



SLOVENSKI STANDARD
SIST EN ISO 10426-1:2000
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Petroleum and natural gas industries - Cements and materials for well cementing - Part 1: Specification (ISO 10426-1:2000)

Petroleum and natural gas industries - Cements and materials for well cementing - Part 1: Specification (ISO 10426-1:2000)

Erdöl- und Erdgasindustrie - Zemente und Materialien für die Zementation von Tiefbohrungen - Teil 1: Anforderungen (ISO 10426-1:2000)

Industries du pétrole et du gaz naturel - Ciments et matériaux de cimentation des puits - Partie 1: Spécifications (ISO 10426-1:2000)

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| 91.100.10 | Cement. Mavec. Apno. Malta | Cement. Gypsum. Lime. Mortar |

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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March 2000

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English version

Petroleum and natural gas industries - Cements and materials for well cementing - Part 1: Specification (ISO 10426-1:2000)

Industries du pétrole et du gaz naturel - Ciments et
matériaux de cimentation des puits - Partie 1:
Spécifications (ISO 10426-1:2000)

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die Zementation von Tiefbohrungen - Teil 1: Anforderungen
(ISO 10426-1:2000)

This European Standard was approved by CEN on 18 February 2000.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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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 the International Standard ISO 10426-1:2000 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 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 September 2000, and conflicting national standards shall be withdrawn at the latest by September 2000.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 10426-1:2000 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to International Standards are listed in annex ZA (normative).

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Annex ZA
(normative)**Normative references to international publications with their corresponding European publications**

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE Where an International Publication has been modified by common modifications, indicated by (mod.), the relevant EN/HD applies.

| <u>Publication</u> | <u>Year</u> | <u>Title</u> | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|--|--------------|-------------|
| ISO 13500 | 1998 | Petroleum and natural gas industries - Drilling fluid materials - Specifications and tests | EN ISO 13500 | 1998 |

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INTERNATIONAL STANDARD

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10426-1

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

Part 1: Specification

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*Industrie du pétrole et du gaz naturel — Ciments et matériaux de
cimentation des puits*

Partie 1: Spécifications

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Foreword

ISO (the International Organisation for Standardisation) 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 organisations, 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 standardisation.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 10426 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 10426-1 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum and natural gas industries*, Subcommittee SC 3, *Drilling and completion fluids, and well cements*.

ISO 10426 consists of the following parts, under the general title *Petroleum and natural gas industries — Cements and materials for well cementing*:

— *Part 1: Specification*

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— *Part 2: Recommended practice for testing of well cement*

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Annex A of this part of ISO 10426 is for information only.

Introduction

This part of ISO 10426 is based on API Specification 10A, 22nd edition, January 1995.

Users of this part of ISO 10426 should be aware that further or differing requirements may be needed for individual applications. This part of ISO 10426 is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this part of ISO 10426 and provide details.

In this part of ISO 10426, where practical, U.S. Customary units are included in brackets for information.

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

Part 1: Specification

1 Scope

This part of ISO 10426 specifies requirements and gives recommendations for eight classes of well cements, including their chemical and physical requirements and procedures for physical testing.

This part of ISO 10426 is applicable to well cement Classes A, B, C, D, E and F, which are the products obtained by grinding Portland cement clinker and, if needed, calcium sulfate as an interground additive. Processing additives may be used in the manufacture of cement of these classes. Suitable set-modifying agents may be interground or blended during manufacture of Classes D, E and F.

This part of ISO 10426 is also applicable to well cement Classes G and H, which are the products obtained by grinding Portland cement clinker with no additives other than calcium sulfate or water.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 10426. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 10426 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3310-1, *Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth.*

ISO 13500, *Petroleum and natural gas industries — Drilling fluid materials — Specifications and tests.*

ASTM C 109/C 109M, *Standard test method for compressive strength of hydraulic cement mortars (using 2-in or [50-mm] cube specimens).*

ASTM C 114, *Standard test methods for chemical analysis of hydraulic cement.*

ASTM C 115, *Standard test methods for fineness of Portland cement by the turbidimeter.*

ASTM C 183, *Standard practice for sampling and the amount of testing of hydraulic cement.*

ASTM C 204, *Standard test method for fineness of Portland cement by air permeability apparatus.*

ASTM C 465, *Standard specification for processing additions for use in the manufacture of hydraulic cements.*

ASTM E 220, *Standard test method for calibration of thermocouples by comparison techniques.*

ASTM E 1404, *Standard specification for laboratory class conical flasks.*

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DIN 12385, *Laboratory glassware, conical flasks, wide neck.*

EN 196-2, *Methods of testing cement — Part 2: Chemical analysis of cement.*

EN 196-6, *Methods of testing cement — Part 6: Determination of fineness.*

EN 196-7, *Methods of testing cement — Part 7: Methods of taking and preparing samples of cement.*

EN 196-21, *Methods of testing cement — Part 21: Determination of the chloride, carbon dioxide and alkali content of cement.*

3 Terms and definitions

For the purposes of this part of ISO 10426, the following terms and definitions apply.

3.1**additive**

material added to a cement slurry to modify or enhance some desired property

NOTE Properties that are commonly modified include: setting time (by use of retarders or accelerators), fluid loss, viscosity, etc.

3.2**Bearden unit of consistency** **B_c**

measure of the consistency of a cement slurry when determined on a pressurized consistometer

3.3**bulk density**

mass per unit volume of a dry material containing entrained air

3.4**cement****Portland cement**

ground clinker generally consisting of hydraulic calcium silicates and aluminates and usually containing one or more forms of calcium sulfate as an interground additive

3.5**cement class**

designation achieved using the ISO system of classification of well cement according to its intended use

3.6**cement grade**

designation achieved using the ISO system for denoting the sulfate resistance of a particular cement

3.7**cement blend**

mixture of dry cement and other dry materials

3.8**clinker**

fused materials from the kiln in cement manufacturing that are interground with calcium sulfate to make cement

3.9**compressive strength**

force per unit area required to crush a set cement sample

3.10**consistometer**

device used to measure the thickening time of a cement slurry under temperature and pressure

3.11**filtrate**

liquid that is forced out of a cement slurry during a fluid loss test

3.12**free fluid**

coloured or colourless liquid which has separated from a cement slurry

3.13**neat cement slurry**

cement slurry consisting of only cement and water

3.14**pressure vessel**

vessel in a consistometer into which the slurry container is placed for the thickening time test

3.15**slurry container****slurry cup**

container in a pressurized consistometer used to hold the slurry for conditioning purposes or for the thickening time test

3.16**thickening time**

time for a cement slurry to develop a selected B_c

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NOTE The results of a thickening time test provide an indication of the length of time a cement slurry will remain pumpable under the test conditions.

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4 Requirements**4.1 Specification, chemical and physical requirements****4.1.1 Classes and grades**

Well cement shall be specified using the following Classes (A, B, C, D, E, F, G and H) and Grades (O, MSR and HSR).

A processing additive or set-modifying agent shall not prevent a well cement from performing its intended functions.

a) Class A

The product obtained by grinding Portland cement clinker, consisting essentially of hydraulic calcium silicates, usually containing one or more forms of calcium sulfate as an interground additive. At the option of the manufacturer, processing additives may be used in the manufacture of Class A cement, provided such materials in the amounts used have been shown to meet the requirements of ASTM C 465.

This product is intended for use when special properties are not required. Available only in ordinary (O) Grade (similar to ASTM C 150, Type I).

b) Class B

The product obtained by grinding Portland cement clinker, consisting essentially of hydraulic calcium silicates, usually containing one or more forms of calcium sulfate as an interground additive. At the option of the