SLOVENSKI STANDARD
SIST EN ISO 13628-11:2008

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Industrija za predelavo nafte in zemeljskega plina - Naļ rtovanje in delovanje podvodnih proizvodnih sistemov - 11. del: Gibki cevni sistemi za podvodno in pomorsko uporabo (ISO 13628-11:2007)

Petroleum and natural gas industries - Design and operation of subsea production systems - Part 11: Flexible pipe systems for subsea and marine applications (ISO 13628-11:2007)

Erdöl- und Erdgasindustrie - Auslegung und Betrieb von Unterwasser-Produktionssystemen - Teil 11: Flexible Rohrleitungssysteme für Unterwasser- und meerestechnische Anwendung (ISO 13628-11:2007)

Industries du pétrole et du gaz naturel - Conception et exploitation des systèmes de production immergés - Partie 11: Systèmes de canalisations flexibles pour applications sous-marines et en milieu marin (ISO 13628-11:2007)

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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 11: Flexible pipe systems for subsea and marine applications (ISO 13628-11:2007)

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Foreword

The text of ISO 13628-11:2007 has been prepared by Technical Committee ISO/TC 67 “Materials, equipment and offshore structures for petroleum and natural gas industries” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 13628-11:2008 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of an identical text or by endorsement, at the latest by December 2008, and conflicting national standards shall be withdrawn at the latest by December 2008.

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The text of ISO 13628-11:2007 has been approved by CEN as a EN ISO 13628-11:2008 without any modification.

INTERNATIONAL STANDARD

ISO 13628-11

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

Part 11: Flexible pipe systems for subsea and marine applications

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

Partie 11: 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 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.

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ISO 13628-11 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 4, *Drilling and production equipment*.

This first edition of ISO 13628-11 cancels and replaces ISO 10420:1994, which has been technically revised.

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: Unbonded flexible pipe systems for subsea and marine applications*

— *Part 3: Through flowline (TFL) systems*

— *Part 4: Subsea wellhead and tree equipment*

— *Part 5: Subsea umbilicals*

— *Part 6: Subsea production control systems*

— *Part 7: Completion/workover riser systems*

— *Part 8: Remotely Operated Vehicle (ROV) interfaces on subsea production systems*

— *Part 9: Remotely Operated Tool (ROT) intervention systems*

— *Part 10: Specification for bonded flexible pipe*

— *Part 11: Flexible pipe systems for subsea and marine applications*

A part 12 dealing with dynamic production risers, a part 13 dealing with remotely operated tools and interfaces on subsea production systems and a part 15 dealing with subsea structures and manifolds are under preparation.

Introduction

This part of ISO 13628 is based on API RP 17B and on matching ISO procedures and API procedures. This ISO standard has been technically updated and revised to cater for the needs of the international oil and natural gas industries. This part of ISO 13628 provides information complementary to ISO 13628-2 and ISO 13628-10.

Users of this International Standard should be aware 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, the vendor should identify any variations from this International Standard and provide details.

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

Part 11: Flexible pipe systems for subsea and marine applications

1 Scope

This part of ISO 13628 provides guidelines for the design, analysis, manufacture, testing, installation and operation of flexible pipes and flexible pipe systems for onshore, subsea and marine applications. This part of ISO 13628 supplements ISO 13628-2 and ISO 13628-10, which specify minimum requirements for the design, material selection, manufacture, testing, marking and packaging of unbonded and bonded flexible pipe, respectively.

This part of ISO 13628 applies to flexible pipe assemblies, consisting of segments of flexible pipe body with end fittings attached to both ends. Both bonded and unbonded pipe types are covered. In addition, this part of ISO 13628 applies to flexible pipe systems, including ancillary components.

The applications covered by this part of ISO 13628 are sweet- and sour-service production, including export and injection applications. This part of ISO 13628 applies to both static and dynamic flexible pipe systems used as flowlines, risers and jumpers. This part of ISO 13628 does cover, in general terms, the use of flexible pipes for offshore loading systems.

NOTE Refer also to Reference [30] for offshore loading systems.

This part of ISO 13628 does not cover flexible pipes for use in choke and kill lines or umbilical and control lines.

2 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.

ISO 13628-2:2006, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 2: Unbonded flexible pipe systems for subsea and marine applications*

ISO 13628-3:2000, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 3: Through flowline (TFL) systems*

ISO 13628-10:2005, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 10: Specification for bonded flexible pipe*

NACE TM0177, *Laboratory testing of metals for resistance to sulfide stress cracking and stress corrosion cracking in H_2S environments*

3 Terms, abbreviated terms, definitions and symbols

For the purposes of this document, the following terms, definitions, symbols and abbreviated terms apply.

3.1 Terms and definitions

3.1.1
annulus
space between two concentric plastic sheaths of an unbonded flexible pipe cross-section

3.1.2
Arrhenius plot
log-linear scale used to plot service life against the inverse of temperature for some polymer materials

3.1.3
basket
device used for storage and transport of flexible pipe

NOTE All pipes are laid freely into the basket.

3.1.4
bird-caging
buckling of the tensile-armour wires, usually caused by extreme axial compression, which results in significant radial deformation

3.1.5
buoyancy module
buoys used in significant numbers at discrete points over a section of riser to achieve wave-shape riser configurations

NOTE See 4.4.6.

3.1.6
carousel
device used for storage and transport of very long lengths of flexible pipe and which rotates about a vertical axis

NOTE Pipe is wound under tension around the centre hub.

3.1.7
Chinese fingers
woven steel wire or fabric sleeve that can be installed over a flexible pipe and drawn tight to grip it for support or applying tension to the pipe

3.1.8
end fitting
termination in a flexible pipe

3.1.9
flexible pipe system
fluid conveyance system for which the flexible pipe(s) is/are the primary component and which includes ancillary components attached directly or indirectly to the pipe

3.1.10
free-hanging catenary
riser configuration that spans the water column in a catenary shape modified by the bending stiffness of the riser

NOTE See Figure 4.

3.1.11
integrated service umbilical
ISU™[1)]
structure in which the inner core is a standard flexible pipe construction

NOTE 1 Umbilical components are wound around the core pipe and covered with a protective outer sheath (see 4.3.6).

NOTE 2 ISU is a trademark of Coflexip Stena Offshore.

3.1.12
lazy wave
free-hanging catenary modified by a section with distributed buoyancy modules

NOTE See Figure 4.

3.1.13
lazy-S
free-hanging catenary modified by a section with concentrated buoyancy modules

NOTE See Figure 4.

3.1.14
multibore
multiple flexible pipes or umbilicals contained in a single construction with an outer sheath extruded over the bundle

NOTE See 4.3.7.

3.1.15
multiple configuration
riser system with more than one riser connected at a mid-depth location

3.1.16
ovalization
out-of-roundness of the pipe, calculated as follows:

$$\frac{D_{\max} - D_{\min}}{D_{\max} + D_{\min}}$$

where $D_{\max}$ and $D_{\min}$ are maximum and minimum pipe outside diameter, respectively.

3.1.17
piggy back
attachment of two parallel and adjacent independent pipes, rigid or flexible, over a significant length

3.1.18
prototype test
test to establish or verify a principal performance characteristic for a particular pipe design, which may be a new or established design

3.1.19
rapid decompression
sudden depressurization of a system during which gas in the pipe expands rapidly and can cause blistering or collapse of the internal pressure sheath or other gas-saturated layers

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1) ISU™ is an example of a suitable product available commercially. This information is given for the convenience of users of this part of ISO 13628 and does not constitute an endorsement by ISO of this product.