SLOVENSKI STANDARD
SIST EN ISO 20312:2011

01-december-2011

Industrija nafte in zemeljskega plina - Načrtovanje in omejitve uporabe vrtalnih nizov s sestavnimi deli iz aluminijevih zlitin (ISO 20312:2011)

Petroleum and natural gas industries - Design and operating limits of drill strings with aluminium alloy components (ISO 20312:2011)

Erdöl- und Erdgasindustrie - Empfohlenes Verfahren für die Auslegung und die Einsatzgrenzen von Bohrsträngen aus Aluminium-Bohrgestängen (ISO 20312:2011)

Industries du pétrole et du gaz naturel - Conception et limites d'exploitation des trains de tiges de forage ayant des composants en alliage d'aluminium (ISO 20312:2011)

Ta slovenski standard je istoveten z: **EN ISO 20312:2011**

ICS:

75.180.10	Oprema za raziskovanje in odkopavanje	Exploratory and extraction equipment
77.150.10	Aluminijski izdelki	Aluminium products

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 20312

October 2011

ICS 75.180.10

English Version

Petroleum and natural gas industries - Design and operating limits of drill strings with aluminium alloy components (ISO 20312:2011)

Industries du pétrole et du gaz naturel - Conception et limites de fonctionnement des garnitures de forage en alliage d'aluminium (ISO 20312:2011)

Erdöl- und Erdgasindustrie - Auslegung und Einsatzgrenzen von Bohrsträngen aus Aluminium-Bohrgestängen (ISO 20312:2011)

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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (EN ISO 20312:2011) has been prepared by Technical Committee ISO/TC 67 "Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries" in collaboration with 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of an identical text or by endorsement, at the latest by April 2012, and conflicting national standards shall be withdrawn at the latest by April 2012.

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Endorsement notice

The text of ISO 20312:2011 has been approved by CEN as a EN ISO 20312:2011 without any modification.

INTERNATIONAL STANDARD

ISO 20312

First edition
2011-10-15

Petroleum and natural gas industries — Design and operating limits of drill strings with aluminium alloy components

Industries du pétrole et du gaz naturel — Conception et limites de fonctionnement des garnitures de forage en alliage d'aluminium

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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ISO 20312 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*.

Introduction

The function of this International Standard is to define operating limits of aluminium drill pipes and recommend design criteria for the drill stem containing such aluminium drill pipes. This International Standard contains formulas and figures to aid in the design and selection of equipment to meet a specific drilling condition.

In this International Standard, data are expressed in the International System of units (SI).

Users of this International Standard need to be aware that further or differing requirements could be needed for individual applications. This International Standard is not intended to inhibit a manufacturer from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application, particularly where there is innovative or developing technology. Where an alternative is offered, the manufacturer will need to identify any variations from this International Standard and provide details.

This International Standard includes provisions of various nature. These are identified by the use of certain verbal forms:

— “shall” is used to indicate that a provision is mandatory;

— “should” is used to indicate that a provision is not mandatory, but recommended as good practice;

— “may” is used to indicate that a provision is optional.

Petroleum and natural gas industries — Design and operating limits of drill strings with aluminium alloy components

1 Scope

This International Standard applies to design and operating limits for drill strings containing aluminium alloy pipes manufactured in accordance with ISO 15546.

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 9712, *Non-destructive testing — Qualification and certification of personnel*

ISO 15546, *Petroleum and natural gas industries — Aluminium alloy drill pipe*

ASNT Recommended Practice No. SNT-TC-1A, *Personnel Qualification and Certification in Non-destructive Testing*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

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

3.1.1
aluminium alloy pipe body
aluminium alloy pipe formed by extrusion, including upsets and protector thickening

3.1.2
aluminium alloy drill pipe
aluminium alloy pipe body with threaded steel tool joints

3.1.3
box
tool joint part that has internal tool-joint thread

3.1.4
buckling
unstable lateral deflection of a drill stem component under compressive effective axial force

3.1.5
corrosion
adverse chemical alteration or destruction of a metal by air, moisture or chemicals

3.1.6
critical buckling load
load level associated with initiation of drill stem components buckling

3.1.7
dogleg
sharp change of direction in a well bore

3.1.8
dogleg severity
measure of the amount of change in the inclination and/or direction of a borehole, usually expressed in degrees per 30 m interval

3.1.9
drill string
complete assembly from the swivel or top drive to the drill bit, which can contain the kelly, drill pipes, subs, drill collars and other bottom hole assembly (BHA) members, such as stabilizers, reamers and junk baskets

3.1.10
effective axial force
force created by adverse combinations of axial load and pressure

3.1.11
helical buckling
buckling in which drill stem components form a helix or spiral shape

3.1.12
manufacturer
firm, company or corporation responsible for marking the product

NOTE Marking by the manufacturer warrants that the product conforms to this International Standard, and it is the manufacturer who is responsible for compliance with all of its applicable provisions.

3.1.13
new class pipe
wear-based classification of pipe not having been put in service

3.1.14
pin
tool joint part that has external tool-joint thread

3.1.15
premium class, class 2 pipe
wear-based classification of pipe worn to an extent listed in Tables 12 and 13

3.1.16
sinusoidal buckling
buckling of drill stem components in a sinusoidal shape

3.1.17
slip area
area within a small distance along the pipe body from the box end, clamped by the pipe slips during the pulling and running operations

3.1.18
tool joint
steel tool joint element for drill pipes consisting of two parts (pin and box)

3.1.19
TT type thread
trapezoidal-shaped thread connecting aluminium pipe body and steel joint

NOTE See ISO 15546.

3.2 Symbols

A	factor depending on the failure theory selected for calculations and adjusted for anisotropy of drill pipe material
A_b	box cross-sectional area at 9,525 mm from the bearing face
A_{dp}	drill pipe cross-sectional area
A_{OD}	cross-sectional area circumscribed by pipe outside diameter
A_p	pin cross-sectional area at 15,875 mm from the bearing face
A_{pb}	cross-sectional area of pin A_p or box A_b, whichever is smaller
A_z	cross-sectional area of drill pipe in upset part
a_e	coefficient of linear expansion of material
a_w	cross-sectional area of pipe wall with regard to pipe ovality
B	variable
b	strain reduction factor
C	pitch diameter of thread at gauge point
c	area coverage coefficient
D_{dp}	pipe body outside diameter
D_h	average diameter of the borehole at the regarded interval
D_{max}	maximum outside diameter of pipe
D_{min}	minimum outside diameter
D_{pt}	protector outside diameter
D_{tj}	tool joint outside diameter
D_U	outside diameter of drill pipe in upset part
$\overline{D}$	conventional outside diameter of drilling pipe with tool joint
d_{dp}	pipe body inside diameter
d_p	pin inside diameter