

**AMERICAN PETROLEUM INSTITUTE**

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## INFORMATION SHEET

*API Bulletin 2509B: Shop Testing of Automatic Liquid-Level Gages (1961)*

Although the text of this publication is currently valid, numerous internal and external references have changed since 1961. For the reader's convenience, an updated listing of internal references follows.

Page 5 — The first two paragraphs cite API Standard 2500, which has been discontinued. The proper current reference is to *API Standard 2545: Method of Gaging Petroleum and Petroleum Products* (ASTM D 1085-65) (ANSI Z11.196-1966)

Page 8 — The last paragraph under Report cites API Standard 2500, which has been discontinued. The proper current reference is to Par. 32 of *API Standard 2545: Method of Gaging Petroleum and Petroleum Products* (ASTM D 1085-65) (ANSI Z11.196-1966)

The first paragraph under Certification cites API Standard 2500. The proper current references are to *API Standard 2534, Appendix B: Measurement Control Charts and Statistical Methods for Petroleum Metering Systems* and *API Standard 2545: Method of Gaging Petroleum and Petroleum Products* (ASTM D 1085-65) (ANSI Z11.196-1966)

Page 15 — API RP 50A and 50B are discontinued. Both are superseded by *API RP 2529: Recommended Practice for Measuring, Sampling, and Testing Natural Gas Fluids*

API Standards 1201 and 1202 are discontinued. Both are superseded by *API Standard 2554: Measurement and Calibration of Tank Cars* (ASTM D 1409-65) (ANSI Z11.201-1966)

API Standard 2500 is discontinued. It is superseded by *API Standard 2546: Method of Sampling Petroleum and Petroleum Products* (ASTM D 270-65) (ANSI Z11.33-1966)

API Standard 2501 is discontinued. It is superseded by API Standards:

2550: *Measurement and Calibration of Upright Cylindrical Tanks* (ASTM D 1220-65) (ANSI Z11.197-1966)

2551: *Measurement and Calibration of Horizontal Tanks* (ASTM D 1410-65) (ANSI Z11.198-1966)

2552: *Measurement and Calibration of Spheres and Spheroids* (ASTM D 1408-65) (ANSI Z11.199-1966)

2553: *Measurement and Calibration of Barges* (ASTM D 1407-65) (ANSI Z11.200-1966)

2554: *Measurement and Calibration of Tank Cars* (ASTM D 1409-65) (ANSI Z11.201-1966)

API RP 2502 has become *API Standard 2502: Lease Automatic Custody Transfer*

Add to listing:

*API Standard 2545: Method of Gaging Petroleum and Petroleum Products* (ASTM D 1085-65) (ANSI Z11.196-1966)

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API BULLETIN  
ON  
SHOP TESTING OF AUTOMATIC LIQUID  
LEVEL GAGES

Prepared by the Committee on Crude Oil Measurements of the  
American Petroleum Institute

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This is not an API Standard.



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# SHOP TESTING OF AUTOMATIC LIQUID LEVEL GAGES

## General

The procedure described herein sets forth a method for shop testing automatic liquid level gages whereby performance and accuracy may be certified to the user by the manufacturer. The American Petroleum Institute does not certify any gaging equipment. The certification covers only performance as determined under shop test conditions. Field installations proposed for custody transfer must conform with the procedure outlined in Sect. 1204, "Testing and Calibration Procedure," of *API Standard 2500: Measuring, Sampling, and Testing Crude Oil*.

Both direct-reading and remote-reading automatic liquid level gages are described in Part III, "Automatic Gaging Devices," of API Standard 2500. Remote-reading automatic liquid level gages require a basic mechanism on which telemetering equipment is applied. Telemetering equipment may affect the performance and accuracy of the basic gage.

Appendix A explains installation and test procedures of basic and total performance of gages, whether direct or remote readings are taken. The performance of the basic gage and the total performance should be indicated when the basic gage is equipped for remote transmission, see Appendix A. If the basic gage is not equipped for remote transmission, Appendix A does not apply because transmission systems are not included in the shop tests.

The addition of any auxiliary equipment to an automatic tank gage also may adversely affect the accuracy of the gage. Therefore, in addition to the test for basic gage performance, separate tests shall be conducted to evaluate accuracy whenever the gage is to be used with any auxiliary equipment. Such auxiliary equipment may include high or low level alarms or controls, level sensitive switchgear, or any other mechanism which derives its operating or positioning power from the same source that powers the basic gage.

One or more direct-reading automatic liquid level gage units of each model manufactured during each production schedule shall be tested. The tests may be made by the manufacturer or may be delegated to an appropriate outside agency.

Accuracy data shall be recorded in the form of tables in such a way as to indicate the number of actual values read; the range over which they were read; and the error, or absence of error, at

each test point. Readings shall be recorded by interpolating to the nearest  $\frac{1}{16}$  in. or less.

Any gage used with auxiliary equipment, which derives its positioning or driving power from the gage mechanism, must be tested separately for basic gage performance and for accuracy after application of the auxiliary equipment. If more than one item of auxiliary equipment is added to the basic gage, a separate test must be made after the application of each item of auxiliary equipment.

When a test is run under the foregoing provisions, the recorded data shall include at each point the following three items:

1. *True liquid level* (level of the liquid when float of gage is at equilibrium on the liquid surface).
2. *Indicated liquid level* (automatic gage reading taken according to the manufacturer's instructions on the particular type gage being tested for direct and remote operation).
3. *Difference* between the true liquid level and the indicated liquid level.

## Test Conditions

Gages to be tested shall be production units, not modified in any way from similar units carrying the same designation. Any change in design, which might affect the accuracy of a gage, shall require a new test to establish its conformance with the requirements in this bulletin. If no design changes are made, each type of gage must be retested at least once a year to assure a continuation of the originally established accuracy and performance.

Gages shall be mounted for test in such a manner as to duplicate in every detail the recommended method for mounting used in the field. If there is any departure from this method, such departure shall be fully described in the report of the test, and proof must be given to show that the results of the test are unaffected by such departure. The only exception is the method for handling excess tape during the test, which is fully detailed in the procedure described herein.

## Detailed Information for Tests

Tests shall be run, using either water or an appropriate liquid of constant specific gravity.