
**Petroleum and natural gas
industries — Steel pipe for pipeline
transportation systems**

*Industries du pétrole et du gaz naturel — Tubes en acier pour les
systèmes de transport par conduites*

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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.

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).

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).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 2, *Pipeline transportation systems*.

This fourth edition cancels and replaces the third edition (ISO 3183:2012), which has been technically revised. It also incorporates the Amendment (ISO 3183:2012/Amd.1:2017).

This document supplements API Spec 5L, 46th edition (2018).

The technical requirements of this document and API Spec 5L used to be identical (except for the inclusion of Annex M in the ISO publication). In the meantime API Spec 5L has been technically revised as API Spec 5L, 46th edition (2018). The purpose of this document is to bring it up to date, by referencing the current edition of API Spec 5L and including supplementary content.

The main changes compared to the previous edition are as follows:

- Technical changes now incorporated by normative reference to API Spec 5L have been made in the API Spec 5L subclauses addressing
 - weld seams (API Spec 5L, 8.8.2 clarifies heat treatment),
 - tolerances for straightness (API Spec 5L, 9.11.3.4b and J.6.4 pipe end tolerances tightened),
 - end squareness (API Spec 5L, 9.12.6 defined in detail),
 - impact test pieces (API Spec 5L, Table 22 test piece size table corrected),
 - location of hardness tests (API Spec 5L, Figures H.1 and J.1 weld centre line for HFW detailed),
 - welded jointers (API Spec 5L, Annex M fit up and geometry, marking & NDT addressed),
 - a new annex N has been added for PSL 2 pipe ordered for applications requiring longitudinal plastic strain capacity, and

- changes on order of annexes.
- Annex M of the previous edition of this document, i.e. ISO 3183:2012/Amd 1:2017, for PSL 2 pipe ordered for European onshore natural gas transmission pipelines, is now provided as [Annex A](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

This document was originally developed by harmonizing the requirements of API Spec 5L, 44th edition (2007) and the second edition of this document, i.e. ISO 3183:2007. This continued to be the case for the third edition of this document, i.e. ISO 3183:2012 and API Spec 5L, 45th edition (2012), in which clarification and additional technical requirements were added.

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Petroleum and natural gas industries — Steel pipe for pipeline transportation systems

1 Scope

This document specifies requirements for the manufacture of two product specification levels (PSL 1 and PSL 2) of seamless and welded steel pipes for use in pipeline transportation systems in the petroleum and natural gas industries.

This document supplements API Spec 5L, 46th edition (2018), the requirements of which are applicable with the exceptions specified in this document.

This document is not applicable to cast pipe.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 148-1, *Metallic materials — Charpy pendulum impact test — Part 1: Test method*

ISO 2566-1, *Steel — Conversion of elongation values — Part 1: Carbon and low alloy steels*

ISO 5173, *Destructive tests on welds in metallic materials — Bend tests*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 10893-2:2011, *Non-destructive testing of steel tubes — Part 2: Automated eddy current testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of imperfections*

ISO 10893-3:2011, *Non-destructive testing of steel tubes — Part 3: Automated full peripheral flux leakage testing of seamless and welded (except submerged arc-welded) ferromagnetic steel tubes for the detection of longitudinal and/or transverse imperfections*

ISO 10893-6:2019, *Non-destructive testing of steel tubes — Part 6: Radiographic testing of the weld seam of welded steel tubes for the detection of imperfections*

ISO 10893-7:2019, *Non-destructive testing of steel tubes — Part 7: Digital radiographic testing of the weld seam of welded steel tubes for the detection of imperfections*

ISO 10893-8:2011, *Non-destructive testing of steel tubes — Part 8: Automated ultrasonic testing of seamless and welded steel tubes for the detection of laminar imperfections*

ISO 10893-9:2011, *Non-destructive testing of steel tubes — Part 9: Automated ultrasonic testing for the detection of laminar imperfections in strip/plate used for the manufacture of welded steel tubes*

ISO 10893-10:2011, *Non-destructive testing of steel tubes — Part 10: Automated full peripheral ultrasonic testing of seamless and welded (except submerged arc-welded) steel tubes for the detection of longitudinal and/or transverse imperfections*

ISO 10893-11:2011, *Non-destructive testing of steel tubes — Part 11: Automated ultrasonic testing of the weld seam of welded steel tubes for the detection of longitudinal and/or transverse imperfections*

ISO 11484, *Steel products — Employer's qualification system for non-destructive testing (NDT) personnel*

ISO 19232-1, *Non-destructive testing — Image quality of radiographs — Part 1: Determination of the image quality value using wire-type image quality indicators*

EN 10204, *Metallic products — Types of inspection documents*

EN 10168, *Steel products — Inspection documents — List of information and description*

API Spec 5L, 46th edition (2018), *Specification for Line Pipe*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in API Spec 5L, 46th edition (2018) apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Supplements to API Spec 5L, 46th edition (2018)

4.1 General requirements

The requirements specified in API Spec 5L, 46th edition (2018) shall apply, with the supplements and exceptions specified in 4.2 to 4.4.

Pipe manufactured in accordance with this document can be named “ISO 3183 pipe” and may be marked in accordance with 4.4.2. If no exceptions to API Spec 5L are taken and the pipe therefore conforms to both standards, the pipe can be named “API 5L pipe” and may be marked in accordance with 4.4.3.

4.2 PSL 2 pipe for European onshore natural gas transmission pipelines

[Annex A](#) shall be applied for PSL 2 pipe ordered for European onshore natural gas transmission pipelines.

4.3 Information to be supplied by the purchaser

In addition to the requirements of API Spec 5L, 46th edition (2018), Clause 7, the purchase order for pipe manufactured according to this document shall also include the following information:

- a) confirmation if [Annex A](#) of this document, i.e. ISO 3183:2019, is applicable;
- b) marking requirements according to 4.4.

4.4 Marking

4.4.1 General

The requirements specified in API Spec 5L, 46th edition (2018) shall apply together with the exceptions specified in 4.4.2 to 4.4.3.

This document describes two marking options (see 4.4.2 and 4.4.3). Additional markings, as desired by the manufacturer or as specified in the purchase order, may be applied, provided that they do not interrupt the sequence of the required markings per 4.4.2 or 4.4.3. If additional markings are used, these markings shall be located after the end of the required marking sequence or as a separate marking at some other location on the pipe.

4.4.2 Pipe marked as ISO 3183

Pipe markings for “ISO 3183 pipe” shall include the following information, as applicable:

- a) Name or mark of the manufacturer of the pipe (X).
- b) “ISO 3183” shall be marked if the product is in conformance with this document. Products in conformance with multiple compatible standards may be marked with the name of each standard. If [Annex A](#) is applicable and certification to API Spec 5L is required, then it is advised to review the requirements of the body of [Annex A](#) with the body of API Spec 5L to ensure that all requirements are met.
- c) Specified outside diameter.
- d) Specified wall thickness.
- e) Steel grade (steel name) as detailed in API Spec 5L, 46th edition (2018), Tables 1, H.1, J.1 or N.1, and [Table A.1](#) of this document, whichever is applicable. If agreed, both corresponding SI and USC steel grades may be marked on the pipe with the corresponding steel grade marked immediately after the order item steel grade. Where [Annex A](#) is specified, the steel grade includes the suffix E, as shown in [Tables A.1](#) and [A.2](#).
- f) Product specification level designation followed by the letter G, if API Spec 5L, 46th edition (2018), Annex G is applicable (see API Spec 5L, 46th edition (2018), G.5.1 and see Examples 7 and 8 below).
- g) Type of pipe [see API Spec 5L, 46th edition (2018), Table 2].
- h) Mark of the purchaser's inspection representative (Y), if applicable.
- i) An identification number (Z), which permits the correlation of the product or delivery unit (e.g. bundled pipe) with the related inspection document, if applicable.
- j) If the specified hydrostatic test pressure is higher than the test pressure specified in API Spec 5L, 46th edition (2018), Table 24 or Table 25 as applicable, or if it exceeds the pressures stated in API Spec 5L, 46th edition (2018), notes a, b, or c in Table 26 if applicable, the word TESTED shall be marked at the end of the marking immediately followed by the specified test pressure MPa if ordered to SI units or in psi if ordered to USC units.

EXAMPLE 1 For SI units: X ISO 3183 508 12,7 L360M PSL 2 SAWL Y Z.

EXAMPLE 2 For USC units: X ISO 3183 20 0.500 X52M PSL 2 SAWL Y Z.

EXAMPLE 3 If pipe also meets the requirements of compatible standard ABC (inserted as agreed), for SI units: X ISO 3183/ABC 508 12,7 L360M PSL 2 SAWL Y Z.

EXAMPLE 4 If pipe also meets the requirements of compatible standard ABC (inserted as agreed), for USC units: X ISO 3183/ABC 20 0.500 X52M PSL 2 SAWL Y Z.

EXAMPLE 5 If hydrotest pressure differs from the standard pressure, for SI units tested to 17,5 MPa: X ISO 3183 508 12,7 L360M PSL 2 SAWL Y Z TESTED 17,5.

EXAMPLE 6 If hydrotest pressure differs from the standard pressure, for USC units tested to 2 540 psi: X ISO 3183 20 0.500 X52M PSL 2 SAWL Y Z TESTED 2540.

EXAMPLE 7 For SI units with both corresponding steel grades marked and application of API Spec 5L, 46th edition (2018), Annex G indicated: X ISO 3183 508 12,7 L360M X52M PSL2G SAWL Y Z.

EXAMPLE 8 For USC units with both corresponding steel grades marked and application of API Spec 5L, Annex G indicated: X ISO 3183 20 0.500 X52M L360M PSL2G SAWL Y Z.

EXAMPLE 9 If pipe meets the requirements of [Annex A](#) and also compatible standard ABC (inserted as agreed), for SI units: X ISO 3183/ABC 508 12,7 L360ME PSL 2 SAWL Y Z.

EXAMPLE 10 If pipe meets the requirements of [Annex A](#) and also compatible standard ABC (inserted as agreed), for USC units: X ISO 3183/ABC 20 0.500 X52ME PSL 2 SAWL Y Z.

NOTE For specified outside diameter markings in USC units, it is not necessary to include the ending zero digits to the right of the decimal sign.

4.4.3 Pipe marked as API 5L (with monogram option) and the additional marking of “ISO 3183”

The additional marking of “ISO 3183” to API 5L marking shall be in accordance with API Spec 5L, 46th edition (2018), 11.2 and 11.1.4. This marking shall be as illustrated in Examples 1 to 4 below.

If dual certification with [Annex A](#) is required, pipe shall meet the requirements of both standards. It is advised to review the requirements of [Annex A](#) with the requirements of API Spec 5L to ensure that all requirements are met.

EXAMPLE 1 For SI units where [Annex A](#) is not specified: X API Spec 5L-#### (API) (MO-YR)/ISO 3183 508 12.7 L360M PSL 2 SAWL Y Z.

EXAMPLE 2 For USC units where [Annex A](#) is not specified: X API Spec 5L-#### (API) (MO-YR)/ISO 3183 20 0.500 X52M PSL 2 SAWL Y Z.

EXAMPLE 3 For SI units, where [Annex A](#) is specified: X API Spec 5L-#### (API) (MO-YR) 508 12.7 L360M PSL2 SAWL Y Z ISO 3183 L360ME

EXAMPLE 4 For USC units, where [Annex A](#) is specified: X API Spec 5L-#### (API) (MO-YR) 20 0.500 X52M PSL2 SAWL Y Z ISO 3183 X52ME

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Annex A (normative)

PSL 2 pipe ordered for European onshore natural gas transmission pipelines

A.1 General

This annex specifies additional provisions that apply for API 5L PSL 2 pipe for European onshore natural gas transmission pipelines. The chemical elements of the composition could be outside the limits of API Spec 5L and therefore ISO 3183 pipe in accordance with this annex conforms to ISO 3183 only. The steel grade designation concludes with the letter "E".

NOTE The chemistry limits in this annex could be different than those in API Spec 5L. Users of this document are cautioned that pipe manufactured with chemistry not in accordance with API Spec 5L, cannot be certified as conforming with API Spec 5L.

A.2 Additional information to be supplied by the purchaser

In addition to specifying API Spec 5L, 46th edition (2018), 7.1 items a) to g) and 7.2 items a) to c), the purchaser shall specify in the purchase order which of the following provisions apply for the specific order item:

- a) items that are subject to mandatory agreement, if applicable:
- 1) chemical composition for pipe with $t > 25,0$ mm (0.984 in) (see [A.4.1.2](https://standards.iteh.ai/catalog/standards/sist/b3970c4b-afc7-4494-a508-917182186cc/iso-3183-2019));
 - 2) carbon equivalent limit for Grades L415NE (X60NE) and L555QE (X80QE) (see [Table A.1](#));
 - 3) tensile properties for pipe with $t > 25,0$ mm (0.984 in) (see [A.4.2.1](#));
 - 4) minimum average CVN energy (see [A.4.4.1](#));
 - 5) diameter and out-of-roundness tolerances for the ends of SMLS pipe with $t > 25,0$ mm (0.984 in) (see [Table A.3](#), footnote b);
 - 6) diameter and out-of-roundness tolerances for pipe with $D > 1\,422$ mm (56.000 in) (see [Table A.3](#));
 - 7) type of inspection certificate (see [A.7.1.1](#));
 - 8) party issuing the inspection certificate (see [A.7.1.1](#));
- b) items that apply as prescribed, unless otherwise agreed:
- 1) steel casting method for coil or plate used for the manufacture of welded pipe (see [A.3.3.2.1](#));
 - 2) application of diameter tolerance to the outside diameter for pipe with $D \geq 610$ mm (24.000 in) (see [Table A.3](#), footnote d);
 - 3) timing of NDT of HFW weld seam with outside diameter $D < 219,1$ mm (8.625 in) (see [A.7.5.3](#));

- 4) timing of NDT of full body seamless pipe (see [A.7.5.3](#));
- c) items that apply, if agreed:
- 1) approval of the quality system (see [A.3.1](#));
 - 2) manufacturing procedure qualification [see [A.3.1](#) and API Spec 5L, Annex B];
 - 3) another steelmaking process (see [A.3.2](#));
 - 4) supply of helical seam pipe containing coil/plate end welds (see [A.3.3.2.3](#));
 - 5) chemical composition limits (see [Table A.1](#), footnotes a, f and j);
 - 6) temperature for the CVN impact test for the pipe body (see [A.4.4.1](#));
 - 7) temperature for the CVN impact test for the pipe weld and heat affected zone (see [A.4.4.2](#));
 - 8) use of inside diameter to determine diameter and out-of-roundness tolerances for pipe with $D \geq 219,1$ mm (8.625 in) (see [Table A.3](#), footnote c);
 - 9) pipe body DWT testing frequency (see [A.7.2](#) and [Table A.7](#));
 - 10) hardness testing frequency (see [A.7.2](#) and [Table A.7](#));
 - 11) orientation of tensile test piece (see [Table A.8](#), footnote c);
 - 12) ultrasonic inspection for laminar imperfections of pipe body and ends (see [Table A.10](#), numbers 2, 5, 6, 8, 9);
 - 13) flux leakage testing for longitudinal imperfections in seamless pipe (see [Table A.10](#));
 - 14) flux leakage, or eddy current testing for longitudinal imperfections in HFW pipe (see [Table A.10](#));
 - 15) alternate acceptance level for ultrasonic (U2) or flux leakage (F2) testing of longitudinal imperfections (see [Table A.10](#));
 - 16) use of fixed-depth notches for equipment standardization [see API Spec 5L, 46th edition (2018), K.5.1.1 c)];
 - 17) radiographic inspection of the pipe ends (non-inspected pipe ends) and repaired areas on longitudinal imperfections [see [Table A.10](#) and API Spec 5L, 46th edition (2018), K.5.3 a)];
 - 18) use of hole penetrameter instead of ISO wire penetrameter (see [A.7.5.6.2](#));
 - 19) use of digital radiographic inspection (see [A.7.5.6.3](#)).

A.3 Manufacturing

A.3.1 Manufacturing procedure

The pipe manufacturer and the stockist, where products are supplied through a stockist, shall operate a quality system. If agreed, the quality system shall be approved by the purchaser.

NOTE The term “stockist” is equivalent to, and interchangeable with, the term “distributor”.

If agreed, the manufacturing procedure shall be qualified in accordance with API Spec 5L, 46th edition (2018), Annex B.