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Standard Specification for Engine Coolant Grade Glycol[1]

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1. Scope

1.1 This specification covers commercial products, engine coolant grade ethylene glycol and propylene glycol, including virgin glycols and those derived from the recycling of vehicle engine coolants and industrial source glycols.

1.2 Types EG-1 and PG-1 cover glycols with sufficiently low limits on components to allow a blended coolant to meet most OEM (Original Equipment Manufacturer) specifications. These types will probably be virgin materials, although redistillation could produce a sufficiently pure product. Types EG-2 and PG-2 cover glycol that will be suitable for many coolants. These types can be either redistilled or virgin.

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

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

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D1122 Test Method for Density or 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

D4725 Terminology for Engine Coolants and Related Fluids

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

E202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols

E300 Practice for Sampling Industrial Chemicals

E394 Test Method for Iron in Trace Quantities Using the 1,10-Phenanthroline Method

3. Requirements

3.1 Engine coolant grade ethylene glycol or propylene glycol, including virgin glycols and those derived from the recycling of vehicle engine coolants and industrial source glycols, shall conform to the chemical and physical property requirements in Table 1.

4. Sampling

4.1 Sample ethylene or propylene glycol in accordance with the appropriate sections of Practice E300 for liquid samples.

5. Test Methods

5.1 Test each composite sample for the chemical and physical requirements listed in 3.1.

6. Packaging, Package Markings, and Transportation

6.1 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.

7. Keywords

7.1 anti-freeze; engine coolant; ethylene; glycol; propylene glycol; recycled

[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.

TABLE 1 Chemical and Physical Requirements

Requirement	Value for Ethylene Glycol, Type EG-1	Value for Propylene Glycol, Type PG-1	Value for Ethylene Glycol, Type EG-2	Value for Propylene-Glycol, PG-2	ASTM Test Method
Clarity	Clear, no suspended matter	Clear, no suspended matter	Clear, no suspended matter	Clear, no suspended matter	Visual
Color, Pt/Co scale	25 max	25 max	100 max	100 max	D1209
Relative density, 20/20°C	1.113 to 1.116	1.0375 to 1.0390	1.113 to 1.116	1.0375 to 1.0390	D1122, D4052, D5931
pH, 50 % by volume in distilled water	6.5 to 9.0	6.5 to 9.0	6.5 to 9.0	6.5 to 9.0	D1287
Acidity as acetic acid, mass %	0.01 max	0.01 max	0.01 max	0.01 max	D1613
Ethylene glycol, mass %	94.5 min	...	94.5 min	...	E202
Propylene glycol, mass %	...	98.5 min	...	98.5 min	E202
Dipropylene glycol, mass %	...	1.0 max	...	1.0 max	E202
Other glycols[A], mass %	5 max	0.2 max	5 max	0.2 max	E202
Total glycols, mass %	98 min	99.5 min	98 min	99.5 min	E202
Water, mass %	0.5 max	0.5 max	2.0 max	0.5 max	D1123
Glycol esters	[B]	[B]	[B]	[B]	Under development
Nitrite, Nitrate, Phosphate (total, ppm)	10 max	10 max	100 max	50 max	D5827
Silicon, ppm	10 max	10 max	10 max	10 max	D6130
Chloride ion, ppm	5 max	5 max	25 max	25 max	D3634, D5827[C]
Sulfate, ppm	10 max	10 max	100 max	100 max	D5827
Boron, ppm	10 max	10 max	50 max	50 max	D5827
Aluminum, Calcium, Copper, Iron, Magnesium, Lead, Zinc (total, ppm)	5	5	5	5	D6130
Iron, ppm	1.0 max	1.0 max	1.0 max	1.0 max	E394, D6130

[A] Other glycols shall be as defined in Terminology D4725.
[B] A titration test method to determine glycol ester content is under development. Specific values will be established once the method has been standardized. However, this is an important property and until such time as specific values are included, a limit for glycol esters should be established by agreement between the supplier and the customer.
[C] In case of dispute, Test Method D3634 shall be the preferred test method.