



SLOVENSKI STANDARD
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Petroleum, petrochemical and natural gas industries - Lubrication, shaft-sealing and control-oil systems and auxiliaries - Part 4: Self-acting gas seal support systems (ISO 10438-4:2003)

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Erdöl-, petrochemische und Erdgasindustrie - Schmieröl-, Sperröl- und Regelölversorgungsanlagen und Hilfsanlagen - Teil 4 - Sperrgasversorgungsanlagen (ISO 10438-4:2004)

Industries du pétrole, de la pétrochimie et du gaz naturel - Systèmes de lubrification, systèmes d'étanchéité, systèmes d'huile de régulation et leurs auxiliaires - Partie 4: Systèmes de soutien pour les étanchéité au gaz auto-actionnées (ISO 10438-4:2003)

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Petroleum, petrochemical and natural gas industries -
Lubrication, shaft-sealing and control-oil systems and auxiliaries
- Part 4: Self-acting gas seal support systems (ISO 10438-
4:2003)

Industries du pétrole, de la pétrochimie et du gaz naturel -
Systèmes de lubrification, systèmes d'étanchéité, systèmes
d'huile de régulation et leurs auxiliaires - Partie 4:
Systèmes de soutien pour les étanchéité au gaz auto-
actionnées (ISO 10438-4:2003)

This European Standard was approved by CEN on 2 December 2003.

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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.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Foreword

This document (EN ISO 10438-4:2003) 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of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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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Endorsement notice

The text of ISO 10438-4:2003 has been approved by CEN as EN ISO 10438-4:2003 without any modifications.

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**Petroleum, petrochemical and natural gas
industries — Lubrication, shaft-sealing
and control-oil systems and auxiliaries —**

**Part 4:
Self-acting gas seal support systems**

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*Industries du pétrole, de la pétrochimie et du gaz naturel — Systèmes
de lubrification, systèmes d'étanchéité, systèmes d'huile de régulation
et leurs auxiliaires*
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*Partie 4: Systèmes de soutien pour les étanchéités au gaz auto-
actionnées* **ISO 10438-4:2004**

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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.

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 10438-4 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for the petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

ISO 10438 consists of the following parts, under the general title *Petroleum, petrochemical and natural gas industries — Lubrication, shaft-sealing and control-oil systems and auxiliaries*:

- Part 1: *General requirements*
- Part 2: *Special-purpose oil systems*
- Part 3: *General-purpose oil systems*
- Part 4: *Self-acting gas seal support systems*

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Introduction

ISO 10438 is based on API Std 614, 4th edn., April 1999, divided into four parts as follows:

- *Part 1: General requirements* is based on Chapter 1 of API Std 614;
- *Part 2: Special-purpose oil systems* is based on Chapter 2 of API Std 614;
- *Part 3: General-purpose oil systems* is based on Chapter 3 of API Std 614;
- *Part 4: Self-acting gas seal support systems* (this part) is based on Chapter 4 of API Std 614.

Users of this part of ISO 10438 should be aware that further or differing requirements might be needed for individual applications. This part of ISO 10438 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 appropriate where there is innovative or developing technology. Where an alternative is offered, the vendor should identify any variations from this part of ISO 10438 and provide details.

This part of ISO 10438 requires the purchaser to specify certain details and features.

A bullet (•) at the beginning of a clause or subclause indicates that either a decision is required or further information is to be provided by the purchaser. This information or decision should be indicated on suitable data sheets; otherwise it should be stated in the quotation request (inquiry) or in the order.

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Petroleum, petrochemical and natural gas industries — Lubrication, shaft-sealing and control-oil systems and auxiliaries —

Part 4: Self-acting gas seal support systems

1 Scope

This part of ISO 10438 specifies requirements for support systems for self-acting gas seals (dry gas seals) as described in ISO 10439, for use in the petroleum, petrochemical and natural gas industries as well as in other industries by agreement. It is intended to be used in conjunction with ISO 10438-1. ISO 10438 in its entirety specifies requirements for lubrication systems, oil-type shaft-sealing systems, self-acting gas seal systems, control-oil systems and other auxiliaries for general- or special-purpose applications. These systems can serve equipment such as compressors, gears, pumps and drivers.

None of the parts of ISO 10438 is applicable to internal combustion engines.

NOTE Annex A provides schemas of typical dry-gas seal support systems.

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 10438-1:2003, *Petroleum, petrochemical and natural gas industries — Lubrication, shaft-sealing and control-oil systems and auxiliaries — Part 1: General requirements*

API RP 520, Parts I and II, *Sizing, selection and installation of pressure-relieving devices in refineries*

API Std 526, *Flanged steel pressure relief valves*

3 Terms, definitions and abbreviated terms

For the purposes of this part of ISO 10438, the terms, definitions and abbreviated terms given in ISO 10438-1 apply.

4 System selection

Annex A provides schemas of typical system components and diagrams of typical complete dry-gas seal support systems and modules. These schemas and diagrams illustrate the general philosophy and requirements of this part of ISO 10438 and are included to assist the purchaser in the selection of an appropriate system. The purchaser and the vendor shall agree upon a mutually acceptable system.

5 Basic design

5.1 The self-acting gas seal support system (including auxiliaries) covered by this part of ISO 10438 shall be designed and constructed for a minimum service life of 20 years and at least 3 years of uninterrupted operation. It is recognized that this is a design criterion.

- **5.2** The purchaser shall specify the vendor responsible for each portion of the design, scope of supply, installation and performance of the gas seal system. If the purchaser is not the end user, then the end user shall approve the vendors specified (see Annex B).
- **5.3** The purchaser shall specify the equipment's normal operating conditions.

5.4 Unless otherwise specified, the lube oil console (when supplied) and the dry-gas seal module shall be separate.

5.5 The dry-gas seal module shall be designed to serve the full range of equipment operating conditions specified. These conditions may include but are not limited to the following:

- a) settling-out pressures;
- b) process relief valve settings;
- c) shop test and field run-ins;
- d) start-up conditions;
- e) gas composition.

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In order to eliminate the possibility of liquid entering the self-acting seal, all gas streams into the seal should be provided at a temperature 20 K above their dew point. For most systems, the discharge temperature of the compressor gas stream provides this dew point margin.

- **5.6** The purchaser shall specify the maximum sealing pressure.
- 5.7** Valved vents, drains and piping shall be furnished to permit draining, cleaning and refilling of idle components while the equipment is in operation.
- **5.8** The purchaser shall specify when and where double block-and-bleed valves are required for isolating a component and how they are to be arranged (for further guidance, see ISO 10438-2:2003, Figure A.23).
- 5.9** Filters, drain traps and other pressure vessels within the scope of the pressure design code shall conform to the code.

5.10 The system shall perform on the test stand and on its permanent foundation within the specified acceptance criteria. After installation, the performance of the system shall be the joint responsibility of the purchaser and the vendor.

- **5.11** The vendor shall advise the purchaser of, and both parties shall mutually agree upon, any special provisions that are necessary to ensure that an adequate supply of seal gas and seal buffer gas or seal separation gas is maintained in the event of complete failure of the seal gas supply system. These provisions may include backup gas bottles and special arrangements for start-up. Provisions shall be adequate for block-in vent or purge situations as applicable. The purchaser will specify the required block-in time. The purchaser and the vendor shall mutually agree upon the system and its components.

NOTE The seal and support system might need to be purged at start-up.

5.12 Block valves which interrupt the gas flow to the equipment shall not be installed in gas supply lines downstream of the filters unless the block valves are part of a component block and bypass arrangement.

6 Piping and tubing

6.1 The vendor shall furnish the dry gas seal module, including mounted appurtenances, located within the confines of the base area. All connections on the module for interconnecting piping to the equipment, shall be flanged.

NOTE This is to keep work areas and walkways as free as possible from obstructions. The intent is to use tubing within the limits of the module such that the module will protect the tubing from external loads.

The interconnecting system between the module and equipment should be rigid pipe. The interconnecting system is provided by the vendor as defined in accordance with 5.2.

6.2 Unless otherwise specified, the piping for each utility, such as for instrument air and nitrogen supply, shall be manifolded to a common connection.

6.3 Unless otherwise specified, self-acting gas seal modules designed for working gauge pressures below 6,2 MPa (62 bar, 900 psi) shall have the gas flow lines manufactured from stainless steel tubing, or stainless steel piping.

6.4 Unless otherwise specified, self-acting gas seal modules with working gauge pressures greater than 6,2 MPa (62 bar, 900 psi) shall have gas flow lines manufactured from stainless steel piping.

6.5 Instrument valves within the self-acting gas seal module on tubing lines shall be tubing valves.

6.6 Control valves shall have steel bodies and stainless steel trim. Valves shall be removable without removing piping or tubing.

7 Gas filters

7.1 General

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7.1.1 The filter element material shall be designed for the maximum process gas temperature and shall be compatible with the process gas.

7.1.2 Unless otherwise specified, filters in flammable or toxic services shall have bolted covers.

7.1.3 Unless otherwise specified, the filter housings shall be stainless steel.

7.2 Particulate filter sizing

7.2.1 For differential pressure control systems, filters shall be sized for a clean pressure drop of 21 kPa (3 psi) at twice the gas flow calculated at maximum labyrinth design clearance and at the design differential pressure.

7.2.2 For flow control systems, filters shall be sized for a clean pressure drop of 1 kPa (4 in of water) at 10 times normal flow. They shall function to a differential of 25 kPa (100 in of water).

7.3 Coalescing filter sizing

When the gas contains liquids or moisture, coalescing filters shall be provided. The coalescing filter shall have an efficiency of 98,7 % on particles greater than 3 μm ($\beta_3 \geq 75$). If the knockout rates exceed 50 % of the coalescing capacity of the element, a mechanical separator shall be installed ahead of the filter assembly.

NOTE It is sometimes advantageous to use filter designs that use the same cartridge in order to avoid having different type cartridges as spare parts. The cost of a possible oversized filter and operation is a consideration with respect to the benefit of standardization.