Manual of Petroleum Measurement Standards
Chapter 7—Temperature Determination

Section 4—Dynamic Temperature Measurement

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Introduction

The purpose of this standard is to describe the measurement practice to accurately determine the temperature of liquid hydrocarbons under dynamic (i.e. flowing) conditions. The accurate measurement of temperature is essential to accurately determine the average temperature of the hydrocarbon liquid transferred, for the purpose of obtaining the temperature and pressure volume correction factors (refer to API *MPMS* Chapter 11.1) to calculate the volume at standard conditions.

Chapter 7—Temperature Determination
Section 4—Dynamic Temperature Measurement

1 Scope

This standard describes methods, equipment, installation, and operating procedures for the proper determination of the temperature of hydrocarbon liquids under dynamic conditions in custody transfer applications. This standard describes the accuracy requirement and the calibration of the temperature measurement equipment.

This standard does not cover dynamic temperature measurement of refrigerated, light hydrocarbon fluids or cryogenic liquids.

2 Normative References

The following standards and other industry publications contain provisions that, through reference in this text, constitute provisions of this standard. All standards are subject to revision, and parties to agreements based on this standard are encouraged to use the most recent editions of the standards indicated below.

API *Manual of Petroleum Measurement Standards* (*MPMS*)

— Chapter 1, *Terms and Definitions,* http://chapter1.api.org

— Chapter 4 (All Relevant Sections), *Proving Systems*

— Chapter 5 (All Relevant Sections), *Metering Systems*

— Chapter 6 (All Relevant Sections), *Metering Assemblies*

— Chapter 7.1, *Liquid in Glass Thermometers*

— Chapter 12.2, *Calculation of Liquid Petroleum Quantities Using Dynamic Measurement Methods*

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

API Recommended Practice 500, *Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I Division 1 and Division 2*

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

ASME [1]

ASME PTC 19.3TW_2016, *American National Standard for Thermowells*

ASTM [2]

— ASTM E1, *Standard Specification for ASTM Thermometers*

— ASTM E77, *Standard Test Method for Inspection and Verification of Liquid-in-glass Thermometers*

— ASTM E344, *Terminology Relating to Thermometry and Hydrometry*

[1] American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990
[2] ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org