair**

removal of defects from, and refurbishment of, a component or assembly by welding, during the manufacture of new equipment

NOTE The term "repair", as referred to in this International Standard, applies only to the repair of defects in materials during the manufacture of new equipment.

3.1.15**rounded indication**

indication revealed by NDE, with a circular shape or with an elliptical shape having a length of less than three times the width

3.1.16**safe working load**

the design load minus the dynamic load

3.1.17**size class**

designation by which dimensionally-interchangeable equipment of the same maximum load rating is identified

3.1.18**special process**

operation which may change or affect the mechanical properties, including toughness, of the materials used in the equipment

3.1.19

test unit

prototype unit upon which a design verification test is conducted

3.2 Abbreviated terms

ER	equivalent-round
HAZ	heat-affected zone
PSL	product specification level
NDE	non-destructive examination
PLC	principal loading condition
PWHT	post-weld heat-treatment

4 Design

4.1 General

Hoisting equipment shall be designed, manufactured and tested so that it is in every respect fit for its intended purpose. The equipment shall safely transfer the load for which it is intended. The equipment shall be designed for simple and safe operation. Guide dollies shall be designed in accordance with annex B.

4.2 Design conditions

The following design conditions shall apply:

- the operator of the equipment shall be responsible for determination of the safe working load for any hoisting operation;
- the minimum design and operating temperature shall be -20 °C , unless supplementary requirement SR 2 has been applied (see A.3).

CAUTION — The equipment should not be used at the full load rating at temperatures below -20 °C unless appropriate materials with the required toughness properties at lower design temperatures have been used (see A.3).

4.3 Strength analysis

4.3.1 General

The equipment design analysis shall address excessive yielding, fatigue and buckling as possible modes of failure.

The strength analysis shall be generally based on the elastic theory. An ultimate strength (plastic) analysis may, however, be used where appropriate. Finite-element mesh analysis, in conjunction with analytical methods, may be used.

All forces that may govern the design shall be taken into account. For each cross-section to be considered, the most unfavourable combination, position and direction of forces shall be used.