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**Standard Method for
ANALYSIS OF COMMERCIAL BUTANE-BUTENE
MIXTURES AND ISOBUTYLENE BY GAS
CHROMATOGRAPHY¹**

This Standard is issued under the fixed designation D 1717; 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.

* NOTE—The title was revised editorially in July 1976.

1. Scope and Application

1.1 This method is applicable to the analysis by gas chromatography of:

1.1.1 Commercial butane-butene mixtures (B-B mix),

1.1.2 Commercial isobutylene of at least 98 percent purity.

NOTE 1—This procedure may be applicable to other C₂ to C₄ products, but commercial butane-butene mixtures and high-purity isobutylene are the only products that have been cooperatively studied by the sponsoring committee.

NOTE 2—The values stated in SI units are to be regarded as the standard.

2. Summary of Method

2.1 The sample is introduced into a gas-liquid partition column; the components are separated as they pass through the column with a carrier gas, and their presence in the effluent is detected and recorded as a chromatogram. For B-B mixtures the composition of the sample is determined from the chromatogram by comparing peak heights or areas with those obtained from a standard sample. The composition of high-purity samples (better than 98 percent purity) is determined from the chromatograms by measuring the area under peaks.

3. Apparatus

3.1 *Chromatograph*—Any chromatograph, commercially available or custom designed, equipped with a bypass sample injector and a suitable gas-handling system. The detector must have sufficient sensitivity to obtain a deflection of at least 2 mm for 0.1 mol per-

cent of *n*-butane when a ¼-ml sample is used.

3.2 *Recorder*—A 1 to 10-mV recorder with a full-scale response time of 2 s or less and a maximum rate of noise of ±0.3 percent of full scale.

3.3 *Aluminum or Stainless Steel Tubing*, ¼-in. in outside diameter.

4. Reagents and Materials

4.1 *Benzyl Cyanide*.²

4.2 *Diatomaceous Earth*, acid-washed, passing a No. 35 (500-μm) and retained on a No. 80 (180-μm) sieve. (Caution, see Note 3).

NOTE 3: *Caution*—This method as written is based on the use of Chromosorb (pink).³ Comparable results may not be obtained with diatomaceous earth from other sources.

4.3 *Helium*.

4.4 *Silver Nitrate* (AgNO₃), reagent grade.

5. Preparation of Apparatus

5.1 *Column Preparation*—Prepare the benzyl cyanide-silver nitrate reagent by weighing 30 g of benzyl cyanide into a 4-oz, brown, screw-cap bottle. Add 15 g of dry, pulverized silver nitrate crystals to the bottle. Dissolve the crystals with occasional shaking and let stand overnight if necessary.

5.1.1 Weigh 75 g of dry, acid-washed dia-

¹ This method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants. Current edition effective Aug. 31, 1965. Originally issued 1960. Replaces D 1717 - 61 T.

² Benzyl cyanide of suitable purity is available from Distillation Products Industries, Rochester, N.Y.

³ Chromosorb (pink) is available from the Johns-Manville Corp., Manville, N.J.