Manual of Petroleum Measurement Standards Chapter 4.8

Operation of Proving Systems

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Introduction

This guide is intended to provide essential information on the operation of the various meter proving systems used in the petroleum industry.

In the petroleum industry, the term proving is used to refer to the testing of liquid petroleum meters. A meter is proved by comparing a known prover volume (mass) to an indicated meter volume (mass). For volume proving, the meter and prover volumes are subjected to a series of calculations using correction factors to convert volumes to standard conditions for the effects of temperature and pressure to establish a meter factor. For mass proving, the prover volume is converted to prover mass by the measurement or calculation of density at the prover in order to compare the meter mass to the prover mass, or by the use of a Coriolis master meter, to establish a meter factor.

Liquid petroleum meters used for custody transfer measurement require periodic proving to verify accuracy and repeatability and to establish valid meter factors.

Displacement, master meter, and tank provers vary in size and may be permanently installed or mobile. These prover types are described in their respective section API *Manual of Petroleum Measurement Standards* Chapter 4, *Proving Systems*.

Operation of Proving Systems

1 Scope

This guide provides information for operating meter provers on single-phase liquid hydrocarbons. It is intended for use as a reference manual for operating proving systems.

The requirements of this chapter are based on customary practices for single-phase liquids. This standard is primarily written for hydrocarbons, but much of the information in this chapter may be applicable to other liquids. Specific requirements for other liquids should be agreeable to the parties involved.

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 4.2, *Displacement Provers*

API *MPMS* Chapter 4.4, *Tank Provers*

API *MPMS* Chapter 4.5, *Master-Meter Provers*

API *MPMS* Chapter 4.6, *Pulse Interpolation*

API *MPMS* Chapter 5.1, *General Considerations for Measurement by Meters*

API *MPMS* Chapter 5.2, *Measurement of Liquid Hydrocarbons by Displacement Meters*

API *MPMS* Chapter 5.3, *Measurement of Liquid Hydrocarbons by Turbine Meters*

API *MPMS* Chapter 5.4, *Accessory Equipment for Liquid Meters*

API *MPMS* Chapter 5.5, *Fidelity and Security of Flow Measurement Pulsed-Data Transmission Systems*

API *MPMS* Chapter 5.6, *Measurement of Liquid Hydrocarbons by Coriolis Meters*

API *MPMS* Chapter 5.8, *Measurement of Liquid Hydrocarbons by Ultrasonic Flow Meters Using Transit Time Technology*

API *MPMS* Chapter 7.2, *Dynamic Temperature Determination*

API *MPMS* Chapter 12. 2, (all parts) *Calculation of Petroleum Quantities Using Dynamic Measurement Methods and Volumetric Correction Factors*

API *MPMS* Chapter 13.1, *Statistical Concepts and Procedures in Measurement*

API *MPMS* Chapter 13.2, *Statistical Methods of Evaluating Meter Proving Data*

3 Terms and Definitions

No definitions are unique to this document.