

Petroleum and natural gas industries - Induction bends, fittings and flanges for pipeline transportation systems - Part 1: Induction bends (ISO 15590-1:2009 modified)

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NATIONAL FOREWORD

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English Version

**Petroleum and natural gas industries - Induction bends, fittings
and flanges for pipeline transportation systems - Part 1:
Induction bends (ISO 15590-1:2009 modified)**

Industries du pétrole et du gaz naturel - Coudes d'induction,
raccords et brides pour systèmes de transport par
conduites - Partie 1: Coudes d'induction (ISO 15590-1:2009
modifiée)

Erdöl- und Erdgasindustrie - Im Induktionsverfahren
gefertigte Rohrbögen, Fittings und Flansche für
Rohrleitungs-Transportsysteme - Teil 1: Im
Induktionsverfahren gefertigte Rohrbögen

This European Standard was approved by CEN on 10 June 2011.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 14870-1:2011) has been prepared by Technical Committee CEN/TC 12 “Materials, equipment and offshore structures for petroleum, petrochemical 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of an identical text or by endorsement, at the latest by December 2011, and conflicting national standards shall be withdrawn at the latest by December 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14870-1:2004.

The text of ISO 15590-1:2009 has been adopted by CEN/TC 12 with some modifications. These modifications are indicated by a vertical line in the left margin of the text.

Where the expression “International Standard” is used, it is understood as “European Standard”.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

This International Standard makes reference to line pipe and bends with delivery conditions based on ISO 3183. Following significant revision of ISO 3183 (ISO 3183:2007), ISO 15590-1 has been reviewed and redrafted taking cognizance of the changes to ISO 3183. In addition to general revision, and in common with ISO 3183:2007, the Technical Committee has introduced additional requirements for special applications as follows:

- Manufacturing procedure specification (Annex A);
- PSL 2 bends for sour service (Annex B).

The requirements of the annexe(s) apply only when it is (they are) specified on the purchase order.

This International Standard does not provide guidance on when it is necessary to specify the above supplementary requirements. Instead it is the responsibility of the purchaser to specify, based upon the intended use and design requirements, which, if any, of the supplementary requirements apply for a particular purchase order.

Users of ISO 15590 need to be aware that further or differing requirements can be needed for individual applications. This part of ISO 15590 is not intended to inhibit a manufacturer 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 the responsibility of the manufacturer to identify any variations from this part of ISO 15590 and provide details.

ISO 15590 consists of the following parts, under the general title *Petroleum and natural gas industries — Induction bends, fittings and flanges for pipeline transportation systems*:

- *Part 1: Induction bends*;
- *Part 2: Fittings*;
- *Part 3: Flanges*.

ISO 15590-1:2009, developed within ISO/TC 67/SC2, has been adopted as EN 14870-1:2011 (ISO 15590-1:2009 modified).

The scope of ISO/TC 67/SC2 is pipeline transportation systems for the petroleum and natural gas industries without exclusions. However in CEN, the scopes of CEN/TC 12 and CEN/TC 234 overlapped until 1995. This scope overlap caused problems for the parallel procedure for the above-mentioned items. The conflict in scope was resolved when both the CEN/Technical Committees and the CEN/BT took the following resolution:

Resolution BT 38/1995: Subject: Revised scope of CEN/TC 12

“BT endorses the conclusions of the coordination meeting between CEN/TC 12 “Materials, equipment and offshore structures for petroleum and natural gas industries” and CEN/TC 234 “Gas supply” and modifies the CEN/TC 12 scope, to read:

“Standardization of the materials, equipment and offshore structures used in drilling, production, refining and the transport by pipelines of petroleum and natural gas, excluding on-land supply systems used by the gas supply industry and those aspects of offshore structures covered by IMO requirement (ISO/TC 8).

The standardization is to be achieved wherever possible by the adoption of ISO Standards.”

In 2009, CEN/TC 12 changed its scope to be in coherency with the last CEN/TC 234's scope changes, as follows (resolution CEN/BTC 19/2009):

Standardisation of the materials, equipment and offshore structures used in the drilling, production, transport by pipelines and processing of liquid and gaseous hydrocarbons within the petroleum, petrochemical and natural gas industries, excluding on-land supply systems used by the gas supply industry excluding gas infrastructure from the input of gas into the on-shore transmission network up to the inlet connection of gas appliances. (covered by CEN/TC 234) and those aspects of offshore structures covered by IMO requirements (ISO/TC 8).

The standardisation is to be achieved wherever possible by the adoption of ISO standards.

Resulting from these resolutions, "on-land supply systems used by the gas supply industry excluding gas infrastructure from the input of gas into the on-shore transmission network up to the inlet connection of gas appliances" has been excluded from the scope of ISO 15590-1:2009 for the European adoption by CEN/TC 12.

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1 Scope

This International Standard specifies the technical delivery conditions for bends made by the induction bending process for use in pipeline transportation systems for the petroleum and natural gas industries as defined in ISO 13623.

This International Standard is applicable to induction bends made from seamless and welded pipe of unalloyed or low-alloy steels.

NOTE These are typically C-Mn steels or low-alloy steels that are appropriate for the corresponding level and grade of line pipe in accordance with ISO 3183.

This International Standard specifies the requirements for the manufacture of two product specification levels (PSLs) of induction bend corresponding to product specification levels given for pipe in ISO 3183.

This International Standard is not applicable to the selection of the induction bend product specification level. It is the responsibility of the purchaser to specify the PSL, based upon the intended use and design requirements; see also ISO 3183:2007, Introduction.

This International Standard is not applicable to pipeline bends made by other manufacturing processes.

On-land supply systems used by the gas supply industry excluding gas infrastructure from the input of gas into the on-shore transmission network up to the inlet connection of gas appliances are excluded from the scope of this standard.

2 Conformance

2.1 Units of measurement

In this International Standard, data are expressed in both SI units and USC units. For a specific order item, unless otherwise stated, only one system of units shall be used, without combining data expressed in the other system.

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

2.2 Rounding

Unless otherwise stated in this International Standard, to determine conformance with the specified requirements, observed or calculated values shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the limiting value, in accordance with ISO 80000-1:2009, Annex B, Rule A.

NOTE For the purposes of this provision, the rounding method of ASTM E29-04^[1] is equivalent to ISO 80000-1:2009, Annex B, Rule A.

2.3 Compliance to standard

A quality management system should be applied to assist compliance with the requirements of this International Standard.

NOTE ISO/TS 29001^[4] gives sector-specific guidance on quality management systems.

A contract may specify that the manufacturer shall be responsible for complying with all of the applicable requirements of this International Standard. It shall be permissible for the purchaser to make any investigation necessary in order to be assured of compliance by the manufacturer and to reject any material that does not comply.

3 Normative references

The following referenced documents are indispensable for the application 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.

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

EN ISO 6507 (all parts), *Metallic materials — Vickers hardness test*

EN ISO 6508 (all parts), *Metallic materials — Rockwell hardness test*

EN ISO 6892(all parts), *Metallic materials — Tensile testing*

EN ISO 7438, *Metallic materials — Bend test (ISO 7438:2005)*

EN ISO 7539-2, *Corrosion of metals and alloys — Stress corrosion testing — Part 2: Preparation and use of bent-beam specimens (ISO 7539-2:1989)*

ISO 783, *Metallic materials — Tensile testing at elevated temperature*

ISO 3183:2007, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems*

ISO 8501-1:2007, *Preparation of steel substrates before application of paints and related products — Visual assessment of surface cleanliness — Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings (ISO 8501-1:2007)*

ISO 9303:1989, *Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes — Full peripheral ultrasonic testing for the detection of longitudinal imperfections*

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

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

ISO 9764:1989, *Electric resistance and induction welded steel tubes for pressure purposes — Ultrasonic testing of the weld seam for the detection of longitudinal imperfections*

ISO 10124, *Seamless and welded (except submerged arc-welded) steel tubes for pressure purposes — Ultrasonic testing for the detection of laminar imperfections*

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

ISO 11496, *Seamless and welded steel tubes for pressure purposes — Ultrasonic testing of tube ends for the detection of laminar imperfections*

ISO 12094, *Welded steel tubes for pressure purposes — Ultrasonic testing for the detection of laminar imperfections in strips/plates used in the manufacture of welded tubes*

ISO 12095, *Seamless and welded steel tubes for pressure purposes — Liquid penetrant testing*

ISO 80000-1:2009, *Quantities and units -- Part 1: General*

ISO 13623, *Petroleum and natural gas industries — Pipeline transportation systems*

ISO 13663, *Welded steel tubes for pressure purposes — Ultrasonic testing of the area adjacent to the weld seam for the detection of laminar imperfections*

ISO 13664, *Seamless and welded steel tubes for pressure purposes — Magnetic particle inspection of the tube ends for the detection of laminar imperfections*

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

ISO 15590-1, *Petroleum and natural gas industries — Induction bends, fittings and flanges for pipeline transportation systems — Part 1: Induction bends*

ISO 15590-2, *Petroleum and natural gas industries — Induction bends, fittings and flanges for pipeline transportation systems — Part 2: Fittings*

ISO 15590-3, *Petroleum and natural gas industries — Induction bends, fittings and flanges for pipeline transportation systems — Part 3: Flanges*

ASNT SNT-TC-1A¹⁾, *Recommended Practice No. SNT-TC-1A: Personnel Qualification and Certification in Nondestructive Testing*

ASTM A370²⁾, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM A435, *Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates*

ASTM A578/ A578M, *Standard Specification for Straight-Beam Ultrasonic Examination of Rolled Steel Plates for Special Applications*

ASTM E18, *Standard Test Methods for Rockwell Hardness of Metallic Materials*

ASTM E92, *Standard Test Method for Vickers Hardness of Metallic Materials*

ASTM E112, *Standard Test Methods for Determining Average Grain Size*

ASTM E165, *Standard Practice for Liquid Penetrant Examination FOR General Industry*

ASTM E340, *Standard Test Method for Macroetching Metals and Alloys*

ASTM E709, *Standard Guide for Magnetic Particle Testing*

ASTM E797, *Standard Practice for Measuring Thickness by Manual Ultrasonic Pulse-Echo Contact Method*

ASTM G39, *Standard Practice for Preparation and Use of Bent-Beam Stress-Corrosion Test Specimens*

NACE TM0177-2005³⁾, *Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in H2S Environments*

NACE TM0284-2003, *Standard Test Method — Evaluation of Pipeline and Pressure Vessel Steels for Resistance to Hydrogen-Induced Cracking*

1) American Society for Nondestructive Testing, 1711 Arlingate Lane, Columbus, OH 43228-0518, USA.

2) American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

3) NACE International, 1440 South Creek Drive, P.O. Box 201009, Houston, TX 77084-4906, USA.