



# Standard Test Method for Analysis of Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Gas Chromatography<sup>1</sup>

This standard is issued under the fixed designation D 2597; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 This test method covers the analysis of demethanized liquid hydrocarbon streams containing nitrogen/air and carbon dioxide, and purity products, such as an ethane/propane mix that fall within the compositional ranges listed in Table 1. This test method is limited to mixtures containing less than 5 mol % of heptanes and heavier fractions.

1.2 The heptanes and heavier fractions, when present in the sample, are analyzed by either (1) reverse flow of carrier gas after *n*-hexane and peak grouping or (2) precut column to elute heptanes and heavier first as a single peak. For purity mixes without heptanes and heavier, no reverse of carrier flow is required.

NOTE 1—**Caution:** In the case of unknown samples with a relatively large C<sub>6</sub> plus or C<sub>7</sub> plus fraction and where precise results are important, it is desirable to determine the molecular weight (or other pertinent physical properties) of these fractions. Since this test method makes no provision for determining physical properties, the physical properties needed can be determined by an extended analysis or agreed to by the contracting parties.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements see Annex A3.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

<sup>1</sup> This test method is under the jurisdiction of Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.H0 on Liquefied Petroleum Gas.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 1 Components and Compositional Ranges Allowed

| Components                               | Concentration Range, Mol % |
|------------------------------------------|----------------------------|
| Nitrogen                                 | 0.01–5.0                   |
| Carbon Dioxide                           | 0.01–5.0                   |
| Methane                                  | 0.01–5.0                   |
| Ethane                                   | 0.01–95.0                  |
| Propane                                  | 0.01–100.0                 |
| Isobutane                                | 0.01–100.0                 |
| <i>n</i> -Butane and 2,2-Dimethylpropane | 0.01–100.0                 |
| Isopentane                               | 0.01–15.0                  |
| <i>n</i> -Pentane                        | 0.01–15.0                  |
| 2,2-Dimethylbutane                       | 0.01–0.5                   |
| 2,3-Dimethylbutane and 2-Methylpentane   |                            |
| 3-Methylpentane and Cyclopentane         | 0.01–15.0                  |
| <i>n</i> -Hexane                         |                            |
| Heptanes and Heavier                     | 0.01–5.0                   |

D 3700 Practice for Obtaining LPG Samples Using a Floating Piston Cylinder

### 2.2 GPA Standard:<sup>3</sup>

GPA Standard 2177 Analysis of Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Gas Chromatography

## 3. Summary of Test Method

3.1 Components to be determined in a demethanized hydrocarbon liquid mixture are physically separated by gas chromatography and compared with calibration data obtained under identical operating conditions. A fixed volume of sample in the liquid phase is isolated in a suitable sample inlet system and entered onto the chromatographic column.

3.1.1 Components nitrogen/air through *n*-hexane are individually separated with the carrier flow in the forward direction. The numerous heavy end components are grouped into an irregular shape peak by reversing direction of carrier gas through the column by means of a switching valve immediately following the elution of normal hexane. (See Fig. 1.) Samples that contain no heptanes plus fraction are analyzed until the final component has eluted with no reverse of carrier flow.

<sup>3</sup> Available from Gas Processors Association (GPA), 6526 E. 60th St., Tulsa, OK 74145.