



International
Standard

ISO 4266-3

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

**Part 3:
Measurement of level in pressurized
storage tanks (non-refrigerated)**

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

*Partie 3: Mesurage du niveau dans les réservoirs de stockage sous
pression (non réfrigérés)*

**Second edition
2024-10**

Reference number
ISO 4266-3:2024(en)

Full document details: ISO 4266-3-2024

© ISO 2024  **Documents**
Document Sharing Hub



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

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	v
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 Intrinsic error of ALGs	3
5.2 Calibration prior to installation	4
5.3 Error caused by installation and operating conditions	4
5.4 Overall accuracy	4
5.4.1 General	4
5.4.2 Use of ALGs for fiscal/custody transfer applications	4
6 Installation of ALGs	5
6.1 General	5
6.2 Mounting location	5
6.3 Manufacturer's requirements	5
6.4 Installation	6
6.4.1 Installation of intrusive ullage ALGs mounted on still-wells	6
6.4.2 Installation of intrusive ullage ALGs using guide wires	7
6.4.3 Installation of non-intrusive ullage ALGs (e.g. microwave or radar) mounted on still-wells	8
6.4.4 Location of ALG	10
6.4.5 Installation of ALGs other than those described in this document	10
6.5 Still-well design	10
7 Initial setting and initial verification of ALGs in the field	10
7.1 Preparation	10
7.1.1 Checking for critical distances	10
7.1.2 Checking for free movement of level-sensing element of intrusive ALGs	11
7.1.3 Checking for influences of changes in physical and electrical properties of the product (vapour/liquid)	11
7.2 Initial setting	11
7.2.1 General	11
7.2.2 Setting of intrusive ullage ALGs	11
7.2.3 Setting of non-intrusive ALGs	12
7.2.4 Other ALGs not described in this document	12
7.3 Initial field verification	12
7.3.1 General	12
7.3.2 Verification procedure	13
7.3.3 Tolerance of initial field verification	13
7.4 Record keeping	13
8 Subsequent verification of ALGs	13
8.1 General	13
8.2 Frequency of subsequent verification	13
8.3 Procedure	14
8.4 Tolerance for subsequent verification of ALGs in fiscal/custody transfer application	14
8.5 Comparison of the ALG readings from current and previous verifications	14
8.6 Adjustment in subsequent verification	15
9 Data communication and receiving	15

Bibliography	16
---------------------------	-----------

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 4266-3:2002), which has been technically revised.

The main changes are as follows:

- terms and definitions in [Clause 3](#) have been updated;
- in [4.3.2](#), the level that is measured and recorded simultaneously with the temperatures has been clarified;
- in [5.2](#), the information on calibration prior to installation has been updated;
- in [Clause 6](#), the design requirements for still-wells have been clarified and the limitation of non-perforated still-wells removed.

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 3: Measurement of level in pressurized storage tanks (non-refrigerated)

1 Scope

This document gives requirements and guidance on the accuracy, installation, commissioning, calibration and verification of automatic level gauges (ALGs) both intrusive and non-intrusive, for measuring the level of petroleum and petroleum products having a vapour pressure less than 4 MPa, stored in pressurized storage tanks.

This document gives guidance on the use of ALGs in custody transfer application.

This document is not applicable to the measurement of level in caverns and refrigerated storage tanks with ALG equipment.

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 the ISO 1998 series 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 level gauge

ALG

automatic tank gauge

ATG

instrument that continuously measures liquid height (i.e. dip or ullage (3.8)) in storage tanks

3.2 datum plate

datum point dip-plate

dipping datum plate

horizontal metal plate located directly below the gauging reference point to provide a fixed contact surface from which manual liquid-depth measurements are made

3.3

gauging reference point

reference gauge point

point clearly defined on the gauge hatch directly above the dipping datum point to indicate the position (and upper datum) from which manual dipping or ullaging should be carried out

3.4

innage automatic level gauge

innage ALG

automatic level gauge (3.1) designed and installed to measure liquid, with an integral reference point at or close to the tank bottom, referenced to the *datum plate* (3.2)

3.5

intrusive automatic level gauge

automatic level gauge (3.1) where the level-sensing device intrudes within the tank and makes physical contact with the liquid, e.g. float and servo-operated-type automatic level gauges

3.6

non-intrusive automatic level gauge

non-intrusive ullage automatic level gauge

automatic level gauge (3.1) where the level-sensing device can intrude within the tank, but does not make physical contact with the liquid

EXAMPLE Microwave or radar-type automatic level gauges.

3.7

still-well

stilling-well

still-pipe

guide pole

vertical, perforated pipe built into a tank to reduce measurement errors arising from liquid turbulence, surface flow or agitation of the liquid

3.8

ullage

outage

distance between the liquid level and the gauging reference point, measured along the vertical measurement axis

3.9

ullage automatic level gauge

ullage ALG

automatic level gauge (3.1) designed and installed to measure the *ullage* (3.8) distance from the upper automatic level gauge reference point to the liquid surface

4 Precautions

4.1 Safety precautions

Relevant international standards on safety and material-compatibility precautions should be followed when using ALG equipment. The manufacturers' 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 of the ALG equipment should be capable of withstanding the pressure, temperature, operating and environmental conditions likely to be encountered in service.