

SLOVENSKI STANDARD
oSIST prEN ISO 10426-4:2018
01-marec-2018

Industrija za predelavo nafte in zemeljskega plina - Cementi in materiali za cementiranje vrtin - 4. del: Priprava in preskušanje penjenih cementnih past pri atmosferskem tlaku (ISO/DIS 10426-4:2018)

Petroleum and natural gas industries - Cements and materials for well cementing - Part 4: Preparation and testing of foamed cement slurries at atmospheric pressure (ISO/DIS 10426-4:2018)

Erdöl- und Erdgasindustrie - Zemente und Materialien für die Zementation von Tiefbohrungen - Teil 4: Vorbereitung und Prüfung von Schaumzementbrühen unter atmosphärischen Bedingungen (ISO/DIS 10426-4:2018)

Industrie du pétrole et du gaz naturel - Ciments et matériaux pour la cimentation des puits - Partie 4: Préparation et essais en conditions ambiantes des laitiers de ciment mousse (ISO/DIS 10426-4:2018)

Ta slovenski standard je istoveten z: prEN ISO 10426-4

ICS:

75.180.10	Oprema za raziskovanje, vrtanje in odkopavanje	Exploratory, drilling and extraction equipment
91.100.10	Cement. Mavec. Apno. Malta	Cement. Gypsum. Lime. Mortar

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en,fr,de

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DRAFT INTERNATIONAL STANDARD

ISO/DIS 10426-4

ISO/TC 67/SC 3

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Petroleum and natural gas industries — Cements and materials for well cementing —

Part 4:

Preparation and testing of foamed cement slurries at atmospheric pressure

*Industrie du pétrole et du gaz naturel — Ciments et matériaux pour la cimentation des puits —
Partie 4: Préparation et essais en conditions ambiantes des laitiers de ciment mousse*

ICS: 91.100.10; 75.020

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ISO/CEN PARALLEL PROCESSING



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ISO/DIS 10426-4:2018(E)

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is 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 10426-4:2004), which has been technically revised.

The lay-out of this document has been significantly re-organised as compared to the first edition. Some clauses have become annexes, clause sequences have been altered and [Clause 3](#) "Terms, definitions and symbols" and quite some references and explanatory text have been added. Except for the following main changes, the technical content has remained the same:

- In the first edition, the nature of the gas used to create the foam cement is not specified and the gas is assumed to be ideal. In this document, air is used to produce a foam cement at atmospheric conditions for testing at atmospheric conditions. Care is taken to assure that this sample mimics a nitrogen-based foam cement sample under downhole conditions. Physical properties of nitrogen at pressure and temperature, such as its density and compressibility factor have been incorporated in annexes. Formulae are presented to calculate actual gas fractions and densities at downhole conditions. These gas fractions are then used to produce the air-based atmospheric samples for atmospheric testing. Formulae used for calculations required for sample preparation have been modified to accommodate for the afore-going.
- In this document, Formula (2) uses the product of mass and absolute volume (reciprocal density) to calculate the volumes of cement, additives and mix water. The first edition simply uses the volumes. Direct volumes of cement and additives are difficult to measure due to the "porous" nature of these materials.

A list of all parts of the ISO 10426 series can be found on the ISO website.

Introduction

The technical requirements of this part of ISO 10426 and API RP 10B-4 used to be identical. In the meantime API RP 10B-4 has been technically revised as API RP 10B-4, 2nd edition (2015). The purpose of this revision is to bring this document up-to-date, by referencing the current edition of API RP 10B-4, including some supplementary content.

The test methods contained in this part of ISO 10426, though generally based on ISO 10426-2, take into account the specialized sampling/testing requirements of foamed cement slurries. ISO 10426-2 contains no dedicated test methods for foamed cement slurries.

Well cements that can be used in foam cementing can include those of ISO Classes A, C, G or H (as given in ISO 10426-1), high-alumina cement, various types of ductile cement compositions, etc. In each foam cementing operation, the cement chosen needs to be fit for purpose.

In this part of ISO 10426, where practical, United States customary (USC) units are included in parentheses for information.

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Petroleum and natural gas industries — Cements and materials for well cementing —

Part 4: Preparation and testing of foamed cement slurries at atmospheric pressure

1 Scope

This document defines the methods for the generation and testing of foamed cement slurries and their corresponding unfoamed base cement slurries at atmospheric pressure. These methods are developed for foamed cement slurries with air, at atmospheric conditions, which could mimic a foam quality experienced with nitrogen at downhole conditions and which can be modified to accommodate other gases such as nitrogen. This document also addresses slurries that are foamed with nitrogen including their properties.

This document does not address testing at pressures above atmospheric conditions and does not include or consider the effects of nitrogen solubility in the nitrogen fraction calculations.

This document is a supplement to API RP 10B-4, 2nd edition (2015), the requirements of which are applicable with the additions and exclusions specified in this document.

2 Normative references

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The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

API RP 10B-2, 2nd edition (2013), *Recommended Practice for Testing Well Cements*

API RP 10B-3, 2nd edition (2016), *Recommended Practice for testing of Deepwater Well cement Formulations*

API RP 10B-4, 2nd edition (2015), *Recommended Practice on Preparation and Testing of Foamed Cement Formulations at Atmospheric Pressure*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in API RP 10B-4, 2nd edition (2015).

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Supplements to API RP 10B-4, 2nd edition (2015)

4.1 General requirements

The requirements specified in API RP 10B-4, 2nd edition (2015) shall apply, with the additions and deletions specified in 4.2 to 4.5.

ISO/DIS 10426-4:2018(E)

4.2 Scope

Replace Clause 1 of API RP 10B-4, 2nd edition (2015) with [Clause 1](#) of this document.

4.3 Normative references

Replace Clause 2 of API RP 10B-4, 2nd edition (2015) with [Clause 2](#) of this document.

NOTE The reason that API RP 10B-2, 2nd edition (2013) is included in [Clause 2](#) of this document is because API RP 10B-2, 2nd edition (2013) is a normative reference in API RP 10B-4, 2nd edition (2015).

4.4 Procedure for compressive strength determination

The reference in API RP 10B-4, 2nd edition (2015), 6.8 to API RP 10B-3, 2nd edition (2016), 7.6.2 shall apply with the following exception:

The reference to ASTM C109/109M-07 in API RP 10B-3, 2nd edition (2016) is replaced by ASTM C109/109M. This is referenced in the first paragraph and in subsection b).

4.5 Bibliography

Replace the Bibliography of API RP 10B-4, 2nd edition (2015) with the Bibliography of this document.

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