



Designation: D5303 – 20

Standard Test Method for Trace Carbonyl Sulfide in Propylene by Gas Chromatography¹

This standard is issued under the fixed designation D5303; 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 determination of traces of carbonyl sulfide (COS) in propylene. It is applicable to COS concentrations from 0.5 mg/kg to 4.0 mg/kg (parts per million by mass). See [Note 1](#).

NOTE 1—The lower limit of this test method is believed to be below 0.1 mg/kg, depending on sample size and sensitivity of the instrumentation being used. However, the cooperative testing program was conducted in the 0.5 to 4.0 range due to limitations in preparing commercial test mixtures.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific hazards statements are given in [Section 9](#).

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

- [D1835 Specification for Liquefied Petroleum \(LP\) Gases](#)
- [D3609 Practice for Calibration Techniques Using Permeation Tubes](#)
- [D4468 Test Method for Total Sulfur in Gaseous Fuels by](#)

¹ This test method is under the jurisdiction of ASTM Committee [D02](#) on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee [D02.D0.03](#) on Propylene.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[Hydrogenolysis and Rateometric Colorimetry](#)

[E355 Practice for Gas Chromatography Terms and Relationships](#)

[E840 Practice for Using Flame Photometric Detectors in Gas Chromatography](#)

3. Terminology

3.1 Definitions:

3.1.1 Additional terminology related to the practice of gas chromatography can be found in [Practice E355](#).

3.1.2 *liquefied petroleum gas (LPG)*, *n*—hydrocarbon gases that can be stored or handled in the liquid phase through compression or refrigeration, or both.

3.1.2.1 *Discussion*—LPG's generally consist of C₃ and C₄ alkanes and alkenes or mixtures thereof and containing less than 10 % by volume of higher carbon number material. Vapor pressure does not normally exceed 2000 kPa at 40 °C.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *propane/propene mixtures*, *n*—mixtures primarily composed of propane and propene where one of these components is usually in the concentration range of 30 % to 85 % by mass with the other comprising the majority of the remainder. Commercial Propane in [Specification D1835](#) is typically this sort of product mixture.

3.2.1.1 *Discussion*—Other components may be present, usually at less than 10 % by mass.

4. Summary of Test Method

4.1 A procedure is given for removing a sample from the sample cylinder, separating COS from propylene, detecting COS, calibrating the detector, quantitating COS content in the sample, and assaying the gas standard. General comments and recommended techniques are given.

4.2 A relatively large volume of sample is injected into a gas chromatograph having a single packed column, operated isothermally at 10 °C to 50 °C, that separates COS from propylene. COS is detected with a flame photometric detector.

4.3 Calibration data, based on peak areas, are obtained using a known gas standard blend of COS in the range expected for the sample. The COS peak area in the sample is measured and the concentration of COS calculated.

*A Summary of Changes section appears at the end of this standard