Manual of Petroleum Measurement Standards Chapter 19.4

Evaporative Loss Reference Information and Speciation Methodology

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

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1 Scope

This standard provides methodology to estimate emissions of individual hydrocarbon species using the total emissions of multicomponent hydrocarbon mixtures (such as crude oils and gasoline) estimated from API *MPMS* Chapter 19.1 for fixed-roof tanks, API *MPMS* Chapter 19.2 for floating-roof tanks, API *MPMS* Chapter 19.5 for marine vessels, and other methods used for total hydrocarbon emission estimates. This process is referred to as speciation.

Speciation of emissions from hydrocarbon mixtures accounts for the higher evaporation rate of the more volatile components, resulting in a different composition of the mixture in the vapor phase than in the liquid phase. The methodology presented in this standard assumes that there is sufficient liquid present such that the chemical composition at the liquid surface may be considered to not change as a result of the evaporative loss.

This standard also contains reference information used for estimating emissions in accordance with API *MPMS* Chapter 19.1, API *MPMS* Chapter 19.2, and API *MPMS* Chapter 19.5.

The methodology in this standard applies to:

a) liquids with vapor pressure that has reached equilibrium with ambient conditions at a true vapor pressure less than the ambient atmospheric pressure (i.e. not boiling);

b) liquids for which the vapor pressure is known or for which sufficient data are available to determine the vapor pressure;

c) liquid mixtures where Raoult's Law can be used to describe the vapor phase equilibria.

This methodology does not apply to:

a) emissions that result from leaks from piping components (e.g. valves, flanges, pumps, connectors);

b) liquid mixtures where Raoult's Law cannot be used to describe the vapor phase equilibria (e.g. mixtures in which hydrocarbons are dissolved in water, or mixtures of hydrocarbons with alcohols).

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 19.1, *Evaporative Loss from Fixed-Roof Tanks*, Fourth Edition, 2012

API *MPMS* Chapter 19.2, *Evaporative Loss from Floating-Roof Tanks*, Third Edition, 2012

API *MPMS* Chapter 19.5, *Atmospheric Hydrocarbon Emissions from Marine Vessel Transfer Operations*, First Edition, September 2009

3 Symbols

The following symbols, units, and source applies to this document.

NOTE Symbols used in Annex I are listed in Section I.1.