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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 21451.3-2017

**Petroleum and liquid petroleum products -- Measurement of level and
temperature in storage tanks by automatic methods -- Part 3:
Measurement of level in pressurized tanks (non-refrigerated)**

石油和液体石油产品 储罐中液位和温度自动测量法 第3部分：带压罐（非冷冻）
中的液位测量

(English Translation)

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Foreword

GB/T 21451 "Petroleum and liquid petroleum products tank automatic measurement of liquid level and temperature" is divided into six parts.

- Part 1. Atmospheric pressure tank level measurement;
- Part 2. Level measurement in tanker tanks;
- Part 3. Pressure tank (non-frozen) in the liquid level measurement;
- Part 4. Atmospheric pressure tank temperature measurement;
- Part 5. Tanker tank temperature measurement;
- Part 6. Temperature measurement in pressurized tanks (not frozen).

This section GB/T 21451 Part 3.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section uses the redrafted law Modify the use of ISO 4266-3:2002 "Petroleum and liquid petroleum products tank level and temperature automatic Measurement methods - Part 3. Level measurement in pressurized tanks (not frozen) ".

This part of ISO 4266-3:2002 technical differences and the reasons are as follows.

- Added at the end of 6.4.1.2, "Connect the ALG to the isolation valve through the calibration chamber (or calibration fitting), which is a good solution to the ALG Setup,

inspection, and float maintenance issues. "To solve the problem of effective ALG calibration;

--- Change 6.4.3.2 to "In order to avoid the influence of the interference of the bottom of the tank, near the bottom of the tank should be provided to reduce the echo or deviate from the vertical Straight reflective plate (as shown in Figure 3), or similar device or mode. Reflector can be used as a reference plate, its installation it is best to measure the distance L accurately by manual method. "In order to clarify the role of the reflector and echo with the label of Figure 3;

--- Replace the 6.4.3.3 "may not need to install and maintain the isolation valve" read "may be required for the installation of maintenance for each interval from the valve "to accurately express the actual use of isolation valve;

--- Delete 6.4.4, incorporate the contents of 6.2.3, the original 6.4.5 into 6.4.4, the contents of 6.2.3 rewritten to avoid the level gauge Repeat the contents of the installation location

--- In the last paragraph of 7.1.1 add a paragraph. "Through the above key distance can be set or check ALG reference point to the lowest tank bottom Point or tank surface zero level. "To illustrate the purpose of key distance measurements;

--- Increase "7.1.2 installation level meter reference flange relative to the lowest point of the tank tank measurement", the original 7.1.2 and 7.1.3 order Becomes 7.1.3 and 7.1.4 to address the issue of pressure gauges and inspections where critical distances are often not directly measurable;

--- Added after the content of 7.1.4 "Before setting up and checking the ALG, the data on the products to be installed in the tank Pre-verification, if necessary, should be the appropriate compensation or amendment. "In order to fully express the true intention of this article;

--- 7.2.2.1b) in the "reference point" to "reference plate (or under the reference point)", and a) consistent;

--- In 7.2.2.2, add "b) Adjust the reading of the ALG to be consistent with the predetermined upper reference point. The adjustment shall include Compensation values or correction factors affected by medium product density and ALG drain/float. ", The original b) into c), and modify "C) Return the level sensing element to the liquid level and lift it again to the upper reference point to record the ALG reading." Place the original c) Change to "d") and "repeat a) and b) three times" in its content "to" repeat c) three times "to conform to the actual meaning of the setting;

--- In 7.3.1, "--- When ALG allows, measure the reference height." To "--- When the conditions permit, the measured reference high (See 7.1.2) to verify the correspondence between the mean ALG reading and the known measured distance. ", So that the sentence is more complete clear;

--- Delete 8.4 "When meeting the tolerance requirement, ALG complies with the calibration requirements and is applicable to custody transfer" 8.5 understanding of mutual relations;

--- The first sentence of 8.5.4 should read "When any tolerance specified in 8.5.2 and 8.5.3 is exceeded, even if the tolerance of 8.4 is met, the accuracy of the ALG measurement system should also be challenged and may still not apply to the transfer of trade. "Echo 8.4, 8.4 and 8.5 considered as a whole.

This section made the following editorial changes.

--- Increase in Note 3.4, indicating the actual significance of this part of the sounding reference;

--- Increase in Note 3.7, indicating the actual meaning of measuring reference points in this section;

--- In 3.11 steady fluid tube, increase the note, indicating the role of steady fluid tube on the level gauge;

--- 5.3 Note 3a) "Accuracy" revised "uncertainty";

--- In Figure 3 illustrates the increase under "Note. The attenuation or deflecting plate shown in this figure perpendicular to the direction of the incoming radar wave can be directly used as a reference plate However, if the deflection plate reflects the radar wave to the stability pipe by changing its angle (greater than 90 °) with the direction of incidence of the radar wave in addition, you may want to configure the baseline separately. ";

--- Reference ISO 4268:2000 with our standard GB/T 8927-2008 instead;

--- Reference ISO 4512-2000 with our standard GB/T 13236-2011 instead.

This part of the National Petroleum Products and Lubricants Standardization Technical Committee (SAC/TC280) and co-ordinated.

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1 Scope

GB/T 21451 provisions of this part of the oil and liquid petroleum products level measurement with automatic level gauge accuracy, installation, commissioning, Calibration and inspection, and gives guidance on the use of automatic level gauges (ALGs) in the custody transfer.

This section applies to the use of immersion and non-immersion automatic level gauge on

the pressure tank with storage, the vapor pressure does not exceed 4MPa stone
Measurement of liquid level of oil and liquid petroleum products. This section does not apply
to the cave and cryogenic storage tanks used in the ALG level measurement.

2 Normative references

The following documents for the application of this document is essential. For dated
references, only the dated version applies to this article Pieces. For undated references, the
latest edition (including all amendments) applies to this document.

ISO .1998 (all parts) Petroleumindustry-Terminology

3 Terms and definitions

ISO .1998 defines the following terms and definitions apply to this document.

Anchor weight Hanging on the guide line of the automatic level gauge test element, the
guide line tensioned and straightened ballast.

Automatic level gauge (ALG); automatic tank gauge (ATG) Continuous measurement of tank
level (height or height) of the instrument.

Real high dip; innage the vertical distance between the reference point and the liquid level.

Sounding reference plate dipping datum plate Sounding reference point dipping datum point
Depth dip plate Just below the measurement reference point, a horizontal metal plate is
provided for manually measuring the depth of the liquid to provide a fixed contact surface.

Note: This section of the sounding reference plate is mainly used for automatic level gauge
calibration and inspection, and vertical pressure tank may have different purposes, and generally
not as a tank Yung table table zero.

Dip dipstick

A graduated steel tape ruler, taut, for measuring the depth of oil or water in a tank, either
directly or through space-time measurement by sounding.