

**DIN EN ISO 14310**

ICS 75.180.10

Ersatz für  
DIN EN ISO 14310:2003-10**Erdöl- und Erdgasindustrie –  
Bohrloch-Ausrüstung –  
Packer und Brückenstopfen (ISO 14310:2008);  
Englische Fassung EN ISO 14310:2008**

Petroleum and natural gas industries –  
Downhole equipment –  
Packers and bridge plugs (ISO 14310:2008);  
English version EN ISO 14310:2008

Industries du pétrole et du gaz naturel –  
Équipement de fond de trou –  
Garnitures d'étanchéité (packers) et bouchons mécaniques d'isolation de fond  
(ISO 14310:2008);  
Version anglaise EN ISO 14310:2008

Gesamtumfang 33 Seiten

Normenausschuss Erdöl- und Erdgasgewinnung (NÖG) im DIN

## Nationales Vorwort

Dieses Dokument (EN ISO 14310:2008) wurde vom Technischen Komitee ISO/TC 67 „Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries“ in Zusammenarbeit mit dem Technischen Komitee CEN/TC 12 „Materialien, Ausrüstungen und Offshore-Bauwerke für die Erdöl-, petrochemische und Erdgasindustrie“ erarbeitet, dessen Sekretariat von AFNOR gehalten wird.

Für Deutschland hat hieran der Arbeitskreis NA 109-00-01 AK 4 „Bohr- und Fördereinrichtungen“ im Normenausschuss Erdöl- und Erdgasgewinnung (NÖG) mitgearbeitet.

Diese Europäische Norm enthält unter Berücksichtigung des DIN-Präsidialbeschlusses 1/2004 nur die englische Originalfassung der ISO-Norm.

Diese Europäische Norm enthält neben den gesetzlichen Einheiten auch die Einheiten „ft“, „in (inch)“, „lb“ und „psi“, die im Deutschen Normenwerk nicht zugelassen sind. Es wird jedoch ausdrücklich darauf hingewiesen, dass die Anwendung dieser Einheiten im nationalen amtlichen und geschäftlichen Verkehr aufgrund des Gesetzes über Einheiten im Messwesen nicht zulässig ist.

### Umrechnung:

| Nicht-SI-Einheit | SI-Einheit | Umrechnung             |
|------------------|------------|------------------------|
| ft               | m          | 1 ft = 0,304 8 m       |
| in (inch)        | mm         | 1 inch = 25,4 mm       |
| lb               | kg         | 1 lb = 0,453 592 37 kg |
| psi              | Pa         | 1 psi = 6 894,757 Pa   |

### Änderungen

Gegenüber DIN EN ISO 14310:2003-10 wurden folgende Änderungen vorgenommen:

- a) neuer Abschnitt 6.7 „Skalierung der Auslegungsgültigkeit“ eingefügt;
- b) neuer Abschnitt 6.9 „Verifizierung der Baugruppe“ eingefügt;
- c) neuer Abschnitt 9 „Verschiffung/Lagerung“ aufgenommen;
- d) Anhang A ersatzlos gestrichen.

### Frühere Ausgaben

DIN EN ISO 14310: 2003-10

English Version

Petroleum and natural gas industries —  
Downhole equipment —  
Packers and bridge plugs  
(ISO 14310:2008)

Industries du pétrole et du gaz naturel —  
Équipement de fond de trou —  
Garnitures d'étanchéité (packers) et bouchons mécaniques  
d'isolation de fond  
(ISO 14310:2008)

Erdöl- und Erdgasindustrie —  
Bohrloch-Ausrüstung —  
Packer und Brückenstopfen  
(ISO 14310:2008)

This European Standard was approved by CEN on 12 October 2008.

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 CEN 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 CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

## Contents

Page

|                                                    |    |
|----------------------------------------------------|----|
| Foreword.....                                      | 3  |
| Introduction .....                                 | 4  |
| 1 Scope .....                                      | 5  |
| 2 Normative references .....                       | 5  |
| 3 Terms and definitions .....                      | 5  |
| 4 Symbols and abbreviated terms .....              | 9  |
| 5 Functional specification.....                    | 9  |
| 5.1 General.....                                   | 9  |
| 5.2 Type description .....                         | 9  |
| 5.3 Well parameters .....                          | 9  |
| 5.4 Operational parameters .....                   | 10 |
| 5.5 Environmental compatibility.....               | 10 |
| 5.6 Compatibility with related well equipment..... | 11 |
| 5.7 Design validation .....                        | 11 |
| 5.8 Quality control.....                           | 11 |
| 6 Technical specification .....                    | 11 |
| 6.1 General.....                                   | 11 |
| 6.2 Technical characteristics.....                 | 11 |
| 6.3 Design requirements .....                      | 12 |
| 6.4 Design verification.....                       | 15 |
| 6.5 Design validation requirements .....           | 15 |
| 6.6 Design changes .....                           | 21 |
| 6.7 Design validation by scaling .....             | 21 |
| 6.8 Other validations.....                         | 22 |
| 6.9 Assembly verification.....                     | 22 |
| 7 Supplier's/manufacturer's requirements.....      | 22 |
| 7.1 General.....                                   | 22 |
| 7.2 Documentation and data control.....            | 22 |
| 7.3 Product identification.....                    | 24 |
| 7.4 Quality control.....                           | 24 |
| 8 Repair.....                                      | 30 |
| 9 Shipment/storage.....                            | 30 |
| Bibliography.....                                  | 31 |

## **Foreword**

This document (EN ISO 14310:2008) 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, 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 14310:2001.

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

### **Endorsement notice**

The text of ISO 14310:2008 has been approved by CEN as a EN ISO 14310:2008 without any modification.

## **Introduction**

This International Standard has been developed by users/purchasers and suppliers/manufacturers of packers and bridge plugs and is intended for use in the petroleum and natural gas industry worldwide. This International Standard is intended to give requirements and information to both parties in the selection, manufacture, testing and use of packers and bridge plugs. Further, this International Standard addresses supplier/manufacture requirements that set the minimum requirements with which it is necessary that suppliers/manufacturers comply to claim conformity with this International Standard.

This International Standard has been structured to allow for grades of increased requirements both in quality control and design validation. These variations allow the user/purchaser to select the grade required for a specific application.

The three quality grades provide the user/purchaser with a choice of requirements to meet a specific preference or application. Quality grade Q3 is the minimum grade of quality offered by this product standard. Quality grade Q2 provides additional inspection and verification steps, and quality grade Q1 is the highest grade provided. Additional quality requirements can be specified by the user/purchaser as supplemental requirements.

Seven standard design-validation grades (V0 to V6) provide the user/purchaser with a choice of requirements to meet a specific preference or application. Design validation grade V6 is the minimum grade and represents equipment where the validation method has been defined by the supplier/manufacture. The complexity and severity of the validation testing increases as the grade number decreases.

It is necessary that users of this International Standard be aware that requirements above those outlined in this International Standard can be needed for individual applications. This International Standard is not intended to inhibit a supplier/manufacture from offering, or the user/purchaser from accepting, alternative equipment or engineering solutions. This can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is necessary that the supplier/manufacture identify any variations from this International Standard.

## 1 Scope

This International Standard provides requirements and guidelines for packers and bridge plugs as defined herein for use in the petroleum and natural gas industry. This International Standard provides requirements for the functional specification and technical specification, including design, design verification and validation, materials, documentation and data control, repair, shipment, and storage. In addition, products covered by this International Standard apply only to applications within a conduit. Installation and maintenance of these products are outside the scope of this International Standard.

## 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 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 3601-1, *Fluid power systems — O-rings — Part 1: Inside diameters, cross-sections, tolerances and designation codes*

ISO 3601-3, *Fluid power systems — O-rings — Part 3: Quality acceptance criteria*

ISO 9000, *Quality management systems — Fundamentals and vocabulary*

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

ISO 11960, *Petroleum and natural gas industries — Steel pipes for use as casing or tubing for wells*

ISO 15156, (all parts), *Petroleum and natural gas industries — Materials for use in H<sub>2</sub>S-containing environments in oil and gas production*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000 and the following apply.

### 3.1

#### **assembly**

product comprised of more than one component

### 3.2

#### **bridge plug**

mechanical device installed in, and used for blocking fluid (liquid or gas) communication in, the conduit and not installed in a designed receptacle

### 3.3

#### **casing**

pipe extending from the surface and intended to line the walls of a drilled well

### 3.4

#### **casing size**

nominal casing outside diameter (OD) as specified in ISO 11960

### 3.5

#### **component**

individual part of an assembly

### 3.6

#### **conduit**

casing, tubing or liner, either metallic or non-metallic

### 3.7

#### **design validation**

process of proving a design by testing to demonstrate conformity of the product to design requirements

NOTE Seven standard design validation grades (V6 to V0) are specified in 6.5.

[ISO/TS 29001]

### 3.8

#### **design verification**

process of examining the result of a given design or development activity to determine conformity with specified requirements

NOTE These activities are described in 6.4.

[ISO/TS 29001]

### 3.9

#### **drift diameter**

minimum inside diameter (ID) of a packer, expressed as the OD of the drift bar utilized during assembly inspection, as outlined in 7.4.11

### 3.10

#### **end connection**

thread or other mechanism connecting the packer or bridge plug to the conduit

### 3.11

#### **exposed component**

**flow-wetted component** (3.13), **internally wetted component** (3.18), and/or component contacted by well fluid below the packing element

### 3.12

#### **extrusion gap**

radial gap between the maximum rated casing ID and the minimum OD immediately adjacent to the packing element

### 3.13

#### **flow-wetted component**

**component** (3.5) that comes in direct contact with the dynamic movement of well fluids in the flow stream

### 3.14

#### **gauge OD**

maximum specified product OD

### 3.15

#### **grade**

category or rank given to different requirements for quality or design validation

### 3.16

#### **heat-traceable**

traceable to a unique heat treatment (heat) of material

**3.17**

**inflatable packing element**

packer or bridge plug packing element energized to form a seal by applying fluid pressure directly to the element

**3.18**

**internally wetted component**

**flow-wetted component** (3.13) and any component out of the flow stream, but contacted by well fluids through a port or other passage to the flow-wetted area

**3.19**

**job lot**

batch of material or components that have undergone the same process or series of processes

**3.20**

**job-lot traceable**

⟨parts⟩ identifiable as originating from a job lot that designates the included heat(s)

**3.21**

**liner**

pipe that does not extend from the surface and is intended to line the walls of a drilled well

**3.22**

**mandrel**

component(s) of a packer that contain(s) the end connections and provide(s) a conduit through the packer

**3.23**

**manufacturing**

process and actions performed by an equipment supplier/manufacture that are necessary to provide finished component(s), assemblies and related documentation that fulfil the requests of the user/purchaser and meet the standards of the supplier/manufacture

NOTE Manufacturing begins when the supplier/manufacture receives the order and is completed at the moment the component(s), assemblies and related documentation are surrendered to a transportation provider.

**3.24**

**NACE service**

packers or bridge plugs whose **type 1 components** (3.41) are manufactured from materials that comply with ISO 15156 (all parts)

**3.25**

**non-conformance**

non-fulfilment of a specified requirement

**3.26**

**packer**

mechanical device with a **packing element** (3.27), not installed in a designed receptacle, used for blocking fluid (liquid or gas) communication through the annular space between conduits by sealing off the space between them

**3.27**

**packing element**

seal on a **packer** (3.26) or **bridge plug** (3.2) that blocks fluid communication by sealing on the ID of the conduit

**3.28**

**performance envelope**

graph that illustrates the combined effects of differential pressure and axial loads on a packer or bridge plug at the rated temperature

**3.29**

**permanent packer**

**permanent bridge plug**

**bridge plug** (3.2) or **packer** (3.26) that has no design feature for intact removal from the conduit, necessitating substantial destruction for its removal

**3.30**

**pressure reversal**

change in the direction of the pressure differential across the packing element from above to below or vice versa

**3.31**

**qualified person**

individual with characteristics or abilities gained through training or experience, or both, as measured against established requirements, such as standards or tests that enable the individual to perform a required function effectively

**3.32**

**repositionable packer**

**repositionable bridge plug**

**bridge plug** (3.2) or **packer** (3.26) that meets the definition of **retrievable packer** (**retrievable bridge plug**) (3.33) and has a design feature facilitating its relocation inside the conduit (without removal) while re-establishing its intended function

**3.33**

**retrievable packer**

**retrievable bridge plug**

**bridge plug** (3.2) or **packer** (3.26) that has a design feature facilitating its removal from the conduit substantially intact

**3.34**

**seal**

device providing a barrier to the passage of liquid and/or gas

**3.35**

**shear device**

component designed to disconnect under a predetermined load

**3.36**

**standard service**

**packer** (3.26) or **bridge plug** (3.2) whose components might or might not be manufactured from materials that comply with ISO 15156 (all parts)

**3.37**

**substantive design change**

change to the design, identified by the supplier/manufacturer, that affects the performance of the product in the intended service condition

**3.38**

**temperature-cycle range**

specified range of temperature fluctuation over which the product is designed to operate

NOTE The temperature-cycle range is applicable anywhere within the product's temperature range.

**3.39**

**temperature range**

specified range of temperature over which the product is designed to operate