Manual of Petroleum Measurement Standards Chapter 6.1A

Metering Assemblies—General Considerations

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Foreword

Revision of API *MPMS* Chapter 6, *Metering Assemblies*, First Edition (2021) is ongoing. The revision supersedes all previous API *MPMS* Chapter 6 standards with the following four separate standards:

— API *MPMS* Chapter 6.1A, *Metering Assemblies—General Considerations*, First Edition (2021)

— API *MPMS* Chapter 6.2A, *Truck and Rail Loading and Unloading Measurement Systems*, First Edition (2021)

— API *MPMS* Chapter 6.3A, *Pipeline and Marine Loading/Unloading Measurement Systems*, First Edition (2021)

— API *MPMS* Chapter 6.4A, *LACT Systems*, First Edition (2021)

These standards supersede the previous API *MPMS* Chapter 6 standards as follows:

— API *MPMS* Chapter 6.1A, *Metering Assemblies—General Considerations*, First Edition (2021) specifies the common requirements for all metering systems and does not supersede any previous API *MPMS* Chapter 6 standards.

— API *MPMS* Chapter 6.2A, *Truck and Rail Loading and Unloading Measurement Systems*, First Edition (2021) supersedes API *MPMS* Chapter 6.2, *Loading Rack Metering Systems*, Third Edition (2004), which will be withdrawn on the publication of API *MPMS* Chapter 6.2A.

— API *MPMS* Chapter 6.3A, *Pipeline and Marine Loading/Unloading Measurement Systems*, First Edition (2021), supersedes API *MPMS* Chapter 6.5, *Metering Systems for Loading Marine Bulk Carriers*, Second Edition (1991) and API *MPMS* Chapter 6.6, *Pipeline Metering Systems*, Second Edition (1991), and Section 5.3.5 of Chapter 6.3A supersedes API MPMS Chapter 6.7, Metering Viscous Hydrocarbons, Second Edition (1991), all of which will be withdrawn.

— API *MPMS* Chapter 6.4A, *LACT Systems*, First Edition (2021), supersedes API *MPMS* Chapter 6.1, *Lease Automatic Custody Transfer (LACT) Systems*, Second Edition (1991), and Section 5.2 of Chapter 6.4A supersedes API *MPMS* Chapter 6.7, *Metering Viscous Hydrocarbons*, Second Edition (1991), all of which will be withdrawn on the publication of API *MPMS* Chapter 6.4A.

NOTE API *MPMS* Chapter 6.7 is superseded by both Chapter 6.3A and Chapter 6.4A. Therefore, Chapter 6.7 will be withdrawn when both Chapter 6.3A and Chapter 6.4A are published.

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The verbal forms used to express the provisions in this document are as follows.

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

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

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 document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API 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, 200 Massachusetts Avenue, Suite 1100, Washington, DC 20001. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 200 Massachusetts Avenue, Suite 1100, Washington, DC 20001.

Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, Suite 1100, Washington, DC 20001, standards@api.org.

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Introduction

This series of 6.XA documents is a guide for the design, installation, calibration, and operation of a liquid flow metering system comprised of equipment used for the custody transfer of liquid hydrocarbons. This section describes general considerations that are applicable to all metering systems.

Many aspects of instrumentation in a metering system for single phase liquids are considered at length in other chapters of this manual and are referenced in Section 2. When aspects are covered under the scope of other chapters of the API Manual of Petroleum Measurement Standards (MPMS), and to avoid replication and conflict, they are not covered by this standard. In these cases, standard provides limited information and refers the user to those chapters.

Work sites and equipment operations may differ. Users are solely responsible for assessing their specific equipment and premises in determining the appropriateness of applying the MPMS. At all times users should employ sound business, scientific, engineering, and judgment safety when using the MPMS.

The following scenarios are merely examples for illustration purposes only. (Each company should develop its own approach.) They are not to be considered exclusive or exhaustive in nature. API makes no warranties, express or implied, for reliance on or any omissions from the information contained in this document.

Metering Assemblies—General Considerations

1 Scope

This standard is part of a set of documents that detail the minimum requirements for metering systems in single phase liquid applications; API *MPMS* Chapter 6.1A is common to all sections of API *MPMS* Chapter 6 and specifies the common requirements for system criteria.

In the event of a conflict between this and API *MPMS* Chapter 6 sections that are not in the 6.XA series, API *MPMS* Chapter 6.1A shall take precedence.

2 Normative References

The following referenced documents are indispensable for the application 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.

API *MPMS* Chapter 4 (all sections), *Proving Systems*

API *MPMS* Chapter 5 (all sections), *Metering*

API *MPMS* Chapter 6 (all sections), *Metering Assemblies*

API *MPMS* Chapter 7 (all sections), *Temperature Determination*

API *MPMS* Chapter 8 (all sections), *Sampling*

API *MPMS* Chapter 9 (all sections), *Density Determination*

API *MPMS* Chapter 9.4, *Continuous Density Measurement Under Dynamic (Flowing) Conditions*

API *MPMS* Chapter 10 (all sections), *Sediment and Water Determination*

API *MPMS* Chapter 12 (all sections), *Calculation of Petroleum Quantities*

API *MPMS* Chapter 21.2, *Electronic Liquid Volume Measurement Using Positive Displacement and Turbine Meters*

GPA 2177,[1] *Analysis of Natural Gas Liquid Mixtures containing Nitrogen and Carbon Dioxide by Gas Chromatography*

GPA 2174, *Obtaining Liquid Hydrocarbons Samples for Analysis by Gas Chromatography*

GPA 2186, *Method for the Extended Analysis of Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Temperature Programmed Gas Chromatography*

ASTM D 3700,[2] *Standard Practice for Obtaining LPG Samples Using a Floating Piston Cylinder*

ASME PTC 19.3,[3] *Thermowells, 2010*

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1 GPA Midstream Association, 6060 American Plaza, Suite 700, Tulsa, Oklahoma 74135, www.gpamidstream.org.

2 ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.

3 American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016, www.asme.org.