



Designation: **D7388 – 18 D7388 – 23**

Standard Specification for Engine Coolant Grade 1,3-Propanediol (PDO)¹

This standard is issued under the fixed designation D7388; 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 specification covers engine coolant grade 1,3-propanediol (PDO).

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.*

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

- D1122 Test Method for Relative Density of Engine Coolant Concentrates and Engine Coolants By The Hydrometer
- D1123 Test Methods for Water in Engine Coolant Concentrate by the Karl Fischer Reagent Method
- D1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)
- D1287 Test Method for pH of Engine Coolants and Antirusts
- D1613 Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products
- D3634 Test Method for Trace Chloride Ion in Engine Coolants
- D4052 Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter
- D5827 Test Method for Analysis of Engine Coolant for Chloride and Other Anions by Ion Chromatography
- D5931 Test Method for Density and Relative Density of Engine Coolant Concentrates and Aqueous Engine Coolants by Digital Density Meter
- D6130 Test Method for Determination of Silicon and Other Elements in Engine Coolant by Inductively Coupled Plasma-Atomic Emission Spectroscopy
- D7515 Test Method for Purity of 1,3-Propanediol (Gas Chromatographic Method)
- E202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols
- E300 Practice for Sampling Industrial Chemicals

¹ This specification is under the jurisdiction of ASTM Committee D15 on Engine Coolants and Related Fluids and is the direct responsibility of Subcommittee D15.07 on Specifications.

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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.

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

3. Requirements

3.1 Engine coolant grade 1,3-propanediol shall conform to the chemical and physical property requirements in **Table 1**.

4. Sampling

4.1 Sample 1,3-propanediol in accordance with the appropriate sections of Practice **E300** for liquid samples.

5. Packaging, Package Marking, and Transportation

5.1 The packaging, labeling, and transportation of commercial quantities shall conform to applicable federal, state, and local regulations. Conformance is the responsibility of the manufacturer and the shipper.

6. Keywords

6.1 engine coolant; glycol; 1,3-propanediol; PDO

SUMMARY OF CHANGES

Subcommittee D15.07 has identified the location of the selected changes to this standard since the last issue (D7388 – 18) that may impact the use of this standard.

(1) In **Table 1**, Physical and Chemical Requirements, the Relative density, 20/20 °C, was changed from 1.0520–1.0540 to 1.052–1.054.

TABLE 1 Physical and Chemical Requirements

Requirement	Values for PDO	ASTM Test Method
1,3-Propanediol, mass %	99.0 min	D7515
Dipropylene glycol, mass %	0.5 max	E202
Other glycols, mass %	0.2 max	E202
Total glycols, mass %	99.5 min	E202
pH at 50 % in DI water	6.00–9.00	D1287
Relative density, 20/20 °C	1.0520–1.0540	D1122, D4052, D5931
Relative density, 20/20 °C	1.052–1.054	D1122, D4052, D5931
Water, mass %	0.5 max	D1123
Acidity as acetic acid, mass %	0.01 max	D1613
Glycol esters	^A	^A
Chloride ion, µg/g (ppm)	5 max	D3634, D5827^B
Sulfate ion, µg/g (ppm)	10 max	D5827
Nitrite, nitrate, phosphate (total, µg/g (ppm))	10 max	D5827
Silicon, µg/g (ppm)	1 max	D6130
Boron, µg/g (ppm)	10 max	D6130
Aluminum, calcium, copper, iron, magnesium, lead, zinc (total, µg/g (ppm))	5 max	D6130
Appearance	Clear, no suspended matter	E202
Color, Pt/Co scale	25 max	D1209

^A A titration test method to determine glycol ester content is under development. Specific values will be established once the method has been standardized.

^B In case of dispute, Test Method **D3634** shall be the preferred test method.