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Measurement and sampling of cargoes on board tank vessels using
closed and restricted equipment

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Foreword

This publication was prepared jointly by the American Petroleum Institute Committee on Petroleum Measurement and the Energy Institute Hydrocarbon Management Committee.

The American Petroleum Institute Committee on Petroleum Measurement (COPM) and the Energy Institute's Hydrocarbon Management Committee (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 sub-committees and work groups consist of technical specialists representing oil companies, equipment manufacturers, service companies, terminal and ship owners 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 since 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 organisations such as the International Maritime Organization (IMO), International Safety Guide for Oil Tankers and Terminals (ISGOTT), 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 their 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 standardised 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.

Classified areas may vary depending on the location, conditions, equipment, and substances involved in any given situation. Users of this standard should consult with the appropriate authorities having jurisdiction. Users of this standard should not rely exclusively on the information contained in this publication. Sound business, scientific, engineering, and safety judgment should be used in employing the information contained herein.

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

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

This publication was produced following API/EI standardisation 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,

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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 non-homogenous cargos 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 2.8B, Establishment of the Location of the Reference Gauge Point and the Gauge Height of Tanks on Marine Tank Vessels*

API *MPMS Chapter 3, Tank Gauging*

API *MPMS Chapter 3.1A-2005, Manual Gauging for 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 17.2, Measurement of Cargo on Board Tank Vessels*

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

API *MPMS Chapter 17.12/EI HM 11, Procedures for Bulk Liquid Chemical Cargo Inspection by Cargo Inspectors*

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

EI HM 28, *Procedures for Oil Cargo Measurement by Cargo Inspectors*

EI HM 29, *Procedures for Oil Product Cargo Measurements by Cargo Inspectors, Section 1, Crude Oil*

ISO 3170:2004¹, *Petroleum liquids—Manual sampling*

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