

This is a preview of "ISO 11960:2014". [Click here to purchase the full version from the ANSI store.](#)

Fifth edition  
2014-01-15

---

---

## **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*



Reference number  
ISO 11960:2014(E)

© ISO 2014

This is a preview of "ISO 11960:2014". [Click here to purchase the full version from the ANSI store.](#)



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested 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.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

This is a preview of "ISO 11960:2014". Click here to purchase the full version from the ANSI store.

## Contents

Page

Foreword .....	vi
Introduction.....	vii
<b>1</b> <b>Scope</b> .....	<b>1</b>
<b>2</b> <b>Conformance</b> .....	<b>2</b>
2.1    Dual referencing of normative references .....	2
2.2    Units of measurement.....	2
<b>3</b> <b>Normative references</b> .....	<b>2</b>
<b>4</b> <b>Terms, definitions, symbols and abbreviated terms</b> .....	<b>5</b>
4.1    Terms and definitions .....	5
4.2    Symbols and abbreviated terms .....	9
<b>5</b> <b>Information to be supplied by the purchaser</b> .....	<b>10</b>
5.1    Grades C90, T95 and C110 .....	10
5.2    Casing.....	10
5.3    Tubing.....	12
5.4    Coupling stock, coupling material and accessory material.....	13
<b>6</b> <b>Process of manufacture</b> .....	<b>14</b>
6.1    General .....	14
6.2    Heat treatment .....	15
6.3    Straightening .....	15
6.4    Traceability.....	16
6.5    Processes requiring validation .....	17
<b>7</b> <b>Material requirements</b> .....	<b>17</b>
7.1    Chemical composition .....	17
7.2    Tensile properties.....	17
7.3    Charpy V-notch test — General requirements .....	18
7.4    Charpy V-notch — Absorbed energy requirements for coupling stock, coupling material, coupling blanks and couplings.....	20
7.5    Charpy V-notch — Absorbed energy requirements for pipe .....	21
7.6    Charpy V-notch — Absorbed energy requirements for accessory material .....	23
7.7    Maximum hardness .....	23
7.8    Hardness variation — Grades C90, T95, C110 and Q125 .....	24
7.9    Process control — Grades C90, T95, C110 and Q125 .....	24
7.10   Hardenability — Minimum percentage martensite for quenched and tempered products .....	24
7.11   Grain size — Grades C90, T95 and C110 .....	25
7.12   Surface condition — Grades L80 9Cr and L80 13Cr .....	25
7.13   Flattening — Electric-welded pipe.....	25
7.14   Sulfide stress cracking test — Grades C90, T95 and C110.....	25
<b>8</b> <b>Dimensions, masses, tolerances, product ends and defects</b> .....	<b>28</b>
8.1    Labels and sizes .....	28
8.2    Dimensions and masses.....	28
8.3    Diameter .....	29
8.4    Wall thickness.....	29
8.5    Mass.....	30
8.6    Length.....	30
8.7    Casing jointers.....	30
8.8    Height and trim of electric-weld flash .....	30
8.9    Straightness .....	31
8.10   Drift requirements .....	31

This is a preview of "ISO 11960:2014". [Click here to purchase the full version from the ANSI store.](#)

8.11	Tolerances on dimensions and masses.....	32
8.12	Product ends.....	33
8.13	Defects.....	34
8.14	Coupling make-up and thread protection.....	35
9	Couplings.....	36
9.1	General requirements.....	36
9.2	Alternative grades or heat treatments.....	36
9.3	Mechanical properties.....	36
9.4	Dimensions and tolerances.....	37
9.5	Regular couplings.....	37
9.6	Special-clearance couplings — Groups 1, 2 and 3.....	37
9.7	Combination couplings.....	37
9.8	Reducing couplings — Groups 1, 2 and 3.....	37
9.9	Seal-ring couplings.....	37
9.10	Special-bevel tubing regular couplings — Groups 1, 2 and 3.....	38
9.11	Threading.....	38
9.12	Surface inspection.....	38
9.13	Measurement of imperfections.....	39
9.14	Repair and removal of imperfections and defects.....	39
9.15	Thread surface treatment — Grade Q125.....	39
9.16	Couplings and coupling blank protection — Grades C90, T95, C110 and Q125.....	39
10	Inspection and testing.....	39
10.1	Test equipment.....	39
10.2	Lot definition for testing of mechanical properties.....	40
10.3	Testing of chemical composition.....	40
10.4	Tensile tests.....	41
10.5	Flattening test.....	44
10.6	Hardness test.....	45
10.7	Impact test.....	51
10.8	Grain size determination — Grades C90, T95 and C110.....	52
10.9	Hardenability — Grades C90, T95 and C110.....	53
10.10	Sulfide stress-cracking test — Grades C90, T95 and C110.....	53
10.11	Metallographic evaluation — EW Grades P110 and Q125.....	53
10.12	Hydrostatic tests.....	53
10.13	Dimensional testing.....	55
10.14	Visual inspection.....	58
10.15	Non-destructive examination (NDE).....	59
11	Marking.....	66
11.1	General.....	66
11.2	Stamp marking requirements.....	67
11.3	Stencil marking requirements.....	68
11.4	Colour identification.....	69
11.5	Thread and end-finish marking — All groups.....	70
11.6	Pipe-threader marking requirements — All groups.....	70
12	Coating and protection.....	71
12.1	Coatings — All groups.....	71
12.2	Thread protectors.....	71
13	Documents.....	72
13.1	Electronic media — All groups.....	72
13.2	Certification — Groups 1, 2 (except Grade C110) and 3.....	72
13.3	Certification requirements — Grades C110 and Q125.....	72
13.4	Retention of records.....	72
14	Minimum facility requirements for various categories of manufacturer.....	72
14.1	Pipe mill.....	72
14.2	Processor.....	73
14.3	Pipe threader.....	73
14.4	Coupling, pup-joint or accessory manufacturer.....	73

This is a preview of "ISO 11960:2014". [Click here to purchase the full version from the ANSI store.](#)

<b>Annex A</b> (normative) <b>Supplementary requirements</b> .....	<b>75</b>
<b>Annex B</b> (normative) <b>Purchaser inspection</b> .....	<b>92</b>
<b>Annex C</b> (normative) <b>Tables in SI units</b> .....	<b>93</b>
<b>Annex D</b> (normative) <b>Figures in SI (USC) units</b> .....	<b>142</b>
<b>Annex E</b> (normative) <b>Tables in USC units</b> .....	<b>167</b>
<b>Annex F</b> (normative) <b>Use of the API Monogram by Licensees</b> .....	<b>215</b>
<b>Annex G</b> (informative) <b>Procedures used to convert from USC units to SI units</b> .....	<b>222</b>
<b>Annex H</b> (normative) <b>Product Specification Levels</b> .....	<b>234</b>
<b>Annex I</b> (normative) <b>Requirements for thread protector design validation</b> .....	<b>241</b>
<b>Annex J</b> (informative) <b>Summary of Product Specification Level (PSL) requirements</b> .....	<b>245</b>
<b>Annex K</b> (normative) <b>Modification of the hydrogen sulfide titration procedures in ANSI-NACE TM0284-2003, Appendix C</b> .....	<b>252</b>
<b>Annex L</b> (informative) <b>Technical changes from the previous edition</b> .....	<b>253</b>
<b>Bibliography</b> .....	<b>262</b>

This is a preview of "ISO 11960:2014". [Click here to purchase the full version from the ANSI store.](#)

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 67, *Materials, equipment and offshore structures for petroleum and petrochemical and natural gas industries*, Subcommittee SC 5, *Casing, tubing and drill pipe*.

This fifth edition cancels and replaces the fourth edition (ISO 11960:2011).

It is the intention of ISO/TC 67 that either this edition or the previous edition of ISO 11960 be applicable, at the option of the purchaser (as defined in 4.1.39), for a period of six months from the first day of the calendar quarter immediately following the date of publication of this edition, after which period the previous edition will no longer be applicable.

This is a preview of "ISO 11960:2014". [Click here to purchase the full version from the ANSI store.](#)

## Introduction

This International Standard is based on API Spec 5CT.

Users of this International Standard are advised that further or differing requirements can 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 can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is advisable that the vendor 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.

Details of the major changes (additions, modifications and deletions) agreed by the committee, and which affect the performance of the products or the technical requirements applicable to the products, are provided for information in Annex L and are indicated in this International Standard by the use of grey shading for changes in the fourth edition and yellow shading for changes in this edition. Shading is also used to indicate editorial changes. Where deletions, but no other changes, have been made, vertical bars are used in the margin adjacent to the applicable line or at each side of a cell in a table. Where a complete line or paragraph has been deleted, margin bars next to a blank line are used. While efforts have been made to ensure the accuracy of the changes indicated, the user of this International Standard is advised to consider the total technical content and not only the changes identified. *The user is ultimately responsible for recognising any differences between this edition and the previous edition of this International Standard. ISO expressly disclaims any liability or responsibility for loss or damage resulting from inappropriate use of this International Standard on the basis of any inaccuracy in the changes identified.*