SLOVENSKI STANDARD
oSIST prEN ISO 10439-4:2010

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Petrokemična industrija ter industrija za predelavo nafte in zemeljskega plina - Aksialni, radialni in ekspanzijski kompresorji - 4. del: Ekspanzijski kompresorji (ISO/DIS 10439-4:2010)

Petroleum, petrochemical and natural gas industries - Axial and centrifugal compressors and expander-compressors - Part 4: Expander-compressors (ISO/DIS 10439-4:2010)

Erdöl-, petrochemische und Erdgasindustrie - Axial- und Radialkompressoren und Expanderkompressoren für Sonderanwendungen zur Handhabung von Gas oder Prozessluft - Teil 4: Expanderkompressoren (ISO/DIS 10439-4:2010)

Industries du pétrole, de la pétrochimie et du gaz naturel - Compresseurs axiaux et centrifuges et compresseurs-détenteurs - Partie 4: Compresseurs-détenteurs (ISO/DIS 10439-4:2010)

Ta slovenski standard je istoveten z: prEN ISO 10439-4

ICS:

23.140	Kompresorji in pnevmatični stroji	Compressors and pneumatic machines
75.180.20	Predelovalna oprema	Processing equipment

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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prEN ISO 10439-4

October 2010

ICS 75.180.20; 71.120.99

Will supersede EN ISO 10439:2002

English Version

Petroleum, petrochemical and natural gas industries - Axial and centrifugal compressors and expander-compressors - Part 4: Expander-compressors (ISO/DIS 10439-4:2010)

Industries du pétrole, de la pétrochimie et du gaz naturel - Compresseurs axiaux et centrifuges et compresseurs-détenteurs - Partie 4: Compresseurs-détenteurs (ISO/DIS 10439-4:2010)

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This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 12.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

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

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Foreword

This document (prEN ISO 10439-4:2010) has been prepared by Technical Committee ISO/TC 118 "Compressors and pneumatic tools, machines and equipment" 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 document is currently submitted to the parallel Enquiry.

This document will supersede EN ISO 10439:2002.

Endorsement notice

The text of ISO/DIS 10439-4:2010 has been approved by CEN as a prEN ISO 10439-4:2010 without any modification.

DRAFT INTERNATIONAL STANDARD ISO/DIS 10439-4

ISO/TC **118**/SC **1** Secretariat: **NEN**

Voting begins on: **2010-10-07** Voting terminates on: **2011-03-07**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors —

Part 4:
Expander-compressors

Industries du pétrole, de la pétrochimie et du gaz naturel — Compresseurs axiaux et centrifuges et compresseurs-détenteurs —

Partie 4: Compresseurs-détenteurs

(Revision in part of ISO 10439:2002)

ICS 71.120.99; 75.180.20

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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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 10439-1 was prepared by Technical Committee ISO/TC 118, *Compressors and pneumatic tools, machines and equipment*, Subcommittee SC 1, *Process compressors*, in collaboration with Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 6, *Processing equipment and systems*.

This second edition cancels and replaces the first edition (ISO 10439:2002), which has been technically revised and split into four (4) parts.
ISO 10439 consists of the following parts, under the general title *Axial and centrifugal compressors and expander-compressors for special purpose applications handling gas of process air for petroleum, petrochemical and natural gas industries:*

Part 1: General requirements

Part 2: Non-integrally geared centrifugal and axial compressors

Part 3: Integrally geared centrifugal compressors

Part 4: Expander-compressors

Introduction

This International Standard is based on the 7th edition of the American Petroleum Institute standard API 617.

Users of this International Standard should be aware that further or differing requirements may be needed for individual applications. This International Standard 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 International Standard and provide details.

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 should be indicated on data sheets or stated in the enquiry or purchase order (see examples in ISO 10439-2 Annex A, ISO 10439-3 Annex A and ISO 10439-4 Annex A).

In this International Standard, where practical, US Customary units are included in parentheses for information.

Petroleum, petrochemical and natural gas industries — Axial and centrifugal compressors and expander-compressors —

Part 4:
Expander-compressors

1 Scope

This International Standard specifies minimum requirements and gives recommendations for axial compressors, single-shaft and integrally geared process centrifugal compressors and expander-compressors for special purpose applications that handle gas or process air in the petroleum, petrochemical and natural gas industries. This part of ISO 10439 specifies requirements for expander-compressors, in addition to the general requirements specified in ISO 10439-1.

This scope covers only expanders and compressors on a common shaft (expander-compressor). This scope does not apply to expanders with separate output shafts (e.g., generator drives). Hot gas expanders over 300 °C (570 °F) are not covered in this standard.

2 Normative References

The following referenced documents are indispensible for the application of this document. For dated references, only the editions cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10439-1:2010, *Petroleum, Petrochemical and natural gas industries – Axial and Centrifugal Compressors and Expander-compressors – Part 1: General requirements*

ISO 10438:2007 (all parts), *Petroleum, petrochemical and natural gas industries – Lubrication, shaft-seating and oil-control systems and auxiliaries.* (identical to API STD 614 5th edition)

3 Terms, Abbreviated terms and Definitions

For the purposes of this document, the terms, abbreviated terms and definitions given in ISO 10439-1 apply.

4 General

4.1 Dimensions and units

The dimensional and unit requirements of ISO 10439-1 shall apply.

4.2 Statutory requirements

The statutory requirements of ISO 10439-1 shall apply.

4.3 Unit responsibility

The unit responsibilities of ISO 10439-1 shall apply

4.4 Basic Design

4.4.1 The expander shall meet at least 98 % of the predicted efficiency at the normal U/C ratio (see 6.3.5.1.1). The compressor shall deliver at least 98 % of the normal head at the normal capacity. The compressor power at the normal condition shall not be more than 106 % of that available from the expander, nor shall it be less than 96 % of that available from the expander.

NOTE Compressor-loaded expanders achieve a power balance that determines the speed of the machine. There is generally no speed control governor to control the speed the way other turbine driven compressors are controlled. If the expander power is more than expected, then the speed of the machine will be higher than predicted. If the compressor power is more than expected, then the speed of the machine will be lower than predicted. The above tolerances are needed to set limits beyond which hardware changes may be required to achieve a reasonable normal speed.

4.4.2 The compressor head-capacity characteristic curve shall rise continuously from the rated point to surge. The compressor shall be suitable for continuous operation at any capacity on the predicted performance curve(s) at least 10 % greater than the predicted surge capacity shown in the proposal.

NOTE It is common for flow to be bypassed around the compressor during normal operation.

4.5 Materials

Materials shall be in accordance with 4.5 of ISO 10439-1. Refer to Annex D for a table of typical materials.

4.5.1 If traces of mercury have been specified, aluminum impellers shall be treated by anodizing or other approved methods.

4.6 Casings

Casings shall be in accordance with 4.6 of ISO 10439-1 and the additional requirements as follows.

4.6.1 Pressure-containing Casings

● **4.6.1.1** The maximum allowable working pressure of the casing(s) shall be at least equal to the relief valve set pressure(s) specified by the purchaser.

4.6.1.1.1 If a relief valve set pressure is not specified, the maximum allowable working pressure of an expander casing shall be at least 1.1 times the maximum specified inlet pressure (gauge). System pressure protection shall be furnished by the purchaser.

4.6.1.1.2 If a relief valve set pressure is not specified, the maximum allowable working pressure of the compressor casing of an expander-compressor shall be at least 1.25 times the maximum specified discharge pressure (gauge). System pressure protection shall be furnished by the purchaser.

4.6.1.1.3 When the purchaser has not supplied a relief valve setting, he shall be responsible for insuring that furnished relief valves are compatible with casing ratings as set by 4.6.1.1.1 and 4.6.1.1.2.

4.6.1.2 "O" rings, gaskets or other sealing devices which may be used on radially spilt casings shall be confined in machined grooves and shall be made of materials suitable for all specified service conditions.

4.6.1.3 Provisions for lifting the casings and removing the center section shall be provided.

4.6.1.4 The expander-compressor casing shall be designed with sufficient strength to contain parts which might separate in the event of uncontrolled overspeed.

4.6.2 Casing repairs

Casing repairs shall be in accordance with ISO 10439-1.

4.6.3 Material Inspection of Pressure containing parts

Material inspection of pressure containing parts shall be in accordance with ISO 10439-1.

4.6.4 Pressure Casing Connections

In addition to the requirements of ISO 10439-1, the following shall apply:

4.6.4.1 Main Process Connections

Main process connections shall be in accordance with ISO 10439-1.

4.6.4.2 Auxiliary Connections

Auxiliary connections shall be in accordance with ISO 10439-1 and as follows.

4.6.4.2.1 Auxiliary connections shall be at least DN 15 (NPS 1/2).

4.6.5 Casing Support Structures

NOTE 1 Expander-compressors have no coupling, therefore, there are no special requirements for casing support structures. Expander-compressors are generally mounted with the expander on centerline supports and the compressor only loosely bolted or unbolted and allowed to float with the piping to account for thermal expansions and contractions.

NOTE 2 Expander-compressor units do not require highly finished mounting surfaces.