

This is a preview of "ISO 11960:2011". [Click here to purchase the full version from the ANSI store.](#)

Fourth edition
2011-06-15

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 11960:2011(E)

© ISO 2011

This is a preview of "ISO 11960:2011". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2011

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.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO 11960:2011". [Click here to purchase the full version from the ANSI store.](#)

Contents

Page

Foreword	vi
Introduction.....	vii
1 Scope.....	1
2 Conformance	2
2.1 Dual referencing of normative references	2
2.2 Units of measurement.....	2
3 Normative references.....	3
4 Terms, definitions, symbols and abbreviated terms	5
4.1 Terms and definitions	5
4.2 Symbols and abbreviated terms	9
5 Information to be supplied by the purchaser	10
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
6 Process of manufacture.....	14
6.1 General	14
6.2 Heat treatment	14
6.3 Straightening	15
6.4 Traceability.....	16
6.5 Processes requiring validation	16
7 Material requirements	16
7.1 Chemical composition	16
7.2 Tensile properties.....	17
7.3 Charpy V-notch test — General requirements	17
7.4 Charpy V-notch — Absorbed energy requirements for coupling stock, coupling material, coupling blanks and couplings.....	19
7.5 Charpy V-notch — Absorbed energy requirements for pipe	20
7.6 Charpy V-notch — Absorbed energy requirements for accessory material.....	22
7.7 Maximum hardness	23
7.8 Hardness variation — Grades C90, T95, C110 and Q125	23
7.9 Process control — Grades C90, T95, C110 and Q125	23
7.10 Hardenability — Minimum percentage martensite for quenched and tempered products	24
7.11 Grain size — Grades C90, T95 and C110	24
7.12 Surface condition — Grades L80 9Cr and L80 13Cr	24
7.13 Flattening — Electric-welded pipe.....	25
7.14 Sulfide stress cracking test — Grades C90, T95 and C110.....	25
8 Dimensions, masses, tolerances, pipe ends and defects.....	27
8.1 Labels and sizes	27
8.2 Dimensions and masses.....	27
8.3 Diameter	28
8.4 Wall thickness.....	28
8.5 Mass.....	29
8.6 Length.....	29
8.7 Casing jointers.....	29
8.8 Height and trim of electric-weld flash	29
8.9 Straightness	30
8.10 Drift requirements	30

This is a preview of "ISO 11960:2011". [Click here to purchase the full version from the ANSI store.](#)

8.11	Tolerances on dimensions and masses.....	31
8.12	Product ends.....	32
8.13	Defects.....	33
8.14	Coupling make-up and thread protection.....	34
9	Couplings.....	34
9.1	General requirements.....	34
9.2	Alternative grades or heat treatments.....	35
9.3	Mechanical properties.....	35
9.4	Dimensions and tolerances.....	35
9.5	Regular couplings.....	36
9.6	Special-clearance couplings — Groups 1, 2 and 3.....	36
9.7	Combination couplings.....	36
9.8	Reducing couplings — Groups 1, 2 and 3.....	36
9.9	Seal-ring couplings.....	36
9.10	Special-bevel tubing regular couplings — Groups 1, 2 and 3.....	36
9.11	Threading.....	37
9.12	Surface inspection.....	37
9.13	Measurement of imperfections.....	38
9.14	Repair and removal of imperfections and defects.....	38
9.15	Thread surface treatment — Grade Q125.....	38
9.16	Couplings and coupling blank protection — Grades C90, T95, C110 and Q125.....	38
10	Inspection and testing.....	38
10.1	Test equipment.....	38
10.2	Lot definition for testing of mechanical properties.....	38
10.3	Testing of chemical composition.....	39
10.4	Tensile tests.....	40
10.5	Flattening test.....	42
10.6	Hardness test.....	44
10.7	Impact test.....	50
10.8	Grain size determination — Grades C90, T95 and C110.....	51
10.9	Hardenability — Grades C90, T95 and C110.....	52
10.10	Sulfide stress-cracking test — Grades C90, T95 and C110.....	52
10.11	Metallographic evaluation — EW Grades P110 and Q125.....	52
10.12	Hydrostatic tests.....	52
10.13	Dimensional testing.....	54
10.14	Visual inspection.....	57
10.15	Non-destructive examination (NDE).....	57
11	Marking.....	65
11.1	General.....	65
11.2	Stamp marking requirements.....	66
11.3	Stencil marking requirements.....	67
11.4	Colour identification.....	68
11.5	Thread and end-finish marking — All groups.....	69
11.6	Pipe-threader marking requirements — All groups.....	69
12	Coating and protection.....	69
12.1	Coatings — All groups.....	69
12.2	Thread protectors.....	70
13	Documents.....	71
13.1	Electronic media — All groups.....	71
13.2	Certification — Groups 1, 2 (except Grade C110) and 3.....	71
13.3	Certification requirements — Grades C110 and Q125.....	71
13.4	Retention of records.....	71
14	Minimum facility requirements for various categories of manufacturer.....	71
14.1	Pipe mill.....	71
14.2	Processor.....	71
14.3	Pipe threader.....	72
14.4	Coupling, pup-joint or accessory manufacturer.....	72

This is a preview of "ISO 11960:2011". [Click here to purchase the full version from the ANSI store.](#)

Annex A (normative) Supplementary requirements	73
Annex B (normative) Purchaser inspection	90
Annex C (normative) Tables in SI units	91
Annex D (normative) Figures in SI (USC) units	142
Annex E (normative) Tables in USC units	170
Annex F (informative) Use of the API Monogram by Licensees	220
Annex G (informative) Procedures used to convert from USC units to SI units	227
Annex H (normative) Product Specification Levels	239
Annex I (normative) Requirements for thread protector design validation	247
Annex J (informative) Summary of Product Specification Level (PSL) requirements	251
Annex K (normative) Modification of the hydrogen sulfide titration procedures in ANSI-NACE TM0284-2003, Appendix C	259
Annex L (informative) Technical changes from the previous edition	260
Bibliography	269

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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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

This fourth edition cancels and replaces the third edition (ISO 11960:2004) and its Technical Corrigendum ISO 11960:2004/Cor.1:2006, which have been extensively technically revised.

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 International Standard has also been published in a marked version indicating changes from the previous edition.

This is a preview of "ISO 11960:2011". [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. 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.*