Manual of Petroleum Measurement Standards Chapter 14.1

Collecting and Handling of Natural Gas Samples for Analysis by Gas Chromatography

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Introduction

This standard focuses on natural gas sampling systems and procedures, recognizing the critical impact of hydrocarbon dew point consideration to the overall accuracy and success of these practices and procedures.

Not all methods are appropriate for all sampling conditions, so it is important to have a thorough knowledge of the phase behavior of the product to be sampled and of the Joule-Thomson effect.

Analyses of gas samples are used for many purposes and are applied to various calculations, some of which have an impact on the accuracy of quantity and quality calculations.

This standard address collection and handling of representative natural gas samples from streams at or above the hydrocarbon dew point, streams that may contain water vapor up to the point of saturation, and streams that may be sour or sweet.

It is not the intent of this standard to recommend particular equipment suppliers or manufacturers.

Collecting and Handling of Natural Gas Samples for Analysis by Gas Chromatography

1 Scope

The purpose of the standard is to provide comprehensive guidelines and procedures for properly extracting, collecting, conditioning, and handling a sample from a flowing natural gas stream at or above its dew point temperature and that represents the composition of the vapor-phase portion of the source fluid. This standard considers spot, composite, continuous, online, and mobile sampling systems and does not include sampling of liquid or multiphase streams.

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.

GPA 2198-16 [1], *Selection, Preparation, Validation, Care and Storage of Natural Gas and Natural Gas Liquids Reference Standard Blends*

GPA 2261-20, *Analysis for Natural Gas and Similar Gaseous Mixtures by Gas Chromatography*

3 Terms, Definitions, Acronyms, and Abbreviations

3.1 Terms and Definitions

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

3.1.1
absorption
Occurs when natural gas constituents are dissolved into a liquid or solid that is not considered to be the mixture's liquid phase.

3.1.2
adsorption
Occurs when a thin film of molecules adheres to a liquid or solid surface.

3.1.3
chilled mirror test
Used to determine dew points of water and/or hydrocarbon by passing the natural gas over a mirror while gradually reducing the temperature of the mirror until condensation forms. A Bureau of Mines–type of dew point apparatus is commonly used for chilled mirror tests.

3.1.4
continuous sampling systems
Provides for an uninterrupted flow of sample.

3.1.5
cricondenbar
The point of maximum pressure on a hydrocarbon dew point curve. This is the highest pressure at which a hydrocarbon mixture can exist separately as gas and liquid.

[1] GPA Midstream Association, 6060 American Plaza, Suite 700, Tulsa, Oklahoma 74135, https://gpamidstream.org.