

## **Obtaining Liquid Hydrocarbons Samples For Analysis by Gas Chromatography**

Adopted as a Tentative Standard 1974

Revised 2014

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#### FOREWORD

This 2014 revision of GPA Publication 2174 is based on the original 2174 publication, first published in 1974 and revised in 1983. It has been expanded and revised to include additional natural gas liquid sampling procedures. These changes are primarily the result of a cooperative analytical study directed by a Gas Processors Association work group through Technical Committee Section B. Testing was performed on eight (8) potential sampling methods. Ten laboratories and eighteen volunteers were eventually involved in gathering 320 samples that covered over 7,000 data points. Criteria for an acceptable sampling method required that it demonstrated minimal variability, was representative of the source, and was user friendly. Details of the project addressed experimental design, sample collection, logic of the evaluation process, and statistical analysis; final conclusions were presented in the Proceedings of the Gas Processors Association's 67th Annual Convention, March 1988, in Dallas, Texas.

Sampling methods found to be acceptable from the chromatographic analysis of the 10 common components of the natural gas liquids and which are covered in the work group report are:

- 1. Floating Piston Cylinder (original GPA Standard 2174)
- 2. Water Displacement (total H20 removal- 80% replaced by hydrocarbons; 20% displaced for outage)
- 3. Water Displacement (partial H20 removal 70% replaced by hydrocarbons; 20% displaced for outage; 10% remaining in cylinder)
- 4. Ethylene Glycol Displacement (total glycol removal- 80% replaced by hydrocarbons; 20% displaced for outage)

Proper samples can be obtained when using any of the four methods listed, provided a strict adherence to detail is maintained. It is recommended that the potential users of these methods study the work group report prior to selection of an applicable method.

# **Obtaining Liquid Hydrocarbon Samples** For Analysis by Gas Chromatography

### 1. SCOPE

**1.1** The specific purpose of this method is to describe the equipment and procedures for obtaining representative samples of natural gas liquids and the subsequent preparation of those samples for laboratory analysis by gas chromatography. The procedures described in this method may be used for obtaining samples for analysis by methods other than gas chromatography. A SAMPLE PROBE MUST BE USED TO OBTAIN A REPRESENTATIVE SAMPLE.

### 2. OUTLINE OF METHODS

- **2.1** A hydrocarbon fluid sample is transferred under pressure from a source into a sample container by one of the following methods:
  - a. Floating Piston Cylinder Method
  - b. Water Displacement Method 1 (total H20 removal 80% replaced by hydrocarbons; 20% displaced for outage)
  - c. Water Displacement Method 2 (partial H20 removal 70% replaced by hydrocarbons; 20% displaced for outage; 10% remaining in cylinder)
  - d. Ethylene Glycol Displacement Method (total glycol removal 80% replaced by hydrocarbons; 20% displaced for outage)

Note 1 — Methods b, c, and d may not be applicable to the analysis of certain samples containing reactive non-hydrocarbons such as sulfur compounds, carbon dioxide, etc.

### 3. GENERAL INFORMATION

- **3.1** The objective of any sampling operation is to secure, in a suitable container, an adequate portion of a hydrocarbon fluid under pressure, having the same composition as the stream being sampled.
- **3.2** Particular emphasis should be given to the necessity of obtaining accurate, representative samples for analysis since the results, regardless of the care and accuracy of the laboratory tests, may be useless if the samples are not valid.
- **3.3** It is not possible, nor is it the intent of this method, to provide a procedure that will be applicable for all sampling situations. The sample source here is assumed to be a homogeneous, single-phase liquid. All samples must be obtained using a probe designed to secure product from the center one-third of the flowing stream. The location of the

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