

# **SLOVENSKI STANDARD**

## **SIST EN ISO 10426-2:2004**

**01-maj-2004**

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**Industrija za predelavo nafte in zemeljskega plina – Cementi in materiali za cementiranje vrtin – 2. del: Preskušanje cementov za vrtine (ISO 10426-2:2003)**

Petroleum and natural gas industries - Cements and materials for well cementing - Part 2: Testing of well cements (ISO 10426-2:2003)

Erdöl- und Erdgasindustrie - Zement Bohrlochmaterialien - Teil 2: Prüfempfehlungen für Bohrloch-Zemente (ISO 10426-2:2003)

Industries du pétrole et du gaz naturel - Ciments et matériaux pour la cimentation des puits - Partie 2: Essais de ciments pour puits (ISO 10426-2:2003)

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**Ta slovenski standard je istoveten z: EN ISO 10426-2:2003**

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**ICS:**

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

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**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**EN ISO 10426-2**

October 2003

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English version

**Petroleum and natural gas industries - Cements and materials  
for well cementing - Part 2: Testing of well cements (ISO 10426-  
2:2003)**

Industries du pétrole et du gaz naturel - Ciments et  
matériaux pour la cimentation des puits - Partie 2: Essais  
de ciments pour puits (ISO 10426-2:2003)

This European Standard was approved by CEN on 1 October 2003.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

**EN ISO 10426-2:2003 (E)****Foreword**

This document (EN ISO 10426-2:2003) 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 April 2004, and conflicting national standards shall be withdrawn at the latest by April 2004.

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**NOTE FROM CMC** The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

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# INTERNATIONAL STANDARD

**ISO**  
**10426-2**

First edition  
2003-10-15

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

### **Part 2: Testing of well cements**

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*Industries du pétrole et du gaz naturel — Ciments et matériaux pour la  
cimentation des puits —*

*Partie 2: Essais de ciment pour puits*

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Reference number  
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## ISO 10426-2:2003(E)

## 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 2.

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 10426-2 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*.

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* [SIST EN ISO 10426-2:2004  
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- *Part 2: Testing of well cements*
- *Part 3: Testing of deepwater well cement formulations*
- *Part 4: Preparation and testing of foamed cement slurries at atmospheric pressure*

The following part is under preparation:

- *Part 5: Determination of shrinkage and expansion of well cement formulations at atmospheric pressure*

## Introduction

This part of ISO 10426 is based on API RP 10B, 22nd edition, December 1997, addendum 1, October 1999.

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, US Customary units are included in brackets for information.

Well cement classes and grades are defined in ISO 10426-1.

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

## Part 2: Testing of well cements

### 1 Scope

This part of ISO 10426 specifies requirements and gives recommendations for the testing of cement slurries and related materials under simulated well conditions.

### 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 10414-1, *Petroleum and natural gas industries — Field testing of drilling fluids — Part 1: Water-based fluids*

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API RP 13J, *Testing of heavy brines (second edition)*, March 1996

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

ASTM C 188, *Standard test method for density of hydraulic cement*

### 3 Terms, definitions and symbols

#### 3.1 Terms and definitions

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

##### 3.1.1

##### **absolute volume**

reciprocal of absolute density

NOTE It is expressed as volume per unit mass.

##### 3.1.2

##### **additive**

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

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

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## 3.1.3

**annulus**

space surrounding the pipe in the wellbore

NOTE The outer wall of the annular space may be either surface or casing

## 3.1.4

**assumed surface temperature**

$T_{AS}$

assumed temperature at surface used for calculating a pseudo-temperature gradient

## 3.1.5

**batch mixing**

process of mixing and holding a volume of cement slurry prior to placement in the wellbore

## 3.1.6

**Bearden units of consistency**

units used to express consistency of a cement slurry when determined on a pressurized consistometer

NOTE The symbol for consistency when expressed in Bearden units is  $B_c$ .

## 3.1.7

**blowout**

point in time at which nitrogen flows through the sample in a fluid loss test

## 3.1.8

**bulk density**

mass per unit volume of a dry material containing entrained air

## 3.1.9

**casing cementing**

complete or partial annular cementing of a full casing string

## 3.1.10

**cement****Portland cement**

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

NOTE 1 Hydraulic calcium silicates and aluminates are those which harden under water.

NOTE 2 Interground additions are added before grinding, rather than after grinding.

## 3.1.11

**cement class****cement type**

designation achieved using the ISO system of classifications of well cement in accordance with its intended use

NOTE See ISO 10426-1 for further information.

## 3.1.12

**cement grade**

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

NOTE See ISO 10426-1 for further information.

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**3.1.13****cement blend**

mixture of dry cement and other dry materials

**3.1.14****clinker**

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

**3.1.15****compatibility**

capacity to form a fluid mixture that does not undergo undesirable chemical and/or physical reactions

**3.1.16****compressive strength**

strength of a set cement sample measured by the force required to crush it

NOTE It is expressed as force per unit area.

**3.1.17****consistometer**

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

**3.1.18****continuous-pumping squeeze-cementing operation**

squeeze-cementing operation that does not involve cessation of pumping

**3.1.19****equivalent sack**

mass of the blend of Portland cement and fly ash or pozzolan that has the same absolute volume as 42,63 kg (94 lbs) of Portland cement

**3.1.20****filtrate**

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

**3.1.21****fly ash**

powdered residue from the combustion of coal having pozzolanic properties

NOTE See Clause 17 for further description.

**3.1.22****free fluid**

coloured or colourless liquid which has separated from a cement slurry

**3.1.23****freeze-thaw cycle**

test involving a cement sample that is alternately exposed to temperatures above and below the freezing point of water

**3.1.24****hesitation-pumping squeeze-cementing operation**

squeeze-cementing operation that incorporates discontinuous pumping of the cement slurry

NOTE The slurry is placed into the well, the pumps are stopped for some period of time, then a volume of slurry is again pumped. The process is repeated until a predetermined pressure is reached or the volume of cement slurry has been completely pumped.