Petroleum and Liquid Petroleum Products—Calibration of Horizontal Cylindrical Tanks

Part 2: Internal Electro-optical Distance-ranging Method

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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.

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 part of ISO 12917 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12917-2 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, Subcommittee SC 3, *Static petroleum measurement*.

ISO 12917 consists of the following parts, under the general title *Petroleum and liquid petroleum products — Calibration of horizontal cylindrical tanks*:

— *Part 1: Manual methods*

— *Part 2: Internal electro-optical distance-ranging method*

Annex A forms a normative part of this part of ISO 12917. Annex B is for information only.

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

Part 2:
Internal electro-optical distance-ranging method

1 Scope

This part of ISO 12917 specifies a method for the calibration of horizontal cylindrical tanks having diameters greater than 2 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.

This part of ISO 12917 is applicable to tanks inclined by up to 10 % from the horizontal, provided a correction is applied for the measured tilt.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 12917. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 12917 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*

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

ISO 7507-4:1995, *Petroleum and liquid petroleum products — Calibration of vertical cylindrical tanks — Part 4: Internal electro-optical distance-ranging method*

ISO 12917-1:2002, *Petroleum and liquid petroleum products — Calibration of horizontal cylindrical tanks — Part 1: Manual methods*

IEC 60079-10:1995, *Electrical apparatus for explosive gas atmospheres — Part 10: Classification of hazardous areas*

IEC 60825-1:1994, *Safety of laser products — Part 1: Equipment classification, requirements and user's guide*

3 Terms and definitions

For the purposes of this part of ISO 12917, the terms and definitions given in ISO 1998, ISO 7507-1 and the following apply.

3.1
reference target point
fixed point clearly marked on the inside surface of the tank shell or a prism mounted on a tripod or stadia

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

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

4 Precautions

The general and safety precautions given in ISO 7507-1 shall apply to this part of ISO 12917. In addition, the laser beam fitted to the EODR instrument shall be operated in conformity with IEC 60825-1. The hazards, if any, in the area in which the calibration is to be carried out shall be assessed in accordance with IEC 60079-10. The equipment to be used in the calibration shall be certified as being safe for use in the area of operation.

5 Equipment

5.1 Electro-optical distance-ranging instrument

5.1.1 The angle-measuring part of the instrument shall have an angular graduation and resolution equal to or better than 0,002 gon.

This part of the instrument shall have a repeatability equal to or better than ± 0,005 gon.

5.1.2 The distance-measuring part of the instrument, used for direct determination of distances, shall have a graduation and resolution equal to or better than ± 1 mm.

This part of the instrument shall have a repeatability equal to or better than ± 2 mm.

5.2 Instrument mounting

A tripod which is firm and stable. The legs of the tripod may be held firm, and steadied, by suitable devices such as magnetic bearers.

5.3 Laser-beam emitter

A low-power laser beam complying with IEC 60825-1, which is either an integral part of the EODR instrument or a separate device. If the laser beam emitter is a separate device, it may be fitted with a fibre-optic light transmitter system and a theodolite telescope eyepiece connection, by which the laser beam may be transmitted through a theodolite, or such that it may be fitted to a theodolite with its axis co-incident to the axis of the theodolite.

NOTE The laser-beam emitter is used to position target points on the tank shell.