



Designation: D8528 – 24

Standard Test Method for Determination of Fluoride and Glycol Degradation Products in Engine Coolants by Ion Chromatography¹

This standard is issued under the fixed designation D8528; 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 fluoride in engine coolants by ion chromatography. Several glycol degradation products (different carboxylates including, but not limited to, formate and glycolate) can be determined by this test method.

1.2 This test method applies to both new and used engine coolants.

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, 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

[D1176 Practice for Sampling and Preparing Aqueous Solutions of Engine Coolants or Antirusts for Testing Purposes](#)

[D1193 Specification for Reagent Water](#)

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

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

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.

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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.

3. Terminology

3.1 *Definitions:*

3.1.1 *eluent, n*—solution used to carry sample material through an ion chromatography system.

4. Summary of Test Method

4.1 A prepared sample is pumped through analytical columns and a suppressor into a conductivity detector. Analytes are separated based on their interaction with the stationary phase (column resin) and mobile phase (eluent). The suppressor increases the sensitivity of the method by both increasing the conductivity of the analytes and decreasing the conductivity of the eluent. Analytes are quantitated by the integration of their conductivity compared with a calibration curve.

5. Significance and Use

5.1 This test method is for the quantitative determination of fluoride and glycol degradation products in engine coolants. By this method, analysis can be performed directly without pretreatment, other than dilution, as required by the linear ranges of the equipment. [Table 1](#) indicates applicable analytes and approximate detection limits.

6. Interferences

6.1 Method interferences can be caused by chemicals with similar retention times, especially if they are in high concentration compared to the analyte of interest. Sample dilution will be used to minimize or solve most interference problems.

6.2 Cross-contamination interferences can be caused by the contamination of glassware, eluent, reagents, etc. Great care must be taken to ensure that these interferences are kept at the lowest possible levels.

7. Apparatus

7.1 *Analytical Balance*, capable of measuring to the nearest 0.0001 g.

7.2 *Ion Chromatograph*—Analytical system with all required accessories. Column life and performance are improved by the use of a gradient pump, if available.

7.3 *Analytical Column*—A high-capacity, hydroxide selective anion exchange column designed for the separation of