

STN	Ropný a plynárenský priemysel Indukčné kolená, tvarovky a príruby na potrubné dopravné systémy Časť 1: Indukčné kolená (ISO 15590-1: 2018, modifikovaná)	STN EN 14870-1 45 1443
------------	---	--

Petroleum and natural gas industries - Induction bends, fittings and flanges for pipeline transportation systems - Part 1: Induction bends (ISO 15590-1:2018, modified)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 09/23

Obsahuje: EN 14870-1:2023, ISO 15590-1:2018

Oznámením tejto normy sa ruší
STN EN 14870-1 (45 1443) z októbra 2011

137318

Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2023
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii v znení neskorších predpisov.

EUROPEAN STANDARD

EN 14870-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2023

ICS 75.200

Supersedes EN 14870-1:2011

English Version

**Petroleum and natural gas industries - Induction bends,
fittings and flanges for pipeline transportation systems -
Part 1: Induction bends (ISO 15590-1:2018, modified)**

Industries du pétrole et du gaz naturel - Coudes
fabriqués par induction, raccords et brides pour
systèmes de transport par conduites - Partie 1 : Coudes
fabriqués par induction (ISO 15590-1:2018, modifiée)

Erdöl- und Erdgasindustrie - Im Induktionsverfahren
gefertigte Rohrbögen, Fittings und Flansche für
Rohrleitungs-Transportsysteme - Teil 1: Im
Induktionsverfahren gefertigte Rohrbögen (ISO 15590-
1:2018, modifiziert)

This European Standard was approved by CEN on 10 April 2023.

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.

CEN members are the national standards bodies of 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN 14870-1:2023 (E)

Contents	Page
European foreword	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	8
4 Symbols and abbreviated terms.....	11
4.1 Symbols	11
4.2 Abbreviated terms.....	11
5 General requirements.....	12
5.1 Units of measurement.....	12
5.2 Rounding.....	12
5.3 Conformance to this document.....	12
6 Designation	12
7 Design.....	13
8 Information that shall be supplied by the purchaser	13
8.1 General information	13
8.2 Additional information.....	13
8.3 Information on the mother pipe.....	14
9 Manufacturing.....	15
9.1 Mother pipe.....	15
9.2 Qualification test bend.....	15
9.3 Production bending	16
9.4 Post-bending heat treatment.....	16
9.5 Forming and sizing after bending.....	17
9.6 Strip/plate end welds.....	17
9.7 Joints and girth welds	17
9.8 End preparation	17
10 Testing and inspection.....	17
10.1 General requirements.....	17
10.2 Extent of testing and inspection	19
10.2.1 Qualification test bend.....	19
10.2.2 Production bends.....	21
10.2.3 Production test bends	21
10.3 Chemical composition.....	21
10.4 Physical testing.....	22
10.4.1 Test pieces — General.....	22
10.4.2 Tensile testing.....	22
10.4.3 Charpy V-notch impact testing.....	22
10.4.4 Through-thickness hardness testing	23
10.4.5 Surface hardness testing	24
10.4.6 Metallographic examination.....	24
10.4.7 Crack tip opening displacement testing	24
10.4.8 Guided bend testing	25

10.4.9	Flattening tests	25
10.5	Non-destructive testing	25
10.5.1	General	25
10.5.2	Visual inspection.....	25
10.5.3	Weld seam testing	26
10.5.4	Inspection of bend ends	26
10.5.5	Magnetic particle testing or liquid-penetrant testing on the bend body	26
10.5.6	Ultrasonic testing on the bend body	26
10.5.7	Level of residual magnetism.....	27
10.5.8	Repairs.....	27
10.5.9	NDT personnel.....	27
10.6	Dimensions	27
10.7	Gauging.....	30
10.8	Hydrostatic testing.....	30
11	Inspection document.....	30
12	Marking	30
Annex A	(normative) Manufacturing procedure specification (MPS)	32
A.1	General	32
A.2	Manufacturing procedure specification	32
Annex B	(normative) PSL 2S bends ordered for sour service	34
B.1	Introduction	34
B.2	Additional information that shall be supplied by the purchaser	34
B.3	Manufacturing.....	34
B.3.1	Manufacturing procedure.....	34
B.3.2	Pipe manufacturing	34
B.4	Testing and inspection.....	35
B.4.1	Chemical composition.....	35
B.4.2	Tensile properties.....	35
B.4.3	HIC/SWC test	35
B.4.4	SSC test.....	36
B.4.5	Hardness test.....	36
B.5	Hard spots	37
B.6	Inspection.....	37
B.7	Non-destructive inspection.....	37
B.7.1	Laminar imperfections at the pipe ends	37
B.7.2	Ultrasonic testing on the bend body	37
B.7.3	Ultrasonic testing adjacent to weld seam	37
B.7.4	Non-destructive inspection of HFW weld seams.....	37
B.7.5	Ultrasonic inspection of SAW seam welds.....	39
Bibliography	40

EN 14870-1:2023 (E)**European foreword**

This document (EN 14870-1:2023) 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 NEN and CYS.

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 2023, and conflicting national standards shall be withdrawn at the latest by December 2023.

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

This document will supersede EN 14870-1:2011.

A list of all parts in the EN 14870 series can be found on the CEN website.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document makes reference to line pipe and bends with delivery conditions based on ISO 3183.

The requirements of the annex(es) apply only when specified on the purchase order.

This document does not provide guidance on when it is necessary to specify the above supplementary requirements. It is the responsibility of the purchaser to specify, based upon the intended use and design requirements, the supplementary requirements that will apply for a particular purchase order.

Users of this document should be aware that further or differing requirements can be needed for individual applications. This document 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 and provide details of any variations from this document.

This third edition cancels and replaces the second edition (ISO 15590-1:2009), which has been technically revised.

ISO 15590-1:2018, developed within ISO/TC 67/SC 2, has been adopted as EN 14870-1:2023 (ISO 15590-1:2018, modified).

The scope of ISO/TC 67/SC 2 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 item. The conflict in scope was resolved when both the CEN Technical Committees concerns and the CEN Technical Board decided to amend the scope of CEN/TC 12 by explicitly 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*".

EN 14870-1:2023 (E)

1 Scope

This document 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.

NOTE 1 ISO 13623 is modified adopted as EN 14161 to exclude on-land supply systems used by the European gas supply industry from the input of gas into the on-land transmission network up to the inlet connection of gas appliances.

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

NOTE 2 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 document specifies the requirements for the manufacture of two product specification levels (PSLs) of induction bends corresponding to product specification levels given for pipe in ISO 3183:2012.

This document is not applicable to the selection of the induction bend PSL. It is the responsibility of the purchaser to specify the PSL, based upon the intended use and design requirements; see also ISO 3183, Introduction.

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

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

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.

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

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

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

ISO 3183:2012, *Petroleum and natural gas industries — Steel pipe for pipeline transportation systems*¹

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

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

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

ISO 6892-2, *Metallic materials — Tensile testing — Part 2: Method of test at elevated temperature*

ISO 7438, *Metallic materials — Bend test*

¹ This document is superseded by ISO 3183:2019 after publication of ISO 15590-1:2018. As ISO 3183:2019 is published as ISO supplement to API Spec 5L, this document maintains the references to particular sections in ISO 3183:2012, which are considered still accurate.

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

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

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

ISO 10893-4, *Non-destructive testing of steel tubes — Part 4: Liquid penetrant inspection of seamless and welded steel tubes for the detection of surface imperfections*

ISO 10893-5, *Non-destructive testing of steel tubes — Part 5: Magnetic particle inspection of seamless and welded ferromagnetic steel tubes for the detection of surface imperfections*

ISO 10893-8, *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, *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 12095, *Seamless and welded steel tubes for pressure purposes — Liquid penetrant testing*

ISO 13623, *Petroleum and natural gas industries — Pipeline transportation systems²*

ISO 17640, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment*

ASNT SNT-TC-1A, *Recommended Practice No. SNT-TC-1A: Personnel Qualification and Certification in Nondestructive Testing³*

ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products⁴*

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*

² This document is modified adopted as EN 14161 to exclude on-land supply systems used by the European gas supply industry from the input of gas into the on-land transmission network up to the inlet connection of gas appliances.

³ American Society for Nondestructive Testing, 1711 Arlingate Lane, Columbus, OH 43228-0518, USA.

⁴ American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, USA.

EN 14870-1:2023 (E)

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 Test Method for Liquid Penetrant Examination*

ASTM E213, *Standard Practice for Ultrasonic Testing of Metal Pipe and Tubing*

ASTM E214, *Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Contact Testing*

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 TM0177:2016, *Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking in Hydrogen Sulfide (H₂S) Environments*⁵

NACE TM0284:2016, *Standard Test Method — Evaluation of Pipeline and Pressure Vessel Steels for Resistance to Hydrogen-Induced Cracking*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN

⁵ NACE International, 1440 South Creek Drive, P.O. Box 201009, Houston, TX 77084-4906, USA.