



Designation: D8302 – 20

Standard Test Method for Determination of Cycloparaffin Content in Saturated ATJ- SPK Jet Fuel Gas Chromatography¹

This standard is issued under the fixed designation D8302; 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 cycloparaffin content by gas chromatography of the saturated ATJ-SPK jet fuel as specified in Specification [D7566](#), section A5.4.1, derived from isobutanol and follows the fuel fingerprint described in the Annex of this test method.

1.2 The working range for the test method is for cycloparaffin content in the range of 1 % to 15 % by mass.

1.3 The test method has an interim precision and will be updated once an extended ILS is conducted.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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

[D2425](#) Test Method for Hydrocarbon Types in Middle Distillates by Mass Spectrometry

[D6299](#) Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance

[D6300](#) Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products, Liquid Fuels, and Lubricants

[D7566](#) Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons

[D7372](#) Guide for Analysis and Interpretation of Proficiency Test Program Results

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

[E594](#) Practice for Testing Flame Ionization Detectors Used in Gas or Supercritical Fluid Chromatography

3. Terminology

3.1 This test method references common gas chromatographic procedures, terms, and relationships which may be found in Practices [E355](#) and [E594](#).

3.2 Definitions:

3.2.1 *paraffins, n*—saturated, non-cyclic hydrocarbons.

3.3 Abbreviations:

3.3.1 *ATJ-SPK*—alcohol-to-jet synthetic paraffinic kerosene

3.3.2 *ASTM*—American Society for Testing and Materials

3.3.3 *FID*—flame ionization detector

3.3.4 *GC/MS*—gas chromatograph mass spectrometer

3.3.5 *IPC*—identified paraffin concentration

3.3.6 *m/z*—molecular mass to charge ratio of an ion

3.3.7 *PTP*—proficiency testing programs

3.3.8 *QC*—quality control

4. Summary of Test Method

4.1 A representative aliquot of ATJ-SPK jet fuel is introduced into a gas chromatograph equipped with a 5 % phenylmethylpolysiloxane bonded phase capillary column. Carrier gas transports the vaporized aliquot through the column where the components are separated by the chromatographic process. Components are sensed by a flame ionization detector as they elute from the column in boiling point order. The detector signal is processed by an electronic data acquisition system. The paraffins are identified by comparing their retention times to the ones reported in the method. Identification of the paraffins has been previously performed by analyzing reference samples and standards by mass spectrometry under conditions as indicated in the Annex. The concentrations of all components are determined in mass percent area by normalization of

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 [D02.04](#) on Hydrocarbon Analysis.

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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.