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On-line Measurement of Water Content in Petroleum and Petroleum Products

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A catalog of API publications can be found at www.api.org/publications.

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Introduction

The purpose of this standard is to provide the requirements for the installation and operation of a water cut analyzer (WCA) for dynamic measurement of water content in petroleum and petroleum products to be used in conjunction with an automatic sampling system that is compliant with API *MPMS* Chapter 8.2.

It may not be possible, nor desirable, to inject water as a test medium into refined products. It is not a requirement to use a proven automatic sampling system in conjunction with a WCA for refined products measurement.

NOTE A "WCA" is sometimes used in this document to denote a complete system (WCA System) to provide this function or be used to describe the key instrument depending on context.

WCA technology is one of several methods to determine water content in petroleum and petroleum products. WCA technologies should be selected with consideration given to the application (properties of the product(s) being measured, the process conditions, installation, operation and maintainability).

Acceptability of the results from a WCA for operation with different petroleum or petroleum products under different process conditions to those originally tested requires ongoing verification.

The standard is applicable, by contract agreement, to the use of a water cut analyzer as a secondary measurement device while the primary sampling system is temporarily out of service, i.e. due to an equipment failure.

This standard also provides useful guidance that could be applied in the use of WCA's for non-custody transfer measurement applications, although in this instance the need for Performance Acceptance Testing (PAT) and ongoing verification may not be commercially required.

On-line Measurement of Water Content in Petroleum and Petroleum Products

1 Scope

To provide requirements for application, installation, operation, testing, and ongoing verification for the use of a water cut analyzer (WCA) for custody transfer of petroleum and petroleum products which shall be used in conjunction with an automatic sampling system that is compliant with API *MPMS* Chapter 8.2.

It is not a requirement to use a proven automatic sampling system in conjunction with a WCA for petroleum products measurement.

This standard also provides guidance that could be applied to the use of WCA's in other applications i.e. the use for quality determination.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes the requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

API *MPMS* Chapter 6.1A, *Manual of Petroleum Measurement Standards Chapter 6.1—Lease Automatic Custody Transfer (LACT) Systems*

API *MPMS* Chapter 8.2, *Standard Practice for Automatic Sampling of Petroleum and Petroleum Products*

API *MPMS* Chapter 8.3, *Standard Practice for Handling and Remixing Samples of Petroleum and Petroleum Products*

3 Terms, Definitions, and Abbreviations

For the purposes of this document, the following definitions apply.

3.1
aliquot
A small portion of a larger sample which is analyzed and assumed to represent the whole sample.

3.2
auxiliary measurement device
Additional measurement devices required to allow the primary measure to be made. For example, this can be density, temperature, salinity or other properties that may influence the primary measurement.

3.3
flow-weighted average (FWA)
The average of a variable weighted by the flow rate or incremental volume. It can be the average of the variable values sampled at uniform volume intervals, or it can be the average of variable values sampled at uniform time intervals and weighted by the incremental volume that occurred during that time interval.

3.4
performance acceptance testing (PAT)
Performance testing that allows the WCA system to be validated for use in a specific application (see also verification testing).