International Standard

ISO 4266-6

Second edition
2024-10

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

Part 6: Measurement of temperature in pressurized storage tanks (non-refrigerated)

ISO 4266-6:2024
https://standards.iteh.ai/catalog/standards/sist/[illegible]-0da-4b7f-94e7-dc90814ecdb5/iso-4266-6-2024

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

Partie 6: Mesurage de la température dans les réservoirs de stockage sous pression (non réfrigérés)

Reference number
ISO 4266-6:2024(en)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword ..... **iv**

1 Scope **1**

2 Normative reference **1**

3 Terms and definitions **1**

4 Precautions **2**
4.1 Safety precautions 2
4.2 Equipment precautions 2
4.3 General precautions 3

5 Accuracy **3**
5.1 General 3
5.2 Intrinsic error of ATTs 3
5.3 Calibration prior to installation 3
5.3.1 General 3
5.3.2 ATT calibrated as a system 4
5.3.3 ATT calibrated by components 4
5.3.4 Multiple-point ATTs 4
5.3.5 Uncertainty of the reference 4
5.4 Error caused by installation and operating conditions 4
5.5 Overall accuracy 4
5.5.1 General 4
5.5.2 Use of ATT for fiscal/custody transfer purposes 5

6 Selection of ATTs **5**
6.1 General 5
6.2 ATTs for fiscal/custody transfer purpose 5

7 Description of ATT equipment **6**
7.1 Introduction 6
7.2 Electrical temperature elements 6
7.2.1 General 6

8 Installation of ATTs **6**
8.1 General 6
8.2 Single-point or spot temperature elements 6
8.3 Multiple-point temperature elements 6
8.4 Moveable spot temperature element 6
8.5 Other methods 7
8.6 Thermowells for electronic temperature elements 7
8.7 Thermowells for verification purposes 7

9 Calibration and field verification of ATTs **7**
9.1 General 7
9.2 Calibration of single-point temperature element ATTs used for fiscal/custody transfer purpose 7
9.2.1 Calibration prior to installation 7
9.2.2 Initial field verification 8
9.3 Calibration of upper, middle and lower or multiple-point ATTs 8
9.3.1 Calibration prior to installation 8
9.3.2 Initial field verification 9
9.4 Subsequent verification of ATTs 9
9.4.1 General 9
9.4.2 Frequency of subsequent verification 9
9.4.3 Record keeping 10

10 Data communication and receiving **10**

Bibliography **11**

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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 4266-6:2002), which has been technically revised.

The main changes are as follows:

— normative references have been updated;

— in 4.3.2, it has been clarified that the level should be measured and recorded simultaneously with the temperatures;

— in 7.2.1, equipment has been clarified;

— in 9.4.2, subsequent verification requirements have been clarified.

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 6: Measurement of temperature in pressurized storage tanks (non-refrigerated)

1 Scope

This document gives guidance and recommendations on the selection, accuracy, installation, commissioning, calibration and verification of automatic tank thermometers (ATTs) in fiscal/custody transfer applications, in which the ATT is used for measuring the temperature of petroleum and liquid petroleum products stored in pressurized storage tanks.

This document is not applicable to the measurement of temperature in caverns or in refrigerated storage tanks.

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 tanks

Note 1 to entry: An ATT, which can also be known as an automatic tank temperature system, typically includes precision temperature sensors, field-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
measures the temperature at a particular point in a tank by the spot temperature element

3.4
multiple-point automatic tank thermometer
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 can also display the temperature profile in the tank.

3.5
multiple-point averaging automatic tank thermometer
where the readout equipment selects the individual, spot temperature element(s) that are submerged in the liquid to determine the average temperature of the liquid in the tank

3.6
variable-length averaging automatic tank thermometer
consisting of several temperature elements of varying length, with all the elements extending upwards from a position close to the bottom of the tank, and where the readout equipment selects the longest, completely submerged temperature element to determine the average temperature of the liquid in the tank

3.7
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 can be provided. Often, the function of the temperature transmitter is provided by the level transmitter of the automatic level gauge (ALG).

4 Precautions

4.1 Safety precautions

When using ATT equipment, it is expected that any relevant International Standards and government regulations on safety and material-compatibility precautions are followed when using ATT equipment. In addition, the manufacturer's recommendations on the use and installation of the equipment should be followed. It is presupposed that all regulations covering entry into hazardous areas are observed.

4.2 Equipment precautions

4.2.1 All ATT equipment should be capable of withstanding the pressure, temperature, operating and environmental conditions likely to be encountered in service.

4.2.2 ATTs should be certified for use in the hazardous-area classification appropriate to their installation.

4.2.3 Measures should be taken to ensure that all exposed metal parts of the ATT have the same electrical potential as the tank.

4.2.4 All parts of the ATT in contact with the product or its vapour should be chemically compatible with the product, to avoid both product contamination and corrosion of the ATT.

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