Manual of Petroleum Measurement Standards Chapter 11.3.4

Miscellaneous Hydrocarbon Product Properties—Denatured Ethanol and Gasoline Component Blend Densities and Volume Correction Factors

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Foreword

This edition of API *Manual of Petroleum Measurement Standards* (*MPMS*) Chapter 11.3.4 supersedes Section 11.1.2.5.13 Gasohol, of API *MPMS* Chapter 11.1-2004.

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

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Introduction

This standard addresses how to calculate volume correction factors for blends of denatured ethanol and gasoline. Previously, the API Standard, API *MPMS* Chapter 11.1, *Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils*, 2004 addressed these blends by recommending a thermal coefficient of expansion in Section 11.1.2.5.13 and using the “Special Applications Category” in the Chapter 11.1 standard. After considerable laboratory work of actual blending denatured ethanol and gasoline, new equations were derived and are presented in this standard, along with examples with different blending scenarios. See API TR 2580 [1] for more information on the laboratory work and background.

Miscellaneous Hydrocarbon Product Properties—Denatured Ethanol and Gasoline Component Blend Densities and Volume Correction Factors

Implementation Guidelines

It is recognized that guidance concerning an implementation period may be needed in order to avoid disruptions within the industry and ensure proper application. As a result, it is recommended that this standard be utilized on all applications no later than two years after the publication date. An application, for this purpose, is defined as the point where the calculation is applied.

1 Scope

1.1 General

This standard covers density and volume correction factors for blends of denatured ethanol and gasoline blend components ranging from 0 % to 95 % denatured ethanol based upon calculation methods defined in API *MPMS* Chapter 11.1 and Chapter 11.3.3. Calculation of blends and denatured ethanol containing more than 95 % ethanol should use the calculation procedures within API *MPMS* Chapter 11.3.3.

The standard consists of correlations and algorithms for estimating the blend volume change at base conditions and for calculating volume correction factors of denatured ethanol and gasoline component blends. This standard also provides the algorithms to estimate certain blend properties in blending situations where some of the required parameters are not measured.

1.2 Range of Applicability

This standard is applicable to blends containing denatured ethanol and gasoline blend components with 15.5 °C (60 °F) densities ranging from 680 to 800 kg/m^3 (45.2 to 76.4 °API) containing between 0 % and 95 % by volume denatured ethanol over the temperature range of –40 °C to 50 °C (–40 °F to 122 °F) and pressure range of 0 to 10.34 MPa gage (0 to 1508 psig).

2 Blends of Gasoline and Denatured Ethanol (BGE) 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 applies (including any addenda/errata).

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,* May 2004, including Addendum 1, September 2007

API *MPMS* Chapter 11.2.1, Compressibility Factors for Hydrocarbons: 0–90 Degrees API Gravity and 638-1074 Kilograms per Cubic Metre Ranges

API *MPMS* Chapter 11.3.3, *Miscellaneous Hydrocarbon Product Properties—Denatured Ethanol Density and Volume Correction Factors*, Third Edition, January 2019

API *MPMS* Chapter 15, *Guidelines for the Use of the International System of Units in the Petroleum and Allied Industries*, Third Edition