SLOVENSKI STANDARD

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Industrija za predelavo nafte in zemeljskega plina - Naļ rtovanje in delovanje podvodnih proizvodnih sistemov - 6. del: Krmilni sistemi za proizvodnjo pod vodo (ISO 13628-6:2006)

Petroleum and natural gas industries - Design and operation of subsea production systems - Part 6: Subsea production control systems (ISO 13628-6:2006)

Erdöl- und Erdgasindustrie - Auslegung und Betrieb von Unterwasser-Fördersystemen - Teil 6: Steuersysteme für die Unterwasser-Produktion (ISO 13628-6:2006)

Industries du pétrole et du gaz naturel - Conception et exploitation des systemes de production immergés - Partie 6: Commandes pour équipements immergés (ISO 13628-6:2006)

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ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment

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English Version

Petroleum and natural gas industries - Design and operation of subsea production systems - Part 6: Subsea production control systems (ISO 13628-6:2006)

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This European Standard was approved by CEN on 20 April 2006.

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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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN ISO 13628-6:2006) 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, 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of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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 United Kingdom.

Endorsement notice

The text of ISO 13628-6:2006 has been approved by CEN as EN ISO 13628-6:2006 without any modifications.

INTERNATIONAL STANDARD

ISO 13628-6

Second edition
2006-05-15

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

Part 6: Subsea production control systems

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

Partie 6: Commandes pour équipements immergés

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

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.

ISO 13628-6 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*.

This second edition cancels and replaces the first edition (ISO 13628-6:2000) 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 Tools (ROT) intervention systems*

— *Part 10: Specification for bonded flexible pipe*

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

Part 12 on dynamic production risers is in preparation.

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

Part 6:
Subsea production control systems

1 Scope

This part of ISO 13628 is applicable to design, fabrication, testing, installation and operation of subsea production control systems.

This part of ISO 13628 covers surface control system equipment, subsea-installed control system equipment and control fluids. This equipment is utilized for control of subsea production of oil and gas and for subsea water and gas injection services. Where applicable, this part of ISO 13628 can be used for equipment on multiple-well applications.

This part of ISO 13628 establishes design standards for systems, subsystems, components and operating fluids in order to provide for the safe and functional control of subsea production equipment.

This part of ISO 13628 contains various types of information related to subsea production control systems. They are

— informative data that provide an overview of the architecture and general functionality of control systems for the purpose of introduction and information;

— basic prescriptive data that shall be adhered to by all types of control system;

— selective prescriptive data that are control-system-type sensitive and shall be adhered to only when they are relevant;

— optional data or requirements that need be adopted only when considered necessary either by the purchaser or the vendor.

In view of the diverse nature of the data provided, control system purchasers and specifiers are advised to select from this part of ISO 13628 only the provisions needed for the application at hand. Failure to adopt a selective approach to the provisions contained herein can lead to overspecification and higher purchase costs.

Rework and repair of used equipment are beyond the scope of this part of ISO 13628.

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 3722, *Hydraulic fluid power — Fluid sample containers — Qualifying and controlling cleaning methods*

ISO 4406:1999 *Hydraulic fluid power — Fluids — Method for coding the level of contamination by solid particles*

ISO 7498 (all parts), *Information processing systems — Open Systems Interconnection — Basic Reference Model*

ISO 9606-1, *Approval testing of welders — Fusion welding — Part 1: Steels*

ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys*

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

ISO 10945, *Hydraulic fluid power — Gas-loaded accumulators — Dimensions of gas ports*

ISO/TR 10949, *Hydraulic fluid power — Component cleanliness — Guidelines for achieving and controlling cleanliness of components from manufacture to installation*

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

ISO 13628-5, *Petroleum and natural gas industries — Design and operation of subsea production systems — Part 5: Subsea umbilicals*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15609-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 2: Gas welding*

ISO 15610, *Specification and qualification of welding procedures for metallic materials — Qualification based on tested welding consumables*

ISO 15611, *Specification and qualification of welding procedures for metallic materials — Qualification based on previous welding experience*

ISO 15612, *Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure*

ISO 15613, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*

ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO/TS 16431, *Hydraulic fluid power — Assembled systems — Verification of cleanliness*

ANSI/ASME B31.3, *Process Piping*

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, *Rules for the Construction of Pressure Vessels*

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

ASTM D97, *Standard Method for Pour Point of Petroleum Products*

ASTM D445, *Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)*

ASTM D471, *Standard Test Method for Rubber Property — Effect of Liquids*

ASTM D665:2003, *Standard Test Method for Rust Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water*

ASTM D892, *Standard Test Method for Foaming Characteristics of Lubricating Oils*

ASTM D1141, *Standard Practice for the Preparation of Substitute Ocean Water*

ASTM D1298, *Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method*

ASTM D2625, *Standard Test Method for Endurance (Wear) Life and Load-Carrying Capacity of Solid Film Lubricants (Falex Pin and Vee Method)*

ASTM D2670, *Standard Test Method for Measuring Wear Properties of Fluid Lubricants (Falex Pin and Vee Block Method)*

ASTM D3233, *Standard Test Methods for Measurement of Extreme Pressure Properties of Fluid Lubricants (Falex Pin and Vee Block Methods)*

ASTM G1:2003, *Standard Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens*

BS 7201-1, *Hydraulic fluid power — Gas loaded accumulators — Specification for seamless steel accumulator bodies above 0,5 l water capacity*

DIN 41612-2, *Special contacts for multi two-part connectors; concentric contacts (type C)*

IEC 61892 (all parts), *Electrical installations of ships and of mobile and fixed offshore units*

Internet RFC 791, *Internet Protocol, http://www.faqs.org/rfcs/rfc791.html*

Internet RFC 793, *The Transmission Control Protocol (TCP), http://www.faqs.org/rfcs/rfc793.html*

Internet RFC 1332, *The PPP Internet Protocol Control Protocol (IPCP), http://www.ietf.org/rfc/rfc1332.txt*

Internet RFC 1661, *The Point-to-Point Protocol (PPP), http://www.faqs.org/rfcs/rfc1661.html*

IP 34*, Determination of flash point Pensky-Martens closed cup method*

IP 135:2005, *Determination of rust-preventing characteristics of steam-turbine oil in the presence of water*

3 Terms and definitions

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

3.1
boost
pressure maintained on the spring-return side of a subsea actuator for the purposes of improving closing-time response

3.2
commanded closure
closure of the underwater safety valve and possibly other valves depending on the control system design

NOTE Such commands can originate manually, automatically or as part of an ESD.

3.3
control path
total distance that a control signal (e.g. electrical, optical, hydraulic) travels from the topside control system to the subsea control module or valve actuator

3.4
design pressure
maximum pressure for which the system or component was designed for continuous usage

3.5
design life
specified operational life of system after pre-delivery test

3.6
diagnostic data
data provided to monitor the condition of the downhole equipment

NOTE Can include the ability to make (engineering) adjustments.

3.7
direct hydraulic control
control method wherein hydraulic pressure is applied through an umbilical line to act directly on a subsea valve actuator

NOTE Upon venting of the pressure at the surface, the control fluid is returned through the umbilical to the surface due to the action of the restoring spring in the valve actuator. Subsea functions may be ganged together to reduce the number of umbilical lines.

3.8
downstream
away from a component in the direction of flow

3.9
electrohydraulic control
control method wherein communication signals are conducted to the subsea system and used to open or close electrically-controlled hydraulic control valves

NOTE Hydraulic fluid is locally sourced and acts on the associated subsea valve actuator. “Locally sourced” may mean locally stored pressurized fluid or fluid supplied by a hydraulic umbilical line. With electrohydraulic control systems, data telemetry (readback) is readily available at high speed. Multiplexing of the communication signals reduces the number of conductors in the umbilical.

3.10
expert operation
operating the IWCS with other control commands or other methods than used for normal operation

NOTE Typically used by IWCS supplier or other skilled resource to read IWCS diagnostic data and make (engineering) adjustments to IWCS equipment.

3.11
hydrostatic test pressure
maximum test pressure at a level greater than the design pressure (rated working pressure)

3.12
intelligent well
well that employs permanently installed downhole sensors and/or permanently installed downhole control devices that are operable from a surface facility

3.13
intelligent well control system
control system used to operate an intelligent well

3.14
normal operation
operating the system to perform the intended basic functionality

3.15
offset
horizontal component of control path length

3.16
proof pressure
maximum test pressure at a level greater than the design pressure

3.17
response time
sum of the signal time and the shift time

3.18
running tool
tool used to install, operate, retrieve, position or connect subsea equipment remotely from the surface

NOTE An example is the subsea control-module running tool.

3.19
shift time
period of time elapsed between the arrival of a control signal at the subsea location (the completion of the signal time) and the completion of the control function operation

NOTE Of primary interest is the time to fully stroke, on a subsea tree, a master or wing valve that has been designated as the underwater safety valve.

3.20
signal time
period of time elapsed between the remote initiation of a control command and the initiation of a control function operation subsea (the commencement of the shift time)

3.21
subsea production control system
control system operating a subsea production system during production operations

3.22
surface safety valve
safety device that is located in the production bore of the well tubing above the wellhead (platform well), or at the point of subsea well production embarkation onto a platform, and that will automatically close upon loss of hydraulic pressure

3.23
umbilical
combination of electric cables, hoses or steel tubes, either on their own or in combination (or with fibre optic cables), cabled together for flexibility and over-sheathed and/or armoured for mechanical strength and typically supplying power and hydraulics, communication and chemicals to a subsea system