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ERRATA

This errata corrects an editorial error in the second edition of API MPMS Chapter 17.11.

Section 7.1.3, page 13, note at the end of section, change:

NOTE Alternate methods of water determination may be used. Refer to API MPMS Chapter 3.1A/EI HM 4.

to

NOTE Alternate methods of water determination may be used; such as the dip rod/water gauge bar (see Figure 5.5), which, when used in conjunction with water-finding past, can be used for determination of free water. Refer to API MPMS Chapter 3.1A/EI HM 4.



AMERICAN PETROLEUM INSTITUTE



Manual of Petroleum Measurement Standards Chapter 17.11

**Measurement and Sampling of Cargoes
On Board Tank Vessels Using Closed and
Restricted Equipment**

**El Hydrocarbon Management
HM 52**

SECOND EDITION, AUGUST 2016

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Using Closed and Restricted Equipment

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Foreword

This publication was prepared jointly by the API Committee on Petroleum Measurement (COPM) and the EI Hydrocarbon Management Committee (HMC).

The COPM and HMC are responsible for the production and maintenance of standards and guides covering various aspects of static and dynamic measurement of petroleum. The API/EI Joint Committee on Hydrocarbon Management (JCHM), its subcommittees, and work groups consist of technical specialists representing oil companies, equipment manufacturers, service companies, terminal and shipowners and operators. The API/EI JCHM encourages international participation, and when producing publications, its aim is to represent the best consensus of international technical expertise and good practice. This is the main reason behind the production of joint publications involving cooperation with experts from both the API and EI.

This standard is intended to provide guidelines for measurement and sampling of cargoes on board tank vessels using closed and restricted equipment. However, it is not intended to preclude the use or development of any other technologies or methods. To gain a better understanding of the methods described in this standard, the reader should review in detail the latest editions of the publications, standards, and documents referenced herein.

SI units are used throughout this publication as the primary units of measure because this system is commonly used in measurement and sampling. However, US Customary (USC) units continue to be used in some applications. Therefore, both SI and USC units are shown (with USC in parentheses).

This standard is not intended to supersede any safety or operating practices recommended by organizations such as the International Maritime Organization (IMO), International Chamber of Shipping (ICS), and Oil Companies International Marine Forum (OCIMF), or individual operating companies, nor is the publication intended to supersede any other safety or environmental considerations, local regulations, or the specific provisions of any contract.

All shipboard procedures described in this standard should be performed by or in the presence of the ship's master or the designated representatives. For reasons of safety, only approved equipment certified intrinsically safe or otherwise approved suitable for its intended use shall be used.

API/EI standards are published as an aid to procurement of standardized equipment and materials and/or as good practice procedures. These standards are not intended to inhibit purchasers or producers from purchasing or producing products made to specifications other than those of API or EI.

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Shall: As used in a standard, "shall" denotes a minimum requirement in order to conform to the requirement.

Should: As used in a standard, "should" denotes a recommendation or that which is advised but not required in order to conform to the requirement.

May: As used in a standard, "may" denotes a course of action permissible within the limits of a standard.

Can: As used in a standard, "can" denotes a statement of possibility or capability.

This publication was produced following API/EI standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API/EI standard.

Questions concerning the interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 1220 L Street, NW, Washington, DC 20005, USA, or the Technical Department, Energy Institute, 61 New Cavendish Street, London, W1G 7AR, UK.

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A catalogue of API publications can be found at www.api.org/publications.

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, USA, standards@api.org, or to the Technical Department, Energy Institute, 61 New Cavendish Street, London, W1G 7AR, UK.

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Introduction

Measurement accuracy and representative sampling are essential to the sale, purchase, and handling of bulk liquids. Accurate measurements and representative sampling require the use of standardized equipment and procedures.

Government and regulatory agencies worldwide are imposing safety and environmental regulations that prohibit tank vessel operations from releasing hydrocarbons into the atmosphere. This has resulted in the restriction and, in some cases, the prohibition of traditional methods of obtaining cargo measurements and samples. Consequently, methods and technologies are now being developed and used that allow cargo measurements and samples to be taken with no vapor release (closed) or with very limited vapor release (restricted).

Shipboard sampling at the load or discharge port is frequently required to test the quality of the cargo against contract and also to determine if any cargo quality degradation has occurred during the shipping process. Shipboard sampling may also be required prior to cargo acceptance and custody transfer, particularly where shipboard blending has taken place.

It should be noted that when taking vessel samples, it may not be possible to obtain representative samples of nonhomogeneous cargoes due to the inherent nature of the cargo and the sampling restrictions.

Measurement and Sampling of Cargoes On Board Tank Vessels Using Closed and Restricted Equipment

1 Scope

This document provides guidance on the use, maintenance, and calibration of restricted and closed measurement and sampling equipment. It also provides guidance on preferred size and positioning for gauging and sampling fittings on vessels.

2 Normative References

This document should be used in conjunction with the following referenced documents. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Manual of Petroleum Measurement Standards (MPMS) Chapter 1, Vocabulary

API MPMS Chapter 2, Tank Calibration

API MPMS Chapter 3.1A-2005, Manual Gauging of Petroleum and Petroleum Products

API MPMS Chapter 7, Temperature Determination

API MPMS Chapter 8.1, Manual Sampling of Petroleum and Petroleum Products

API MPMS Chapter 17.4, Method of Quantification of Small Volumes on Marine Vessels (OBQ/ROB)

API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents

EI HM 4, Manual Level Measurement for Petroleum Liquids

ISO 3170:2004¹, Petroleum Liquids—Manual Sampling

3 Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1

air-saturated vapor pressure

ASVP

The observed pressure exerted in vacuo by air-saturated petroleum products, components, and feedstocks, in the absence of undissolved water.

3.2

assay

The procedure to determine the presence, absence, or quantity of one or more components.

3.3

dead bottom sample

A sample obtained from the lowest accessible point in a tank.

¹ International Organization for Standardization, 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva, Switzerland, www.iso.org.