

INTERNATIONAL STANDARD

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Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks —

Part 3:

Optical-triangulation method

*Pétrole et produits pétroliers liquides — Étalonnage des réservoirs
cylindriques verticaux —*

Partie 3: Méthode par triangulation optique



Reference number
ISO 7507-3:1993(E)

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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.

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.

International Standard ISO 7507-3 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Sub-Committee SC 3, *Static petroleum measurement*.

ISO 7507 consists of the following parts, under the general title *Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks*:

- Part 1: *Strapping method*
- Part 2: *Optical-reference-line method*
- Part 3: *Optical-triangulation method*
- Part 4: *Internal electro-optical distance-ranging methods*
- Part 5: *External electro-optical distance-ranging methods*

At the time of publication of this part of ISO 7507, parts 4 and 5 were in course of preparation.

Annexes A, B, C, D, E and F form an integral part of this part of ISO 7507.

Introduction

This method describes the calibration of vertical cylindrical tanks by means of optical triangulation using theodolites. The circumference of the tank is determined at different levels by reference to a base line which may be either a reference circumference measured by strapping or a base line between two stations of a theodolite measured by means of a tape or by an optical method. External circumferences are corrected to give true internal circumferences.

The method is an alternative to other methods such as strapping (ISO 7507-1) and the optical-reference-line method (ISO 7507-2).

Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks —

Part 3: Optical-triangulation method

1 Scope

1.1 This part of ISO 7507 specifies a calibration procedure for application to tanks above 8 m in diameter with cylindrical courses that are substantially vertical. It provides a method for determining the volumetric quantity contained within a tank at gauged liquid levels. The measurement required to determine the radius may be made internally (clause 8) or externally (clause 9). The external method is applicable only to tanks that are free of insulation.

1.2 Abnormally deformed, e.g. dented or non-circular, tanks are excluded from this part of ISO 7507.

1.3 This method is suitable for tilted tanks up to 3 % deviation from the vertical provided that a correction is applied for the measured tilt as described in ISO 7507-1.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 7507. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7507 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7507-1:1993, *Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks — Part 1: Strapping method.*

3 Definitions

For the purposes of this part of ISO 7507, the definitions given in ISO 7507-1 apply.

4 Precautions

The general precautions and safety precautions specified in ISO 7507-1 shall apply to this part of ISO 7507.

5 Equipment

5.1 Equipment for measurement of angles, as listed in 5.1.1 to 5.1.4 below.

5.1.1 Theodolites, with angular graduations and a resolution equal to or better than 0,000 2 grade¹⁾. Each theodolite shall be mounted on a tripod which is firm and stable. The legs of the tripod shall be steadied by means of magnetic bearers when being used for the internal method. Repeat readings shall agree to within 0,000 2 grade¹⁾.

5.1.2 Low-power laser-beam emitter, equipped with a device such as a fibre-optic light-transfer system and a theodolite-telescope eye-piece connection, by which the laser beam can be transmitted through

1) 1 grade = $\pi/200$ radians = 0,9°.