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Erdöl-, petrochemische und Erdgasindustrie – Nichtmetallische Werkstoffe mit Medienkontakt bei der Öl- und Gasproduktion – Teil 1: Thermoplaste (ISO 23936-1:2009); Englische Fassung EN ISO 23936-1:2009

Petroleum, petrochemical and natural gas industries –
Non-metallic materials in contact with media related to oil and gas production –
Part 1: Thermoplastics (ISO 23936-1:2009);
English version EN ISO 23936-1:2009

Industries du pétrole, de la pétrochimie et du gaz naturel –
Matériaux non-métalliques en contact avec les fluides relatifs à la production d'huile et de gaz –
Partie 1: Matières thermoplastiques (ISO 23936-1:2009);
Version anglaise EN ISO 23936-1:2009

Gesamtumfang 36 Seiten

Normenausschuss Erdöl- und Erdgasgewinnung (NÖG) im DIN

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Nationales Vorwort

Dieses Dokument (EN ISO 23936-1:2009) 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 Arbeitsausschuss NA 109-00-01 AA „Materialien, Ausrüstungen und Offshore-Bauwerke für die Erdöl-, petrochemische und Erdgasindustrie" - 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.

Folgende Begriffe werden in der Norm verwendet:

3.1 Begriffe

3.1.1
Batch
diskontinuierlich hergestellte Menge an thermoplastischen Werkstoffen

3.1.2
Übereinstimmungszertifikat (Inspektionsdokument)
〈Prüf-〉Bescheinigung, die vom Hersteller entsprechend den in der vorliegenden Norm oder in der Bestellung angegeben Anforderungen herausgegeben werden muss

3.1.3
Endanwender
Öl- und/oder Gasunternehmen (operativer Betrieb)

3.1.4
Fluid
Flüssigkeit oder Gas

3.1.5
Dichtring
in eine Verbindung gepresstes Bauteil zum Abdichten

3.1.6
Liner
thermoplastischer Werkstoff zum Schutz von medienberührten Oberflächen von Rohren, Verrohrungen, Rohrleitungen oder Ausrüstungen

3.1.7
Charge
Teil eines Batches oder Teil einer diskontinuierlich hergestellten Menge an thermoplastischen Werkstoffen

3.1.8
Chargenzertifikat
durch den Hersteller herausgegebenes Analysenzertifikat

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3.1.9
Hersteller
Produzent des thermoplastischen Werkstoffes oder von Halbzeugen, die aus thermoplastischen Werkstoffen gefertigt sind

3.1.10
Werkstoffspezifikation
Beschreibung der Eigenschaften und Prüfanforderungen für thermoplastische Werkstoffe

3.1.11
Betriebstemperatur
Temperatur, der ein Bauteil während des Normalbetriebs ausgesetzt ist

3.1.12
höchste Betriebstemperatur
höchste Temperatur, der ein Bauteil ausgesetzt ist, einschließlich der Abweichungen vom Normalbetrieb, beispielsweise Anfahren/Herunterfahren

3.1.13
niedrigste Betriebstemperatur
niedrigste Temperatur, der ein Bauteil ausgesetzt ist, einschließlich der Abweichungen vom Normalbetrieb, beispielsweise Anfahren/Herunterfahren

3.1.14
Rohrleitung
die Einrichtungen, durch die Fluide oder Gase transportiert werden, einschließlich Rohre, Molchschleusen, Bauteile und Zubehör bis zu Absperrarmaturen

ANMERKUNG Angepasst nach ISO 13623 13623:2000, Definition 3.12.

3.1.15
Verrohrung
Rohr oder Rohrsystem für den Transport von Flüssigkeiten und Gasen

ANMERKUNG 1 Ein Rohrsystem kann unter der Voraussetzung, dass es Substanzen transportiert, die die gleichen Merkmale besitzen und das als Ganzes für den gleichen zulässigen Druck ausgelegt ist, als ein einzelnes System angesehen werden.

ANMERKUNG 2 Die Unterbrechung durch unterschiedliche Bauteile, wie z. B. Pumpen, Maschinen, Behälter usw., schließt nicht die Integration in ein einzelnes Rohrsystem aus.

3.1.16
Dichtung
verformbare polymere Vorrichtung, die dafür ausgelegt ist, unterschiedliche Umgebungen voneinander abzutrennen

3.1.17
Expandieren
Zunahme des Volumens aufgrund der Absorption von Fluiden

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3.1.18
Thermoplaste
Kunststoffe, die innerhalb eines typischen Temperaturbereiches wiederholt in der Wärme erweichen, beim Abkühlen erhärten, und im erweichten Zustand wiederholt durch Fließen als Formteil, Extrudat oder Uniformteil zu Gegenständen formbar sind

[ISO 15750-3:2002]

3.1.19
Unterlegscheibe
flache Platte aus einem bestimmten Werkstoff mit einem mittig angeordneten Loch, wird unter anderem für die Auflage von Schraubenköpfen und -muttern verwendet

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Industries du pétrole, de la pétrochimie et du gaz naturel — Matériaux non-métalliques en contact avec les fluides relatifs à la production d'huile et de gaz — Partie 1: Matières thermoplastiques (ISO 23936-1:2009)

Erdöl-, petrochemische und Erdgasindustrie — Nichtmetallische Werkstoffe mit Medienkontakt bei der Öl- und Gasproduktion — Teil 1: Thermoplaste (ISO 23936-1:2009)

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Foreword

This document (EN ISO 23936-1:2009) 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 October 2009, and conflicting national standards shall be withdrawn at the latest by October 2009.

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Introduction

Non-metallic materials are used in the petroleum and natural gas industries for pipelines, piping, liners, seals, gaskets and washers, among others. Specifically, the use of piping and liners will considerably increase in the future. The purpose of ISO 23936 is to establish requirements and guidelines for systematic and effective planning, for the reliable use of non-metallic materials to achieve cost effective technical solutions, taking into account possible constraints due to safety and/or environmental issues.

ISO 23936 will be of benefit to a broad industry group ranging from operators and suppliers to engineers and authorities. It covers relevant generic types of non-metallic material (thermoplastics, elastomers, thermosetting plastics) and includes the widest range of existing technical experience. This is particularly important because the subject has not been summarized before in a technical standard. Coatings are excluded from the scope of ISO 23936.

ISO 23936 was initiated during work on ISO 15156-1, ISO 15156-2 and ISO 15156-3, which give the requirements and recommendations for the selection and qualification of low-alloy steels, corrosion-resistant alloys and other alloys for service in equipment used in environments containing H_2S in oil and natural gas production and natural gas treatment plants, where failure of such materials could pose a risk to the health and safety of the public and personnel or to the environment. A fourth part of ISO 15156 was originally envisaged to cover, likewise, the selection and qualification of non-metallic materials in the same environment. However, at a later stage it was decided that due to the differences in the corrosion mechanisms of metallic and non-metallic materials it would be too limiting to solely consider hydrogen sulfide as the corrosive component for non-metallic materials, because in oil and gas production services other systems parameters must also be considered as being corrosive and deteriorating for non-metallic materials.

It was therefore decided to produce a stand-alone International Standard, covering all systems parameters that are considered relevant in the petroleum and natural gas industries to the avoidance of corrosion damages to non-metallic equipment. ISO 23936 supplements, but does not replace, the materials requirements of the appropriate design codes, standards or regulations.

ISO 23936 applies to the qualification and selection of materials for equipment designed and constructed using conventional design criteria for technical application of non-metallic materials. Designs utilizing other criteria are excluded from its scope. ISO 23936 is not necessarily suitable for application to equipment used in refining or downstream processes and equipment.

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CAUTION — Non-metallic materials selected using the parts of ISO 23936 are resistant to the given environments in the petroleum and natural gas industries, but not necessarily immune under all service conditions. ISO 23936 allocates responsibility for suitability for the intended service in all cases to the equipment user.

1 Scope

ISO 23936 as a whole presents general principles and gives requirements and recommendations for the selection and qualification, and gives guidance for the quality assurance, of non-metallic materials for service in equipment used in oil and gas production environments, where the failure of such equipment could pose a risk to the health and safety of the public and personnel or to the environment. It can be applied to help to avoid costly corrosion failures of the equipment itself. It supplements, but does not replace, the material requirements given in the appropriate design codes, standards or regulations.

This part of ISO 23936 addresses the resistance of thermoplastics to the deterioration in properties that can be caused by physical or chemical interaction with produced and injected oil and gas-field media, and with production and chemical treatment. Interaction with sunlight is included; however, ionizing radiation is excluded from the scope of this part of ISO 23936.

Furthermore, this part of ISO 23936 is not necessarily suitable for application to equipment used in refining or downstream processes and equipment.

The equipment considered includes, but is not limited to, non-metallic pipelines, piping, liners, seals, gaskets and washers.

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 178, *Plastics — Determination of flexural properties*

ISO 179-1, *Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test*

ISO 306, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)*

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 1183-2, *Plastics — Methods for determining the density of non-cellular plastics — Part 2: Density gradient column method*

ISO 2578, *Plastics — Determination of time-temperature limits after prolonged exposure to heat*

ISO 11357-6, *Plastics — Differential scanning calorimetry (DSC) — Part 6: Determination of oxidation induction time (isothermal OIT) and oxidation induction temperature (dynamic OIT)*

ISO 15156–1, *Petroleum and natural gas industries — Materials for use in H_2S-containing environments in oil and gas production — Part 1: General principles for selection of cracking-resistant materials*

ISO 15156–2, *Petroleum and natural gas industries — Materials for use in H_2S-containing environments in oil and gas production — Part 2: Cracking-resistant carbon and low-alloy steels, and the use of cast irons*

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ISO 15156–3, *Petroleum and natural gas industries — Materials for use in H_2S-containing environments in oil and gas production — Part 3: Cracking-resistant CRAs (corrosion-resistant alloys) and other alloys*

ASTM D638, *Standard Test Method for Tensile Properties of Plastics*

ASTM D746, *Standard Test Method for Brittleness Temperature of Plastics and Elastomers By Impact*

ASTM D792, *Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement*

3 Terms, definitions and abbreviated terms

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

3.1 Terms and definitions

3.1.1
batch
discontinuously manufactured amount of thermoplastic material

3.1.2
certificate of compliance
〈inspection〉 document to be issued by the manufacturer in accordance with requirements stated in this standard or in the purchase order

3.1.3
end user
oil and/or gas operating company

3.1.4
fluid
liquid or gas

3.1.5
gasket
sealing component compressed in a joint

3.1.6
liner
thermoplastic material for protection of medium-contacted surfaces of pipes, piping, pipelines or equipment

3.1.7
lot
part of a batch or part of a continuously manufactured thermoplastic material

3.1.8
lot certificate
certificate of analysis issued by the manufacturer

3.1.9
manufacturer
producer of the thermoplastic material or semi-finished products made from thermoplastic materials

3.1.10
material specification
description of characteristics and test requirements for thermoplastic materials

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3.1.11
operating temperature
temperature to which a component is subjected during normal operation

3.1.12
maximum operating temperature
maximum temperature to which a component is subjected, including deviations from normal operations, such as start-up/shutdown

3.1.13
minimum operating temperature
minimum temperature to which a component is subjected, including deviations from normal operations, such as start-up/shutdown

3.1.14
pipeline
those facilities through which fluids or gases are transported, including pipes, pig traps, components and equipment, including valves

NOTE Adapted from ISO 13623:2000, definition 3.12.

3.1.15
piping
pipe or system of pipes for the transport of fluids and gases

NOTE 1 A piping system can be regarded as one single system provided it conveys substances having the same properties and as a whole is designed for the same allowable pressure.

NOTE 2 Interruption by different components such as pumps, machines, vessels, etc. does not preclude integration into one single piping system.

3.1.16
seal
deformable polymeric device designed to separate different environments

3.1.17
swelling
increase in volume due to absorption of fluids

3.1.18
thermoplastics
plastics that are capable of being repeatedly softened by heating and hardened by cooling through a temperature range characteristic of the plastics and, in the softened state, of being repeatedly shaped by flow into articles by moulding, extrusion or forming

[ISO 15750-3:2002]

3.1.19
washer
flat plate of a material with a centralized hole used to seat bolt heads and nuts, among others

3.2 Abbreviated terms

COC	Certificate of compliance
COA	Certificate of analysis
DSC	Differential scanning calorimetry

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