



**SLOVENSKI STANDARD**  
**SIST EN ISO 3170:2004**

01-julij-2004

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**SIST EN ISO 3170:1999**

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Petroleum liquids - Manual sampling (ISO 3170:2004)

Flüssige Mineralölerzeugnisse - Manuelle Probenahme (ISO 3170:2004)

**iTeh STANDARD PREVIEW**  
Produits pétroliers liquides - Echantillonnage manuel (ISO 3170:2004)  
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**Ta slovenski standard je istoveten z: EN ISO 3170:2004**

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**ICS:**

75.080      Naftni proizvodi na splošno      Petroleum products in general

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

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February 2004

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English version

**Petroleum liquids - Manual sampling (ISO 3170:2004)**

Produits pétroliers liquides - Echantillonnage manuel (ISO 3170:2004)

Flüssige Mineralölerzeugnisse - Manuelle Probenahme (ISO 3170:2004)

This European Standard was approved by CEN on 16 January 2004.

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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 Central Secretariat has the same status as the official versions.

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## EN ISO 3170:2004 (E)

<b>CORRECTED 2004-03-17</b>
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**Foreword**

This document (EN ISO 3170:2004) has been prepared by Technical Committee ISO/TC 28 "Petroleum products and lubricants" in collaboration with Technical Committee CEN/TC 19 "Petroleum products, lubricants and related products", 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of an identical text or by endorsement, at the latest by August 2004, and conflicting national standards shall be withdrawn at the latest by August 2004.

This document supersedes EN ISO 3170:1998.

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

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# INTERNATIONAL STANDARD

**ISO  
3170**

Third edition  
2004-02-01

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## **Petroleum liquids — Manual sampling**

*Produits pétroliers liquides — Échantillonnage manuel*

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## ISO 3170:2004(E)

## 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 3170 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 3, *Static petroleum measurement*.

This third edition cancels and replaces the second edition (ISO 3170:1988), which has been technically revised.

The principal technical changes include the addition of

- procedures for tank sampling under restricted and closed system conditions, and
- procedures for the taking of manual spot samples from pipelines containing high vapour pressure liquids.

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## Introduction

This International Standard may be applied in combination with ISO 3171.

The purpose of this International Standard is to standardize conditions for obtaining a sample of liquid/semi-liquid hydrocarbons from a tank, drum or pipeline by manual means. If the hydrocarbon to be sampled is of non-homogeneous character showing significant variations in composition or containing sediments and water, samples taken manually should not be expected to be representative, but may enable the degree of non-homogeneity to be assessed and estimates of quality and quantity to be made.

Procedures are specified which minimize or eliminate losses of light ends from samples. Such losses can occur during handling or transfer of samples, thereby making them non-representative of the bulk.

The procedures specified are intended to provide samples for the following purposes:

- a) the determination of the liquid/hydrocarbon quality;
- b) the determination of the water content;
- c) the determination of other contaminants that are not considered to be part of the liquid transferred.

If the sampling conditions for purposes a), b) and c) are in conflict, separate samples are required.

Sampling procedures for tank contents that are not homogeneous are specified that enable the degree of non-homogeneity to be assessed and estimates of quality and quantity to be made.

Procedures for the tank sampling of liquid hydrocarbons under inert gas pressure are included, together with techniques for sampling from tanks which are equipped with vapour emission control systems.

It is recognized that, in many countries, some or all of the items covered by this International Standard are the subject of mandatory regulations imposed by the laws of those countries. In cases of conflict between such mandatory regulations and this International Standard, the former prevail.

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# Petroleum liquids — Manual sampling

## 1 Scope

This International Standard specifies the manual methods to be used for obtaining samples of liquid or semi-liquid hydrocarbons, tank residues and deposits from fixed tanks, railcars, road vehicles, ships and barges, drums and cans, or from liquids being pumped in pipelines.

It applies to the sampling of petroleum products, crude oils and intermediate products, which are stored in tanks at or near atmospheric pressure, or transferred by pipelines, and are handled as liquids at temperatures from near ambient up to 200 °C.

The sampling procedures specified are not intended for the sampling of special petroleum products which are the subject of other International Standards, such as electrical insulating oils (IEC 60475), liquefied petroleum gases (ISO 4257), liquefied natural gases (ISO 8943) and gaseous natural gases (ISO 10715).

This International Standard refers to existing methods of sampling and the type of equipment presently in use. It is, however, not intended that it should exclude the use of new equipment not yet developed for commercial use, provided that such equipment enables samples to be obtained in accordance with the requirements and procedures of this International Standard.

NOTE For the purposes of this International Standard, the term “% (*m/m*)” is used to represent the mass fraction.

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## 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 1998 (all parts), *Petroleum industry — Terminology*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling plans indexed by acceptable quality limit (AQL) for lot-by-lot inspection*

ISO 3171:1988, *Petroleum liquids — Automatic pipeline sampling*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1998 and the following apply.

### 3.1

#### acceptable quality level

#### AQL

maximum per cent defective (or the maximum number of defects per hundred units) that, for purposes of sampling inspection, can be considered satisfactory as a process average

**ISO 3170:2004(E)****3.2****all-level sample**

sample obtained with an apparatus which accumulates the sample while passing in one direction only through the total liquid height, excluding any free water

**3.3****automatic sampler**

device used to extract a representative sample from the liquid flowing in a pipe

NOTE The automatic sampler generally consists of a probe, a sample extractor, an associated controller, a flow measuring device, and a sample receiver.

**3.4****batch**

collection of packages containing a product of a single type and composition and of a single manufactured lot, or of a single delivery

**3.5****bottom sample**

spot sample taken from the product at or close to the bottom of a tank or container

See Figure 1.

**3.6****bottom water sample**

spot sample of free water taken from beneath the petroleum in a tank

**3.7****closed sampling**

process of taking samples within a tank under closed conditions, which does not permit the release of any tank contents or vapour to the atmosphere

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**3.8****composite sample**

sample obtained by combining a number of spot samples in defined proportions so as to obtain a sample representative of the bulk of the product

**3.9****dipper sample**

sample obtained by placing a dipper or other collecting vessel in the path of a free-flowing stream to collect a definite volume from the full cross-section of the stream at regular time intervals for a constant time rate of flow, or at time intervals varied in proportion to the flow rate

NOTE This method is normally restricted to sampling petroleum coke from conveyor belts.

**3.10****drain sample**

sample obtained from the water draw-off valve on a storage tank

NOTE Occasionally, a drain sample may be the same as a bottom sample, for example, in the case of a tank car.

**3.11****floating roof sample**

spot sample taken just below the surface to determine the density of the liquid on which the roof is floating

**3.12****grease sample**

spot sample obtained by scooping or dipping a quantity of soft or semi-liquid material from a container

**3.13****integrity of the sample**

condition of being complete and unaltered, i.e. the sample being preserved with the same composition as when it was taken from the bulk of the liquid

**3.14****lower sample**

spot sample taken at a level of five-sixths of the depth of liquid below the top surface

See Figure 1.

**3.15****middle sample**

spot sample taken at a level of one-half of the depth of liquid below the top surface

See Figure 1.

**3.16****mixer**

device which provides a homogeneous mixture of the liquid within a pipeline or container in order to obtain a representative sample

**3.17****open sampling**

process of taking traditional samples within a tank via an open gauge hatch or gauging access point

NOTE If the tank ullage space is pressurized, it will normally be necessary to use other (closed or restricted) procedures to avoid de-pressurizing the tank and the consequent loss of volatile organic compounds (VOCs).

**3.18****per cent defective**

one hundred times the number of defective units of product contained in any given quantity of units of product divided by the total number of units of product inspected, i.e.:

$$\text{per cent defective} = \frac{\text{number of defectives}}{\text{number of units inspected}} \times 100$$

**3.19****portable sampling device****PSD**

housing designed to provide a gas-tight connection to a vapour-lock valve, which contains a restricted or closed system sampler and is fitted with a tape or cable winding mechanism for lowering and retrieving the sampler

**3.20****representative sample**

sample having its physical or chemical characteristics identical to the volumetric average characteristics of the total volume being sampled

**3.21****residues and deposits**

organic and inorganic matter, together with any water dispersed within it, which has separated from the liquid and either fallen to the bottom of the tank containing the liquid, or been left in the tank after the liquid has been pumped out

**ISO 3170:2004(E)****3.22****restricted sampling**

process of taking samples within a tank using equipment which is designed to substantially reduce or minimize the vapour losses that would occur during open sampling, but where the equipment is not completely gas-tight

**3.23****running sample**

sample obtained with an apparatus which accumulates the sample while passing in both directions through the total liquid height, excluding any free water

**3.24****sample conditioning**

mixing necessary to homogenize the sample during sample handling in preparation for subsampling and/or analysis

**3.25****sample handling**

any conditioning, transferring, dividing and transporting of the sample

NOTE Sample handling includes transferring the sample from the primary sampling device to any secondary container, and the transferring of subsamples to the laboratory apparatus in which it is to be analyzed.

**3.26****sample size**

number of samples to be drawn from a batch to determine its acceptability as given in sampling plans

**3.27****skim sample**

surface sample

spot sample taken from the surface of the liquid [SIST EN ISO 3170:2004](https://standards.iteh.ai/catalog/standards/sist/59d6cef2-46e8-4d8c-befa-eae0d29e494b/sist-en-iso-3170-2004)

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See Figure 1.

**3.28****spot sample**

sample taken at a specific location in a tank or from a flowing stream in a pipe at a specific time

**3.29****static mixer**

mixing device having no moving parts and located within a pipe or tube

NOTE The effectiveness of the static mixer depends on the kinetic energy of the moving liquid for the energy required to mix the liquid.

**3.30****still-well**

guide pole

still-pipe

sounding-pipe

stand pipe

vertical cylindrical pipe built into a tank to permit gauging operations while reducing errors arising from turbulence or agitation of the liquid

NOTE 1 Samples taken from unperforated or unslotted still-wells should not be used for custody transfer applications, see 7.2.1.3.

NOTE 2 Still-wells may also be found on ships and barges.

**3.31****suction-level sample**

outlet sample

sample taken at the lowest level from which liquid hydrocarbon is pumped from the tank

See Figure 1.

NOTE In determining this level, appropriate allowance is made for any fittings within the tank such as swing-arm, suction baffle or internal bend.

**3.32****sump sample**

spot sample taken from within a sump

**3.33****suspended water**

water within the oil that is finely dispersed as small droplets

NOTE It may, over a period of time, either collect as free water or become dissolved water, depending on the conditions of temperature and pressure prevailing.

**3.34****tap sample**

tank-side sample

spot sample taken from a sample tap on the side of a tank

**3.35****test portion**

portion of a sample or subsample that is introduced into the analytical test apparatus

**3.36****top sample**

spot sample obtained 150 mm below the top surface of the liquid

See Figure 1.

**3.37****total water**

sum of all the dissolved, suspended and free water in a cargo or parcel of oil

**3.38****ullage**

empty capacity left in a fixed volume sample receiver/container above the liquid surface

**3.39****upper sample**

spot sample taken at a level of one-sixth of the depth of liquid below the top surface

See Figure 1.

**3.40****vapour-lock valve**

vapour control valve

device fitted to the top of vapour-tight or pressure tanks to permit manual measurement and/or sampling operations to be carried out without loss of pressure