

Manual of Petroleum Measurement Standards Chapter 7.1

Temperature Determination— Liquid-in-Glass Thermometers

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Introduction

This section describes how to correctly use various types of liquid-in-glass thermometers to accurately determine the temperatures of hydrocarbon liquids. Other methods, equipment, and procedures for temperature determination are described in the other subsections of *API Manual of Petroleum Measurement Standards (MPMS) Chapter 7*.

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Temperature Determination—Liquid-in-Glass Thermometers

1 Scope

This section describes how to correctly use various types of liquid-in-glass thermometers to accurately determine the temperatures of hydrocarbon liquids. Other methods, equipment, and procedures for temperature determination are described in the other subsections of API *MPMS* Chapter 7.

This chapter describes the methods, equipment, and procedures for manually determining the temperature of liquid petroleum and petroleum products with liquid-in-glass thermometers. This chapter discusses temperature measurement requirements in general for custody transfer, inventory control, and marine measurements. The actual method and equipment selected for temperature determination are left to the agreement of the parties involved.

The manual method covers:

- non-pressurized tanks and non-pressurized marine vessels;
- gas-blanketed tanks and gas-blanketed marine vessels.

It does not cover hydrocarbons under pressures in excess of 21 kPa gauge (3 psi gauge) or cryogenic temperature measurement, unless equipped with a thermowell.

The requirements of this chapter are based on practices for crude oils and petroleum products covered by API *MPMS* Ch. 11.1 (ASTM D1250). Requirements in this chapter may be used for other fluids and other applications. However, other applications may require different performance and installation specifications.

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 *Manual of Petroleum Measurement Standards (MPMS) Chapter 1, Terms and Definitions*
(<https://chapter1.api.org>)

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 2 (all sections), Tank Calibration*

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 3 (all sections), Tank Gauging*

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 8.1, Standard Practice for Manual Sampling of Petroleum and Petroleum Products*

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 9.4, Continuous Density Measurement Under Dynamic (Flowing) Conditions*

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 11.1, Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils*

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 12.1.1, Calculation of Static Petroleum Quantities—Upright Cylindrical Tanks and Marine Vessels*

API *Manual of Petroleum Measurement Standards (MPMS) Chapter 12.2, Calculation of Petroleum Quantities Using Dynamic Methods and Volumetric Correction Factors*