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Second edition
2024-09

Petroleum and liquid petroleum products — Measurement of level and temperature in storage tanks by automatic methods —

Part 5: Measurement of temperature in marine vessels

Pétrole et produits pétroliers liquides — Mesurage du niveau et de la température dans les réservoirs de stockage par méthodes automatiques —

Partie 5: Mesurage de la température dans les citernes de navire

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Foreword

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This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*, Subcommittee SC 2, *Measurement of petroleum and related products*.

This second edition cancels and replaces the first edition (ISO 4266-5:2002), which has been technically revised.

The main changes are as follows:

— slightly modified the scope;

— updated normative references;

— expanded safety precautions;

— clarified the expectations for calibrated equipment throughout the document;

— added references to the bibliography.

A list of all parts in the ISO 4266 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Petroleum and liquid petroleum products — Measurement of level and temperature in storage tanks by automatic methods —

Part 5: Measurement of temperature in marine vessels

1 Scope

This document provides requirements and guidance on the selection, accuracy, installation, commissioning, calibration and verification of automatic tank thermometers (ATTs) in fiscal/custody transfer applications.

The ATT is used for measuring the temperature of petroleum and liquid petroleum products having a Reid vapour pressure less than 100 kPa, stored in cargo tanks on board marine vessels (i.e. tankers and barges).

This document is not applicable to the measurement of temperature in refrigerated storage tanks, or pressurized cargo tanks on board marine vessels, which is covered in ISO 8310.

2 Normative reference

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
automatic tank thermometer
ATT
instrument that continuously measures temperature in storage (or cargo) tanks

Note 1 to entry: A marine ATT, which can also be known as an automatic tank temperature system, typically includes precision temperature sensors, deck-mounted transmitters for electronic signal transmission, and receiving/readout device(s).

3.2
resistance temperature detector
RTD
electrical temperature-sensing element commonly used to measure the temperature of the contents of a storage tank

3.3
single-point automatic tank thermometer
spot automatic tank thermometer
automatic tank thermometer (3.1) that measures the temperature at a particular point in a tank by the spot temperature element

3.4
multiple-point automatic tank thermometer
automatic tank thermometer (3.1) consisting of multiple (usually three or more) spot temperature elements to measure the temperature(s) at selected liquid level(s)

Note 1 to entry: The readout equipment should average the readings from the submerged temperature elements to compute the average temperature of the liquid in the tank and may also display the temperature profile in the tank.

3.5
temperature transmitter
instrument that typically provides electrical power to the temperature element(s), converts the temperature measured by the element(s) to an electrical or electronic signal, and transmits the signal to a remote readout

Note 1 to entry: A local readout may be provided. Often, the function of the temperature transmitter is provided by the level transmitter of the automatic level gauge

4 Precautions

4.1 Safety precautions

Relevant international standards, classification society rules and the International Safety Guide for Oil Tankers and Terminals (ISGOTT)[4] containing regulations on safety and material-compatibility precautions should be followed when using marine ATT equipment. In addition, the manufacturer's recommendations on the use and installation of the equipment should be followed. All requirements covering entry into hazardous areas are expected to be observed.

4.2 Equipment precautions

4.2.1 All marine ATTs should be capable of withstanding the pressure, temperature and other environmental conditions likely to be encountered in marine service. When an ATT is installed in a corrosive service, any parts exposed to the liquid or vapour should be of durable, corrosion-resistant construction to avoid both product contamination and ATT corrosion. All ATTs should be sealed to withstand the vapour pressure of liquid in the tank. ATTs mounted on vessels with an inert gas system (IGS) should be designed to withstand the operating pressure of the IGS.

4.2.2 All marine ATTs should be specified and installed according to appropriate marine electrical safety standards, including those developed by the IMO, IEC, CENELEC, ISGOTT and ISO. ATTs should be certified for use in the hazardous-area classification appropriate to their installation.

4.2.3 All external metal parts of ATTs mounted on tanks should be firmly connected to an electrical earth, i.e. the ship's hull.

4.2.4 All ATT equipment should be maintained in safe operating condition and the manufacturer's maintenance instructions should be complied with.

4.3 General precautions

4.3.1 The general precautions given in 4.3.2 to 4.3.6 apply to all types of ATTs and should be observed where they are applicable.