SLOVENSKI STANDARD
SIST EN ISO 8222:2020

01-junij-2020

Nadomešča:
SIST EN ISO 8222:2003

Naftni merilni sistemi - Umerjanje - Volumetrični ukrepi, rezervoarji in terenski ukrepi (vključno s formulami za lastnosti tekočin in materialov) (ISO 8222:2020)

Petroleum measurement systems - Calibration - Volumetric measures, proving tanks and field measures (including formulae for properties of liquids and materials) (ISO 8222:2020)

Messsysteme für Mineralölerzeugnisse - Kalibrierung - Temperaturkorrekturen zur Anwendung auf volumetrische Bezugsmessbehälter (ISO 8222:2020)

Systèmes de mesure du pétrole - Étalonnage - Contenants de mesure volumétriques, jauges étalons et contenants de mesure de travail (y compris les formules relatives aux propriétés des liquides et des matériaux) (ISO 8222:2020)

Ta slovenski standard je istoveten z: EN ISO 8222:2020

ICS:

75.180.30	Oprema za merjenje prostornine in merjenje	Volumetric equipment and measurements

SIST EN ISO 8222:2020 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 8222

April 2020

ICS 75.180.30

Supersedes EN ISO 8222:2002

English Version

Petroleum measurement systems - Calibration - Volumetric measures, proving tanks and field measures (including formulae for properties of liquids and materials) (ISO 8222:2020)

Systèmes de mesure du pétrole - Étalonnage - Contenants de mesure volumétriques, jauges étalons et contenants de mesure de travail (y compris les formules relatives aux propriétés des liquides et des matériaux) (ISO 8222:2020)

Messsysteme für Mineralölerzeugnisse - Kalibrierung - Temperaturkorrekturen zur Anwendung auf volumetrische Bezugsmessbehälter (ISO 8222:2020)

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN ISO 8222:2020 E

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European foreword

This document (EN ISO 8222:2020) has been prepared by Technical Committee ISO/TC 28 "Petroleum and related products, fuels and lubricants from natural or synthetic sources" in collaboration with Technical Committee CEN/TC 19 “Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin.” the secretariat of which is held by NEN.

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 2020, and conflicting national standards shall be withdrawn at the latest by October 2020.

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

This document supersedes EN ISO 8222:2002.

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Endorsement notice

The text of ISO 8222:2020 has been approved by CEN as EN ISO 8222:2020 without any modification.

INTERNATIONAL STANDARD

ISO 8222

Third edition
2020-03

Petroleum measurement systems — Calibration — Volumetric measures, proving tanks and field measures (including formulae for properties of liquids and materials)

Reference number
ISO 8222:2020(E)

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Published in Switzerland

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*, Subcommittee SC 2, *Measurement of petroleum and related products*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 19, *Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition cancels and replaces the second edition (ISO 8222:2002), which has been technically revised. The main changes to the previous edition are as follows:

— revision of the title and scope to allow the document to cover the design, calibration and use of a wide range of volumetric measures comprising proving tanks, test measures, field and standard measures;

— provision of revised, updated and extended formulae to allow calculation of temperature correction including the addition of formulae for saline water, other liquids and material properties.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Volumetric, or capacity, measures are used to provide an accurate measure of volume, thereby providing a calibration reference for other volume-measuring devices, such as pipe displacement provers or flowmeters.

Volume measures are categorized in terms of capacity, test measures being below 20 l. Measures above 20 l are categorised as prover tanks. Standard measures are designed to comply with regulatory guidance and hence have specified volumes. Other measures have non-standard volumes specifically designed to suit an application, for example measures to accompany a small volume prover.

Volumetric measures can be used to calibrate flowmeters, both duty and reference meters. They can also be used to calibrate secondary volume measures, displacement (pipe) provers and storage tanks.

Annex A provides the recommended formulae used in the calibration and use of volumetric measures and for other volumetric measurements. This includes pure and saline water properties, the properties of hydrocarbon liquids and the materials of construction of volumetric measuring devices.

Petroleum measurement systems — Calibration — Volumetric measures, proving tanks and field measures (including formulae for properties of liquids and materials)

WARNING — The use of this document could involve hazardous materials, operations and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices.

1 Scope

This document describes the design, use and calibration of volumetric measures (capacity measures) which are intended for use in fixed locations in a laboratory or in the field. This document gives guidance on both standard and non-standard measures. It also covers portable and mobile measures. This document is applicable to the petroleum industry; however, it may be applied more widely to other applications.

This document excludes measures for cryogenic liquids and pressurized measures as used for liquid petroleum gas (LPG) and liquefied natural gas (LNG).

Volumetric measures are classified as test measures or prover tanks depending on capacity and design.

Measures described in this document are primarily designed, calibrated and used to measure volumes from a measure which is wetted and drained for a specified time before use and designated to deliver. Many of the provisions, however, apply equally to measures which are used to measure a volume using a clean and dry measure and designated to contain.

Guidance is given regarding commonly expected uncertainties and calibration specifications.

The document also provides, in Annex A, reference formulae describing the properties of water and other fluids and materials used in volumetric measurement more generally.

2 Normative references

There are no normative references in this document.

3 Terms, definitions, symbols and units

3.1 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
accuracy
closeness of the agreement between a measured quantity value and a true quantity value of a measurand

Note 1 to entry: The concept 'measurement accuracy' is not a quantity and should not be given a numerical value. The quantitative expression of accuracy should be in terms of uncertainty. "Good accuracy" or "more accurate" implies small measurement error. Any given numerical value should be taken as indicative of this.

[SOURCE: VIM:2012, 2.13]

3.1.2
adjustment
set of operations carried out on a measuring system so that it provides prescribed indications corresponding to given values of a quantity to be measured

Note 1 to entry: Adjustment should not be confused with calibration, which is a prerequisite for adjustment.

Note 2 to entry: After adjustment, a recalibration is usually required.

[SOURCE: VIM:2012, 3.11]

3.1.3
automatic pipette
overflow pipette
high precision measure, where the volume withdrawn is defined by a top overflow weir rather than a gauge scale

3.1.4
brim measure
field measure where the volume is defined by an overflow from the top edge of the neck

3.1.5
calibration
operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties and in a second step uses this information to establish a relation for obtaining a measurement result from an indication

Note 1 to entry: A simplified definition is 'set of operations that establish, under specified conditions, the relationship between quantities indicated by an instrument and the corresponding values realized by standards'.

Note 2 to entry: Calibration should not be confused with adjustment of a measuring system.

Note 3 to entry: The word "proving" is used in the oil industry and has the same meaning but can include a check of the results against specified acceptance criteria.

[SOURCE: VIM:2012, 2.39]

3.1.6
calibrated volume
volume of a measure between a top and bottom datum as determined by calibration and expressed at a standard temperature

3.1.7
clingage
film of liquid that adheres to the inside surface of a volumetric measure after it has been emptied, resulting in a residual volume

3.1.8
correction factor
numerical factor by which the uncorrected result of a measurement at the measured conditions is multiplied

Note 1 to entry: Correction factors to standard conditions are used to convert a volume at observed conditions to the volume at another (standard) condition.

3.1.9
plunger
displacement plunger
device consisting of a piston which is used for adjusting the volume of a volumetric measure

3.1.10
drain time
total time taken to empty the measure or tank to leave a consistent residual volume

Note 1 to entry: Drain time commences when the drain valve is opened and ceases when closed after a defined time or condition. Drain time may be divided into two parts: first drain time and final drain time.

Note 2 to entry: A dry measure can be employed where the product evaporates quickly, for example petrol. These measures will not have a drain time and the means to ensure they are dry will be specified in documents regulating their use.

3.1.11
final drain time
time which follows the cessation of the first drain time and finishes at a defined time, or condition, such as rate of dripping

3.1.12
first drain time
time to drain the majority of the fluid from the measure

Note 1 to entry: The first drainage flow commences when the drain valve is opened and ends at a defined level, time or when flow breaks into a defined trickle or drip rate. This is prior to the start of the final drain time.

3.1.13
dry measure
contents measure which is calibrated and used with the internal surface completely dry (i.e. no clingage or residual volume)

Note 1 to entry: The volume of a dry measure may be marked and designated to contain.

3.1.14
error
measured quantity value minus a reference quantity value

Note 1 to entry: Note1 to entry: Relative error is error divided by a reference value. This can be expressed as a percentage.

[SOURCE: VIM:2012, 2.16]

3.1.15
field measure
measure designed to be used in the regular calibration of other devices

Note 1 to entry: While most field measures are portable, some can be in a fixed location.