
Petroleum and natural gas industries - Design and operation of subsea production systems - Part 2: Flexible pipe systems for subsea and marine applications (ISO 13628-2:2000)

Petroleum and natural gas industries - Design and operation of subsea production systems - Part 2: Flexible pipe systems for subsea and marine applications (ISO 13628-2:2000)

Erdöl- und Erdgasindustrie - Auslegung und Betrieb von Unterwasser-Fördersystemen - Teil 2: Flexible Rohrleitungssysteme für Unterwasser- und meerestechnische Anwendungen (ISO 13628-2:2000)

Industries du pétrole et du gaz naturel - Conception et exploitation des systèmes de production immergés - Partie 2: Systèmes de canalisations flexibles pour applications sous-marines et en milieu marin (ISO 13628-2:2000)

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ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment
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**Petroleum and natural gas industries - Design and operation of
subsea production systems - Part 2: Flexible pipe systems for
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Industries du pétrole et du gaz naturel - Conception et
exploitation des systèmes de production immergés - Partie
2: Systèmes de canalisations flexibles pour applications
sous-marines et en milieu marin (ISO 13628-2:2000)

Erdöl- und Erdgasindustrie - Auslegung und Betrieb von
Unterwasser-Fördersystemen - Teil 2: Flexible
Rohrleitungssysteme für Unterwasser- und
meerestechnische Anwendungen (ISO 13628-2:2000)

This European Standard was approved by CEN on 1 December 2000.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (ISO 13628-2:2000) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum and natural gas industries" in collaboration with Technical Committee CEN/TC 12 "Materials, equipment and offshore structures for petroleum 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 June 2001, and conflicting national standards shall be withdrawn at the latest by June 2001.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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Endorsement notice

The text of the International Standard ISO 13628-2:2000 has been approved by CEN as a European Standard without any modifications. <https://standards.iteh.ai/catalog/standards/sist/a417bbf8-6b99-48ac-a305-c88cc58d4adb/sist-en-iso-13628-2-2001>

NOTE Normative references to International Standards are listed in annex ZA (normative).

Annex ZA (normative)

Normative references to international publications with their relevant European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

Publication	Year	Title	EN	Year
ISO 10423	2001	Petroleum and natural gas industries - Drilling and production equipment - Wellhead and christmas tree equipment	ISO 10423	2001
ISO 13628-4	1999	Petroleum and natural gas industries - Design and operation of subsea production systems - Part 4: Subsea wellhead and tree equipment	ISO 13628-4	1999

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Part 2: Flexible pipe systems for subsea and marine applications

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*Industries du pétrole et du gaz naturel — Conception et exploitation
des systèmes de production immergés —*

*Partie 2: Systèmes de canalisations flexibles pour applications
sous-marines et en milieu marin*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 13628 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 13628-2 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 4, *Drilling and production equipment*.

ISO 13628 consists of the following parts, under the general title *Petroleum and natural gas industries — Design and operation of subsea production systems*:

- Part 1: *General requirements and recommendations*
- Part 2: *Flexible pipe systems for subsea and marine applications*
- Part 3: *Through flowline (TFL) systems*
- Part 4: *Subsea wellhead and tree equipment*
- Part 5: *Subsea control umbilicals*
- Part 6: *Subsea production control systems*
- Part 7: *Workover/completion riser systems*
- Part 8: *Remotely Operated Vehicle (ROV) interfaces on subsea production systems*
- Part 9: *Remotely Operated Tool (ROT) intervention systems*

Annexes A and B of this part of ISO 13628 are for information only.

ISO 13628-2:2000(E)**Introduction**

This part of ISO 13628 is based on API Spec 17J, *Unbonded Flexible Pipe*, first edition, December 1996.

This part of ISO 13628 is complementary to ISO 10420 [29]. API Spec 17J was the result of a Joint Industry Project to develop a worldwide industry standard specification for the design, material selection, manufacture, testing, marking and packaging of flexible pipes.

Users of this part of ISO 13628 should be aware that further or differing requirements may be needed for individual applications. This part of ISO 13628 is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this part of ISO 13628 and provide details.

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Petroleum and natural gas industries — Design and operation of subsea production systems —

Part 2: Flexible pipe systems for subsea and marine applications

1 Scope

This part of ISO 13628 specifies the minimum requirements and recommendations for the design, material selection, manufacture, testing, marking and packaging of flexible pipes, and defines the technical requirements and recommendations for safe, dimensionally and functionally interchangeable flexible pipes.

This part of ISO 13628 applies to unbonded flexible pipe assemblies, consisting of segments of flexible pipe body with end fittings attached to both ends.

This part of ISO 13628 covers applications in both sweet and sour service production, including export and injection applications. Production fluids include oil, gas, water and injection chemicals. This part of ISO 13628 applies to both static and dynamic flexible pipes used as flowlines, risers and jumpers.

This part of ISO 13628 does not cover flexible pipes of bonded structure, and does not apply to flexible pipe ancillary components.

This part of ISO 13628 does not apply to flexible pipes for use in choke and kill line applications.

NOTE Guidelines for bend stiffeners and bend restrictors are given in annex B and guidelines for other components are given in API RP 17B [1].

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 13628. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 13628 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 10423, *Petroleum and natural gas industries — Drilling and production equipment — Wellhead and christmas tree equipment.*

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

ISO 13628-4, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 4: Subsea wellhead and tree equipment.*

ANSI/NACE MR0175, *Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment.*

ANSI/NACE TM0177, *Laboratory Testing of Metals for Resistance to Specific Forms of Environment.*

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API Spec 16C, *Choke and Kill Systems*.

API Std 1104, *Welding of Pipelines and Related Facilities*.

ASME Section IX, *Boiler and Pressure Vessel Code, Section IX, Welding and Brazing Qualifications*.

ASTM A 29, *Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold-Finished — General Requirements*.

ASTM A 182, *Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings and Valves and Parts for High-Temperature Service*.

ASTM A 370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*.

ASTM A 388, *Standard Practice for Ultrasonic Examination of Heavy Steel Forgings*.

ASTM A 480, *Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip*.

ASTM A 668, *Standard Specification for Steel Forgings, Carbon and Alloy for General Industrial Use*.

ASTM A 751, *Standard Test Methods, Practices and Terminology for Chemical Analysis of Steel Products*.

ASTM D 695, *Standard Test Methods for Compressive Properties of Rigid Plastics*.

ASTM D 789, *Standard Test Methods for Determination of Relative Viscosity, Standard and Moisture Content of Polyamide (PA)*.

ASTM D 1238, *Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer*.

ASTM D 1418, *Standard Practice for Rubber and Rubber Latices — Nomenclature*.

ASTM D 4019, *Standard Test Method for Moisture in Plastics by Coulometric Regeneration of Phosphorus Pentoxide*.

ASTM D 5028, *Standard Test Method for Curing Properties of Pultrusion Resins by Thermal Analysis*.

ASTM E 10, *Standard Test Method for Brinell Hardness of Metallic Materials*.

ASTM E 18, *Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials*.

ASTM E 92, *Standard Test Method for Vickers Hardness of Metallic Materials*.

ASTM E 94, *Standard Guide for Radiographic Testing*.

ASTM E 165, *Standard Test Method for Liquid Penetrant Examination*.

ASTM E 384, *Standard Test Method for Microindentation Hardness of Materials*.

ASTM E 428, *Standard Practice for Fabrication and Control of Steel Reference Blocks Used in Ultrasonic Inspection*.

ASTM E 709, *Standard Guide for Magnetic Particle Examination*.

ASTM E 1356, *Standard Test Method for Assignment of the Glass Transition Temperatures by Differential Scanning Calorimetry or Differential Thermal Analysis*.

DNV Fire Test, *DNV Classification Note 6.1 Test (Fire Test)*.

EN 287-1, *Approval testing of welders — Fusion welding — Part 1: Steels.*

EN 288-3, *Specification and approval of welding procedures for metallic materials — Part 3: Welding procedure tests for the arc welding of steels.*

Lloyds Fire Test, *Lloyds Register of Shipping, Fire Testing Memorandum ICE/Fire OSG 1000/499.*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this part of ISO 13628, the following terms, definitions, symbols and abbreviated terms apply.

3.1 Terms and definitions

3.1.1

ancillary component

component used to control the flexible pipe behaviour

EXAMPLES Bend stiffeners and buoyancy modules.

3.1.2

annulus

space between the internal pressure sheath and outer sheath

NOTE

Permeated gas and liquid is generally free to move and mix in the annulus.

3.1.3

anti-wear layer

non-metallic layer, either extruded thermoplastic sheath or tape wrapping, used to minimize wear between structural layers

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3.1.4

bellmouth

part of a guide tube, formed in the shape of a bellmouth and designed to prevent overbending of the flexible pipe

3.1.5

bend limiter

device used to restrict bending of the flexible pipe

NOTE

Bend limiters include bend restrictors, bend stiffeners and bellmouths.

3.1.6

bend radius

radius of curvature of the flexible pipe measured to the pipe centreline

NOTE

Storage and operating MBRs are defined in 5.3.1.6 and 5.3.1.7.

3.1.7

bend restrictor

mechanical device that functions as a mechanical stop and limits the local radius of curvature of the flexible pipe to a minimum value

3.1.8

bend stiffener

ancillary conically shaped component which locally supports the pipe to limit bending stresses and curvature of the pipe to acceptable levels

NOTE

Bend stiffeners can be attached to either an end fitting or a support structure if the flexible pipe passes through the bend stiffener.