SLOVENSKI STANDARD
SIST EN ISO 10414-1:2009

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Industrija za predelavo nafte in zemeljskega plina - Preskušanje vrtalnih tekočin na terenu (in situ) - 1. del: Tekočine na vodni osnovi (ISO 10414-1:2008)

Petroleum and natural gas industries - Field testing of drilling fluids - Part 1: Water-based fluids (ISO 10414-1:2008)

Erdöl- und Erdgasindustrie - Feldprüfung von Bohrflüssigkeiten - Teil 1: Flüssigkeiten auf Wasserbasis (ISO 10414-1:2008)

Industries du pétrole et du gaz naturel - Essais in situ des fluides de forage - Partie 1: Fluides aqueux (ISO 10414-1:2008)

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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 - Field testing of drilling fluids - Part 1: Water-based fluids (ISO 10414-1:2008)

Industries du pétrole et du gaz naturel - Essais in situ des fluides de forage - Partie 1: Fluides aqueux (ISO 10414-1:2008)

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Foreword

The text of ISO 10414-1:2008 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 10414-1:2008 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of an identical text or by endorsement, at the latest by May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

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The text of ISO 10414-1:2008 has been approved by CEN as a EN ISO 10414-1:2008 without any modification.

INTERNATIONAL STANDARD

ISO 10414-1

Second edition
2008-03-15

Petroleum and natural gas industries — Field testing of drilling fluids

Part 1: Water-based fluids

Industries du pétrole et du gaz naturel — Essais in situ des fluides de forage

Partie 1: Fluides aqueux

Reference number
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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.

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ISO 10414-1 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 3, *Drilling and completion fluids, and well cements*.

This second edition cancels and replaces the first edition (ISO 10414-1:2001), to which Annexes I, J and K have been added and other minor changes made to the sentence structure, grammar and other non-technical editing.

ISO 10414 consists of the following parts, under the general title *Petroleum and natural gas industries — Field testing of drilling fluids*:

— *Part 1: Water-based fluids*

— *Part 2: Oil-based fluids*

Introduction

This part of ISO 10414 is based on API RP 13B-1, third edition, December 2003[2] and ISO 10414 (all parts)[6].

Annexes A to H and K of this part of ISO 10414 are for information only. Annexes I and J are normative.

In this part of ISO 10414, where practical, U.S. Customary (USC) units are included in brackets for information.

Petroleum and natural gas industries — Field testing of drilling fluids

Part 1: Water-based fluids

DANGER — As with any laboratory procedure requiring the use of potentially hazardous chemicals, the user is expected to have proper knowledge and to have received training in the use and disposal of these chemicals. The user is responsible for compliance with all applicable local, regional and national requirements for worker and local health, safety and environmental liability.

1 Scope

This part of ISO 10414 provides standard procedures for determining the following characteristics of water-based drilling fluids:

a) drilling fluid density (mud weight);

b) viscosity and gel strength;

c) filtration;

d) water, oil and solids contents;

e) sand content;

f) methylene blue capacity;

g) pH;

h) alkalinity and lime content;

i) chloride content;

j) total hardness as calcium.

Annexes A through K provide additional test methods which may be used for

— chemical analysis for calcium, magnesium, calcium sulfate, sulfide, carbonate and potassium;

— determination of shear strength;

— determination of resistivity;

— removal of air;

— drill-pipe corrosion monitoring;

— sampling, inspection and rejection;

— rig-site sampling;

— calibration and verification of glassware, thermometers, viscometers, retort-kit cup and drilling-fluid balances;

— permeability-plugging testing at high temperature and high pressure for two types of equipment;

— example of a report form for water-based drilling fluid.

2 Terms and definitions

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

2.1
ACS reagent grade
chemical meeting the purity standards specified by the American Chemical Society (ACS)

2.2
darcy
permeability of a porous medium, where one darcy is the flow of a single-phase fluid of 1 cP viscosity that completely fills the voids of the porous medium, flowing through the medium under conditions of viscous flow at a rate of 1 $ml \cdot s^{-1} \cdot cm^{-2}$ cross-sectional area and under a pressure or equivalent hydraulic gradient of 1 $atm \cdot cm^{-1}$

NOTE 1 cP = 1 mPa·s.

2.3
quarter
〈verb〉 mix and divide into four specimens to ensure homogeneity of specimens

2.4
spurt loss
volume of fluid that passes through the filtration medium before a filter cake is formed

2.5
tube sampling
sampling method consisting of the withdrawal of powdered sample from bag or bulk via a cylindrical device pushed into the sample, locked shut and withdrawn

3 Symbols and abbreviated terms

3.1 Symbols

NOTE Subscript “A” to symbol denotes metric units. Subscript “B” to symbol denotes U.S. customary units.

A_A area, in square centimetres

A_B area, in square inches

$c_{b,A}$ concentration of weighting material, in kilograms per cubic metre

$c_{b,B}$ concentration of weighting material, in pounds per barrel

$c_{Ca,A}$ concentration of calcium ion, in milligrams per litre

$c_{Ca,B}$ concentration of calcium ion, in parts per million by mass (USC)

$c_{\text{Ca+Mg,A}}$ concentration of calcium and magnesium ion (total hardness), in milligrams per litre

$c_{\text{Ca+Mg,B}}$ concentration of calcium and magnesium ion (total hardness), in parts per million (USC)

$c_{\text{CaSO4,A}}$ concentration of calcium sulfate, in milligrams per litre

$c_{\text{CaSO4,B}}$ concentration of calcium sulfate, in parts per million by mass (USC)

$c_{\text{CO2+CO3+HCO3,A}}$ concentration of total soluble carbonates, in milligrams per litre

$c_{\text{CO2+CO3+HCO3,B}}$ concentration of total soluble carbonates, in parts per million by mass (USC)

$c_{\text{Cl,A}}$ concentration of chloride ion, in milligrams per litre

$c_{\text{Cl,B}}$ concentration of chloride ion, in parts per million by mass (USC)

$c_{\text{ex-CaSO4,A}}$ concentration of excess, undissolved calcium sulfate, in milligrams per litre

$c_{\text{ex-CaSO4,B}}$ concentration of excess, undissolved calcium sulfate, in parts per million by mass (USC)

$c_{\text{f,KCl,A}}$ concentration of potassium chloride in filtrate, in milligrams per litre

$c_{\text{f,KCl,B}}$ concentration of potassium chloride in filtrate, in parts per million by mass (USC)

$c_{\text{K,A}}$ concentration of potassium ion, in milligrams per litre

$c_{\text{K,B}}$ concentration of potassium ion, in parts per million by mass (USC)

$c_{\text{KCl,A}}$ concentration of potassium chloride, in milligrams per litre

$c_{\text{KCl,B}}$ concentration of potassium chloride, in parts per million by mass (USC)

$c_{\text{lg,A}}$ concentration of low-gravity solids, in kilograms per cubic metre

$c_{\text{lg,B}}$ concentration of low-gravity solids, in pounds per barrel

$c_{\text{lime,A}}$ lime content of the drilling fluid, in kilograms per cubic metre

$c_{\text{lime,B}}$ lime content of the drilling fluid, in pounds per barrel

$c_{\text{NaCl,A}}$ concentration of sodium chloride, in milligrams per litre

$c_{\text{NaCl,B}}$ concentration of sodium chloride, in parts per million by mass (USC)

$c_{\text{S,A}}$ concentration of sulphide ion, in milligrams per litre

$c_{\text{S,B}}$ concentration of sulphide ion, in parts per million by mass (USC)

$c_{\text{SS,A}}$ suspended solids concentration, in kilograms per cubic metre

$c_{\text{SS,B}}$ suspended solids concentration in pounds per barrel

c_{MBT} methylene blue capacity

c_{th} thermometer correction to be added to the working thermometer reading

D outer diameter

$E_{\text{BE,A}}$ bentonite equivalent, expressed in kilograms per cubic metre