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**Erdöl- und Erdgasindustrie –
Auslegung und Betrieb von Unterwasser-Produktionssystemen –
Teil 9: ROT-Systeme (ISO 13628-9:2000);
Englische Fassung EN ISO 13628-9:2006**

Petroleum and natural gas industries –
Design and operation of subsea production systems –
Part 9: Remotely Operated Tool (ROT) intervention systems (ISO 13628-9:2000);
English version EN ISO 13628-9:2006

Industries du pétrole et du gaz naturel –
Conception et exploitation des systèmes de production immergés –
Partie 9: Systèmes d'intervention utilisant des dispositifs à commande à distance (ROT)
(ISO 13628-9:2000);
Version anglaise EN ISO 13628-9:2006

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Nationales Vorwort

Dieses Dokument (EN ISO 13628-9:2006) wurde vom Technischen Komitee CEN/TC 12 „Materialien, Ausrüstungen und Offshore-Bauwerke für die Erdöl-, petrochemische und Erdgasindustrie“ (Sekretariat: AFNOR Frankreich) erstellt. Es handelt sich dabei um die unveränderte Übernahme von ISO 13628-9:2000, erarbeitet von ISO/TC 67 „Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries“, Subkomitee SC 4 „Drilling and production equipment“.

Für Deutschland hat hieran der Arbeitskreis NA 109-00-01-04 AK „Bohr- und Fördereinrichtungen“ im Normenausschuss Erdöl- und Erdgasgewinnung (NÖG) mitgearbeitet.

Diese Norm enthält unter Berücksichtigung des DIN-Präsidialbeschlusses 13/1983 nur die englische Originalfassung der ISO-Norm.

Diese Norm enthält neben den gesetzlichen Einheiten auch die Einheiten „°F“, „ft“, „lbf“, „psi“, die im Deutschen Normenwerk nicht zugelassen sind. Es wird jedoch ausdrücklich darauf hingewiesen, dass die Anwendung dieser Einheiten im nationalen amtlichen und geschäftlichen Verkehr aufgrund des Gesetzes über Einheiten im Messwesen nicht zulässig ist.

Umrechnung:

$$1\text{ }^{\circ}\text{F} = 9/5\text{ }^{\circ}\text{C} + 32$$

$$1\text{ ft} = 0,304\text{ 8 m}$$

$$1\text{ lbf} = 4,448\text{ 222 N}$$

$$1\text{ psi} = 6,894\text{ 757 kPa}$$

English Version

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This European Standard was approved by CEN on 13 November 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
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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Foreword

The text of ISO 13628-9:2000 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 13628-9:2006 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 June 2007, and conflicting national standards shall be withdrawn at the latest by June 2007.

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 13628-9:2000 has been approved by CEN as EN ISO 13628-9:2006 without any modifications.

Introduction

This part of ISO 13628 is considered to be closely related to ISO 13628-1 and ISO 13628-8. ISO 13628-1 provides general requirements and overall recommendations for development of complete subsea production systems for the petroleum and natural gas industries, from design to decommissioning, and gives a description of how the ROT intervention systems relate to the total subsea production system.

The objective of subsea intervention systems, including vessel and deck handling equipment, is to facilitate safe and efficient intervention on subsea installations.

1 Scope

This part of ISO 13628 provides functional requirements and recommendations for ROT intervention systems and interfacing equipment on subsea production systems for the petroleum and natural gas industries.

This part of ISO 13628 does not cover manned intervention and ROV-based intervention systems (e.g. for tie-in of sealines and module replacement). Vertical wellbore intervention, internal flowline inspection, tree running and tree running equipment are also excluded from this part of ISO 13628.

2 Terms, definitions and abbreviated terms

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

2.1 Terms and definitions

2.1.1

subsea intervention

all work carried out subsea

2.1.2

primary intervention

all work carried out during the scheduled intervention task

2.1.3

ROT system

dedicated, unmanned, subsea tools used for remote installation or module replacement tasks that require lift capacity beyond that of free-swimming ROV systems

NOTE The ROT system comprises wire-suspended tools with control system and support-handling system for performing dedicated subsea intervention tasks. They are usually deployed on liftwires or a combined liftwire/umbilical. Lateral guidance may be via guidewires, dedicated thrusters or ROV assistance.

2.1.4

deployment system

all equipment involved in the launch and recovery of the ROT system

2.1.5

heave-compensated system

system that limits the effect of vertical vessel motion on the deployed ROT system

2.1.6

skid system

storage, transportation, lifting and testing frames to facilitate movement of the ROT systems and the modules and components to be replaced or installed

NOTE Skids are used in combination with a skidding system.

2.1.7

sealines

all pipelines, flowlines, umbilicals and cables installed on the seabed

2.1.8

termination head

part of the PICS interfacing with the end of the sealine

2.1.9

pull-in head

part of the pull-in system acting as attachment point for the end of the pull-in wire

2.2 Abbreviated terms

CB	centre of buoyancy
CF	connection function
CG	centre of gravity
CT	connection tool
FAT	factory acceptance test
HPU	hydraulic power unit
ICS	intervention control system
ID	internal diameter
IP	ingress protection
LCC	life cycle cost
MQC	multi quick connector
NAS	National Aerospace Standard Institute
PGB	permanent guide base
PICS	pull-in and connection system
PIF	pull-in function
PIT	pull-in tool
ROT	remotely operated tool
ROV	remotely operated vehicle
SPS	subsea production system

SWL	safe working load
WOCS	workover control system

3 System selection

3.1 General

The design, configuration and operation of the ROT intervention system impacts directly on the LCC for the entire SPS. In order to obtain an SPS design providing safe and cost-effective intervention operations, it is important to obtain a closed loop between SPS design and intervention system design. See Figure 1.

An ROT intervention system typically comprises the following:

- a) ROTs for dedicated intervention tasks,
- b) deck handling equipment,
- c) ICS,
- d) deployment/landing equipment,
- e) ROV spread interfaced with ROT systems.

An illustration of the main features of an ROT intervention system and associated equipment is shown in Figure 2.

The breakdown of the ROT intervention system into sub-elements and components as presented in this part of ISO 13628 should not pose limitations on the selection of new intervention concepts whose functionality and reliability can be documented.

Configurational options for the ROT intervention system and interfacing equipment, such as intervention vessel and ROV systems when used, are shown in Figure 3.

ROT intervention systems shall be evaluated for all phases of an intervention operation, which typically are:

- mobilization (specific issues at the location in question),
- deck handling and preparation,
- launch, descent and landing,
- intervention task,
- testing,
- complementary tasks,
- retrieval,
- demobilization,
- contingency.

During the evaluation, consideration shall be given to reasonably foreseeable misuse of the ROT intervention system.