



Designation: D7515 – 19 (Reapproved 2023)

Standard Test Method for Purity of 1,3-Propanediol (Gas Chromatographic Method)¹

This standard is issued under the fixed designation D7515; 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 describes the gas chromatographic determination of purity for 1,3-propanediol (PDO). This test method was originally developed to determine the purity of 1,3-propanediol used for the application as the freeze point depressant base fluid in formulated PDO engine coolants. Use of the method for purity of PDO for other applications may be viable.

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

1.2.1 *Exception*—Inch-pound units (psi) are used in [Table 1](#), Pressure Program, Options A and B.

1.3 Review the current Material Safety Data Sheets (MSDS) for detailed information concerning toxicity, first aid procedures, and safety precautions.

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

¹ This test method is under the jurisdiction of ASTM Committee D15 on Engine Coolants and Related Fluids and is the direct responsibility of Subcommittee D15.04 on Chemical Properties.

Current edition approved Sept. 1, 2023. Published September 2023. Originally approved in 2009. Last previous edition approved in 2019 as D7515 – 19. DOI: 10.1520/D7515-19R23.

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.

[D1123 Test Methods for Water in Engine Coolant Concentrate by the Karl Fischer Reagent Method](#)

[E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)

[E300 Practice for Sampling Industrial Chemicals](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[E2409 Test Method for Glycol Impurities in Mono-, Di-, Tri- and Tetraethylene Glycol and in Mono- and Dipropylene Glycol \(Gas Chromatographic Method\)](#)

3. Summary of Test Method

3.1 The sample is analyzed by a temperature-programmed gas chromatograph, equipped with a capillary column and flame ionization detector (FID), and quantification is performed by direct area normalization.

3.2 Additionally, the use of a reference sample using Ethylene, Propylene, or Dipropylene Glycol (EG, PG or DPG) in 1,3-PDO (minimum purity 99.5 %) should be used as a performance check (see [Section 8](#)).

NOTE 1—The application of this reference sample is also used to demonstrate the separation of commonly used glycols (EG, PG and DPG) in engine coolants, from PDO. Solutions of EG, PG, or DPG in concentrations of 0.1 to not more than 1 % may be used.

4. Significance and Use

4.1 Knowledge of an approved method is required to establish whether the product meets the requirements of its specifications. The use of glycols in the reference sample is not intended to suggest the presence of glycol (EG, PG and DPG) impurities, but to demonstrate and quantify the separation of commonly used Engine Coolant glycols from PDO.

5. Apparatus

5.1 *Gas Chromatograph(s)*—provided with a sample splitter or on-column injection, flame ionization detector and temperature-programming facilities. The instrument must be suitable for analysis according to the operating instructions given in [Table 1](#). To account for differences among laboratory equipment, the two most common column choices are listed.