

INTERNATIONAL
STANDARD

ISO
7507-4

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

Part 4:

Internal electro-optical distance-ranging
method

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

Partie 4: Méthode par mesurage électro-optique interne de la distance



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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 7507-4 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee 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*
- *Part 6: Recommendations for checking and verification of tank calibration and capacity tables*

Annexes A and B form an integral part of this part of ISO 7507. Annex C is for information only.

Introduction

The method described in this part of ISO 7507 is an alternative to other tank calibration methods such as the strapping method (ISO 7507-1), the optical-reference-line method (ISO 7507-2) and the optical-triangulation method (ISO 7507-3).

The parts of ISO 7507 form part of a series on tank calibration which also includes: ISO 8311:1989, *Refrigerated light hydrocarbon fluids — Calibration of membrane tanks and independent prismatic tanks in ships — Physical measurement*, ISO 9091-1:1991, *Refrigerated light-hydrocarbon fluids — Calibration of spherical tanks in ships — Part 1: Stereophotogrammetry*, and ISO 9091-2:1992, *Refrigerated light hydrocarbon fluids — Calibration of spherical tanks in ships — Part 2: Triangulation measurement*.

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

Part 4: Internal electro-optical distance-ranging method

1 Scope

1.1 This part of ISO 7507 specifies a method for the calibration of vertical cylindrical tanks having diameters greater than 5 m by means of internal measurements using an electro-optical distance-ranging instrument, and for the subsequent compilation of tank capacity tables. This method is known as the internal electro-optical distance-ranging (EODR) method.

1.2 This part of ISO 7507 is not applicable to the calibration of abnormally deformed (e.g. dented) tanks or of noncircular tanks.

1.3 This part of ISO 7507 is applicable to tanks tilted by $\leq 3\%$ from the vertical, provided a correction is applied for the measured tilt as described in ISO 7507-1.

1.4 This part of ISO 7507 is applicable to tanks with cone-up or cone-down bottoms, as well as to tanks with flat bottoms.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7507. At the time of publication, the editions indicated were 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 editions of the standards 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.*

ISO 7507-3:1993, *Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks — Part 3: Optical-triangulation method.*

IEC 825-1:1993, *Safety of laser products — Part 1: Equipment classification, requirements and user's guide.*

3 Definitions

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

3.1 reference target point: Fixed point clearly marked on the inside surface of the tank shell wall.

3.2 slope distance: Distance measured from the electro-optical distance-ranging instrument to a target point on any given course of the tank shell wall.

3.3 target point: One of a series of points on the inside surface of the tank shell wall to which slope distance, vertical and horizontal angles are measured by use of the electro-optical ranging instrument.