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**Nafta in tekoči naftni proizvodi – Oprema za merjenje nivoja tekočine v rezervoarjih za shranjevanje – Ročne metode**

Petroleum and liquid petroleum products -- Equipment for measurement of liquid levels in storage tanks -- Manual methods

Pétrole et produits pétroliers liquides -- Appareils de mesure du niveau des liquides dans les réservoirs -- Méthodes manuelles

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75.180.30	Oprema za merjenje prostornine in merjenje	Volumetric equipment and measurements
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# INTERNATIONAL STANDARD

# ISO 4512

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## Petroleum and liquid petroleum products — Equipment for measurement of liquid levels in storage tanks — Manual methods

*Pétrole et produits pétroliers liquides — Appareils de mesure du niveau  
des liquides dans les réservoirs — Méthodes manuelles*

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Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 4512 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 3, *Static petroleum measurement*.

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## Introduction

This International Standard describes the equipment required to measure the level of petroleum and petroleum products contained in a tank or container. Calculation of the quantity of petroleum and petroleum products contained in a tank or container also requires that the temperature of the liquid and its density are determined. The equipment required and the methods of determination of temperature and density are described in other International Standards to which reference should be made.

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# Petroleum and liquid petroleum products — Equipment for measurement of liquid levels in storage tanks — Manual methods

## 1 Scope

This International Standard specifies the requirements for the equipment required to measure manually the liquid level or the corresponding volume of petroleum and petroleum products stored in tanks and containers.

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 1998 (all parts), *Petroleum industry — Terminology*.

IEC 60079-11:1991, *Electrical apparatus for explosive gas atmospheres — Part 11: Intrinsic safety “i”*.

## 3 Terms and definitions

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

### 3.1

#### **calibration table**

#### **tank table**

#### **tank capacity table**

table showing the capacities of, or volumes in, a tank corresponding to various liquid levels measured from the specified dipping datum-plate and/or gauging reference point

### 3.2

#### **dip**

#### **innage**

depth of liquid in a tank above the dipping datum-plate

### 3.3

#### **dip-rod**

#### **dip-stick**

rigid length of wood or other material, graduated in units of volume or length, for measuring by dip the quantity of liquid in small tanks which have been calibrated in terms of dip

### 3.4

#### **dip-tape**

graduated steel tape used for measuring the level of oil or water in a tank, either directly by dipping or indirectly by ullaging

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## 3.5

**dip-weight**

weight attached to a steel dipping-tape, of sufficient mass to keep the tape taut and of a shape to facilitate the penetration of any sludge that may be present on the datum-plate

## 3.6

**dipping datum-point**

point at the bottom of a tank which the dip-weight touches during dipping, and from which the measurements of the oil and water depths are taken

NOTE The dipping datum-point usually corresponds with the datum-plate but, when this is not so, the difference in level between the datum-plate and the datum-point should be allowed for in the calibration table.

## 3.7

**free water**

water, present in a tank, which is not in solution or suspension within the oil and which exists as a separate layer within the tank

## 3.8

**gauge-hatch**

opening at the top of a tank through which dipping, ullaging and/or sampling operations are carried out

NOTE When gauging operations are carried out under closed or restricted conditions (via a vapour lock valve), the term "gauging access point" may be used.

## 3.9

**gauging**

process of taking all the necessary measurements in a tank in order to determine the quantity of liquid which it contains

NOTE For the purposes of this International Standard, gauging refers to level measurements only.

## 3.10

**gauging reference point****reference gauge point****upper datum****upper reference point**

point clearly marked on the gauge-hatch, vapour lock valve or on a plate suitably located above or below the gauge-hatch, to indicate the position (and upper datum) from which the measurements of dip or ullage are made

## 3.11

**identification marks**

marks on a dip-tape that record the temperature and tension at which the tape was calibrated

NOTE Other marks may include the total length of the tape and/or its conformance with this International Standard.

## 3.12

**master dip-tape**

dip-tape and weight combination of known accuracy, which is calibrated by an accredited laboratory and is traceable to national standards of length

## 3.13

**portable electronic gauging device****PEGD**

portable instrument employing electronic or electrical sensor(s) for the measurement of liquid level, temperature and/or water interface

NOTE Other optional measurements such as density may also be provided.

**3.14****pressure tank**

storage tank designed to operate at pressures above atmospheric

NOTE For convenience, this type of tank is divided into two general classes:

- low-pressure tanks, used for volatile products which are liquid at ambient temperatures;
- high-pressure tanks, used for liquids which are normally in the vapour phase at ambient temperature and pressure.

**3.15****ullage paste****product-finding paste****gasoline-finding paste**

paste used to facilitate reading the liquid level on the scale of a dip-tape, dip-rod, ullage-rule or ullage-rod, when gauging products which do not give a clear cut on the gauging device

**3.16****reference height****reference gauge height**

height of the gauging reference point above the dipping datum-point

**3.17****ullage****outage**

working capacity of a tank not occupied by the liquid

**3.18****ullage hatch****ullage port****ullage plug**

manual gauge-hatch usually fitted with a heavy-duty cover

**3.19****ullage-rod****ullage-stick**

rigid length of wood or other material, usually graduated in units of volume, for measuring by ullage the quantity of liquid in small tanks which have been calibrated in terms of ullage

**3.20****ullage-rule**

graduated rule attached to a dip-tape to facilitate the measurement of ullage where it would not be practical to obtain a tape cut, for example when gauging viscous, waxy or heated oils

**3.21****vapour lock 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

**3.22****vapour-tight tank**

tank intended primarily for the storage of volatile liquids, for example gasoline, and so constructed that it will withstand pressures slightly above atmospheric pressure

**3.23****water bottom****water dip**

depth of any free water at the bottom of a tank