



SLOVENSKI STANDARD SIST EN ISO 11960:2004

01-maj-2004

BUXca Yý U
SIST EN ISO 11960:2001

Petroleum and natural gas industries - Steel pipes for use as casing or tubing for wells (ISO 11960:2001)

Petroleum and natural gas industries - Steel pipes for use as casing or tubing for wells (ISO 11960:2001)

Erdöl- und Erdgasindustrie - Stahlrohre zur Verwendung als Futter- oder Steigrohre für Bohrungen (ISO 11960:2001) **(standards.iteh.ai)**

Industries du pétrole et du gaz naturel - Tubes d'acier utilisés comme cuvelage ou tubes de production dans les puits (ISO 11960:2001)

Ta slovenski standard je istoveten z: EN ISO 11960:2001

ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment
77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use

SIST EN ISO 11960:2004 en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 11960:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN ISO 11960

October 2001

ICS 75.180.10; 77.140.75

Supersedes EN ISO 11960:1998

English version

Petroleum and natural gas industries - Steel pipes for use as casing or tubing for wells (ISO 11960:2001)

Industries du pétrole et du gaz naturel - Tubes d'acier utilisés comme cuvelage ou tubes de production dans les puits (ISO 11960:2001)

Erdöl- und Erdgasindustrien - Stahlrohre zur Verwendung als Futter- oder Steigrohre für Bohrungen (ISO 11960:2001)

This European Standard was approved by CEN on 1 October 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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN ISO 11960:2004](https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>



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

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

EN ISO 11960:2001 (E)

Foreword

The text of the International Standard ISO 11960:2001 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 supersedes EN ISO 11960:1998.

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 April 2002, and conflicting national standards shall be withdrawn at the latest by April 2002.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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.

Endorsement notice

The text of the International Standard ISO 11960:2001 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO
11960

Second edition
2001-10-01

Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells

*Industries du pétrole et du gaz naturel — Tubes d'acier utilisés comme
cuvelage ou tubes de production dans les puits*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 11960:2004](https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>



Reference number
ISO 11960:2001(E)

© ISO 2001

ISO 11960:2001(E)

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 11960:2004](https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

© ISO 2001

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

Contents

	Page
Foreword.....	vi
Introduction.....	vii
1 Scope	1
2 Conformance	2
2.1 Normative references	2
2.2 Units of measurement	2
2.3 Tables and figures	2
3 Normative references	2
4 Terms, definitions, symbols and abbreviated terms	4
4.1 Terms and definitions	4
4.2 Symbols and abbreviated terms	8
5 Information to be supplied by the purchaser	9
5.1 Casing	9
5.2 Tubing	10
6 Process of manufacture	12
6.1 General	12
6.2 Heat treatment	12
6.3 Straightening	13
6.4 Traceability	13
7 Material requirements	14
7.1 Chemical composition	14
7.2 Tensile properties	14
7.3 Charpy V-notch test properties — General requirements	15
7.4 Charpy V-notch (CVN) — Absorbed energy requirements for coupling stock, coupling blanks and couplings	16
7.5 Charpy V-notch — Absorbed energy requirements for pipe	17
7.6 Charpy V-notch test — Absorbed energy requirements for casing and tubing accessories	19
7.7 Hardness maxima	20
7.8 Hardness variation — Grades C90, T95 and Q125	20
7.9 Process control — Grades C90, T95 and Q125	20
7.10 Hardenability — Minimum percentage martensite for quenched and tempered products	21
7.11 Grain size — Grades C90 and T95	21
7.12 Surface condition — Grades L80 9Cr and L80 13Cr	21
7.13 Flattening — Electric-welded pipe	21
7.14 Sulfide stress corrosion cracking (SSCC) test — Grades C90 and T95	21
8 Dimensions, masses, tolerances, pipe ends and defects	23
8.1 Labels and sizes	23
8.2 Dimensions and masses	23
8.3 Diameter	23
8.4 Wall thickness	24
8.5 Mass	24
8.6 Length	24
8.7 Casing jointers	24
8.8 Height and trim of electric-weld flash	24
8.9 Straightness	25
8.10 Drift requirements	25
8.11 Tolerances on dimensions and masses	26
8.12 Pipe ends	27

ISO 11960:2001(E)

8.13	Defects	28
8.14	Coupling make-up and thread protection	29
9	Couplings.....	29
9.1	General requirements.....	29
9.2	Alternative grades or heat treatments	29
9.3	Process of manufacture — Groups 1, 2 and 3.....	30
9.4	Process of manufacture — Grade Q125.....	30
9.5	Mechanical properties	30
9.6	Dimensions and tolerances	31
9.7	Regular couplings.....	31
9.8	Special-clearance couplings — Groups 1, 2 and 3	31
9.9	Combination couplings.....	31
9.10	Reducing couplings.....	31
9.11	Seal-ring couplings.....	31
9.12	Special-bevel couplings — Groups 1, 2 and 3	32
9.13	Threading.....	32
9.14	Surface inspection.....	32
9.15	Measurement of imperfections.....	33
9.16	Repair and removal of imperfections and defects	33
9.17	Thread surface treatment — Grade Q125.....	33
9.18	Couplings and coupling blank protection — Grade Q125.....	33
10	Inspection and testing.....	33
10.1	Test equipment	33
10.2	Lot definition for testing of mechanical properties.....	34
10.3	Testing of chemical composition.....	34
10.4	Tensile tests	35
10.5	Flattening test	37
10.6	Hardness test	38
10.7	Impact test	41
10.8	Grain size determination — Grades C90 and T95	43
10.9	Hardenability — Grades C90 and T95.....	43
10.10	Sulfide stress cracking test — Grades C90 and T95.....	43
10.11	Metallographic evaluation — EW Grades P110 and Q125.....	43
10.12	Hydrostatic test.....	43
10.13	Dimensional testing.....	45
10.14	Visual inspection	47
10.15	Non-destructive examination (NDE)	48
11	Marking	53
11.1	General.....	53
11.2	Stamp marking requirements	54
11.3	Stencil marking requirements	55
11.4	Colour identification	55
11.5	Thread and end-finish marking — All groups.....	56
11.6	Pipe-threader marking requirements — All groups	56
12	Coating and protection.....	57
12.1	Coatings — All groups	57
12.2	Thread protectors	57
13	Documents.....	58
13.1	Electronic media — All groups.....	58
13.2	Certification — Groups 1, 2 and 3	58
13.3	Certification requirements — Grade Q125	58
13.4	Retention of records.....	58
14	Minimum facility requirements for various categories of manufacturer	58
14.1	Pipe mill	58
14.2	Processor.....	59
14.3	Threader.....	59
14.4	Coupling, pup-joint, and accessory manufacturer.....	59

Annex A (normative) Supplementary requirements	60
Annex B (normative) Purchaser inspection	72
Annex C (normative) Tables in SI units	73
Annex D (normative) Figures in SI (USC) units	136
Annex E (normative) Tables in USC units	158
Annex F (informative) Marking instructions for API licensees	217
Annex G (informative) Procedures used to convert from USC units to SI units	221
Bibliography	234

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 11960:2004](https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

ISO 11960:2001(E)**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 11960 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 5, *Casing, tubing and drill pipe*.

This second edition replaces the first edition (ISO 11960:1996) which has been technically revised. It is the intent of TC 67 that the first and second editions of ISO 11960 both be applicable, at the user's option, for a period of six months after the date of publication of this second edition, after which the first edition will no longer be applicable.

Annexes A to E form a normative part of this International Standard. Annexes F and G are for information only.

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

Introduction

This International Standard is based on API 5CT (Specification for Casing and Tubing).

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.

This International Standard includes requirements of various nature. These are identified by the use of certain verbal forms:

- SHALL is used to indicate that a provision is MANDATORY;
- SHOULD is used to indicate that a provision is not mandatory, but RECOMMENDED as good practice;
- MAY is used to indicate that a provision is OPTIONAL.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN ISO 11960:2004](https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN ISO 11960:2004](#)

<https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells

1 Scope

1.1 This International Standard specifies the technical delivery conditions for steel pipes (casing, tubing, plain end casing liners and pup-joints) and accessories. This International Standard is applicable to the following connections in accordance with ISO 10422 or API Spec 5B:

- short round thread casing (STC);
- long round thread casing (LC);
- buttress thread casing (BC);
- extreme-line casing (XC);
- non-upset tubing (NU);
- external upset tubing (EU);
- integral joint tubing (IJ).

iTeh STANDARD PREVIEW
(standards.iteh.ai)

For such connections, this International Standard specifies the technical delivery conditions for couplings and thread protection.

For pipes covered by this International Standard, the sizes, masses, wall thicknesses, grades and applicable end finishes are defined.

<https://standards.iteh.ai/catalog/standards/sist/3fdb70b-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

This International Standard may also be applied to tubulars with connections not covered by ISO/API standards.

1.2 The four groups of products to which this International Standard is applicable include the following grades of pipe:

- Group 1: All casing and tubing in Grades H, J, K and N;
- Group 2: All casing and tubing in Grades C, L, M and T;
- Group 3: All casing and tubing in Grade P;
- Group 4: All casing in Grade Q.

1.3 Casing sizes larger than Label 1: 4-1/2 but smaller than Label 1: 10-3/4 may be specified by the purchaser to be used in tubing service, see Tables C.1, C.24, C.30 and C.31 or Tables E.1, E.24, E.30 and E.31.

1.4 Supplementary requirements that may optionally be agreed between purchaser and manufacturer, for non-destructive examination, coupling blanks, upset casing, electric-welded casing, impact testing, seal ring couplings and certificates are given in annex A.

1.5 This International Standard is not applicable to threading requirements.

NOTE Dimensional requirements on threads and thread gauges, stipulations on gauging practice, gauge specifications, as well as instruments and methods for inspection of threads are given in ISO 10422 or API Spec 5B. Connections machined to either of these specifications are the same for practical purposes and are totally interchangeable.

ISO 11960:2001(E)**2 Conformance****2.1 Normative references**

In the interests of worldwide application of this International Standard, ISO/TC 67 has decided, after detailed technical analysis, that certain of the normative documents listed in clause 3 and prepared by ISO/TC 67 or other ISO Technical Committee are interchangeable in the context of the relevant requirement with the relevant document prepared by the American Petroleum Institute (API), the American Society for Testing and Materials (ASTM) or the American National Standards Institute (ANSI). These latter documents are cited in the running text following the ISO reference and preceded by “or”, for example “ISO XXXX or API YYYY”. Application of an alternative normative document cited in this manner will lead to the same results as the use of the preceding ISO reference. These documents are thus considered interchangeable in practice.

2.2 Units of measurement

In this International Standard, data are expressed in both the International System (SI) of units and the United States Customary (USC) system of units. For a specific order item, it is intended that only one system of units be used, without combining data expressed in the other system.

Products manufactured to specifications expressed in either of these unit systems shall be considered equivalent and totally interchangeable. Consequently, compliance with the requirements of this International Standard as expressed in one system provides compliance with requirements expressed in the other system.

For data expressed in the SI, a comma is used as the decimal separator and a space as the thousands separator. For data expressed in the USC system, a dot (on the line) is used as the decimal separator and a space as the thousands separator.

In the text, data in SI units are followed by data in USC units in brackets.

2.3 Tables and figures <https://standards.iteh.ai/catalog/standards/sist/3fdb70f3-13b3-407a-94e3-422bd67bd709/sist-en-iso-11960-2004>

Separate tables for data expressed in SI units and USC units are given in annex C and annex E respectively. For a specific order item, only one unit system shall be used.

Figures are contained in annex D and express data in both SI and USC units.

3 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. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 31-0, *Quantities and units — Part 0: General principles*

ISO 643, *Steels — Micrographic determination of the ferritic or austenitic grain size*

ISO 6506-1, *Metallic materials — Brinell Hardness test — Part 1: Test method*

ISO 6508-1, *Metallic materials — Rockwell Hardness test — Part 1: Test method (Scales A, B, C, D, E, F, G, H, K, N, T)*

ISO 6892, *Metallic materials — Tensile testing at ambient temperature*

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tensile/compression testing machines — Verification and calibration of the force-measuring system*

ISO 9303, *Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes — Full peripheral ultrasonic testing for the detection of longitudinal imperfections*

ISO 9304, *Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes — Eddy current testing for the detection of imperfections*

ISO 9305, *Seamless steel tubes for pressure purposes — Full peripheral ultrasonic testing for the detection of transverse imperfections*

ISO 9402, *Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes — Full peripheral magnetic transducer/flux leakage testing of ferromagnetic steel tubes for the detection of longitudinal imperfections*

ISO 9598, *Seamless steel tubes for pressure purposes — Full peripheral magnetic transducer/flux leakage testing of ferromagnetic steel tubes for the detection of transverse imperfections*

ISO 9764, *Electric resistance and induction welded steel tubes for pressure purposes — Ultrasonic testing of the weld seam for the detection of longitudinal imperfections*

ISO 10400, *Petroleum and natural gas industries — Formulae and calculation for casing, tubing, drill pipe and line pipe properties*

ISO 10422, *Petroleum and natural gas industries — Threading, gauging and thread inspection of casing, tubing and line pipe threads — Specification*

ISO 10474, *Steel and steel products — Inspection documents*

ISO 11484, *Steel tubes for pressure purposes — Qualification and certification of non-destructive testing (NDT) personnel*

ISO 13665, *Seamless and welded steel tubes for pressure purposes — Magnetic particle inspection of the tube body for the detection of surface imperfections*

ISO 13678, *Petroleum and natural gas industries — Evaluation and testing of thread compounds for use with casing, tubing and line pipe*

ISO/TR 9769, *Steel and iron — Review of available methods of analysis*

ANSI-ASNT SNT-TC-1A:1984, *Personnel qualifications and certification in non-destructive testing*

ANSI-NACE TM0177:1996, *Laboratory testing of metals for resistance to sulfide stress cracking at ambient temperature in H₂S environment*

API Bul 5C2, *Bulletin on performance properties of casing, tubing and drill pipe*

API Bul 5C3, *Bulletin on formulas and calculations for casing, tubing, drill pipe and line pipe properties (plus Supplement 1)*

API RP 5A3, *Bulletin on thread compounds for casing, tubing and line pipe*

API Spec 5B, *Specification for threading, gauging and thread inspection of casing, tubing and line pipe threads*

API Std 5T1, *Imperfection technology*

ASTM A370, *Standard test methods and definitions for mechanical testing of steel products*