



# Standard Specification for Polyester Grade Ethylene Glycol<sup>1</sup>

This standard is issued under the fixed designation E 2470; 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 polyester grade ethylene glycol.

1.2 The following safety hazards caveat pertains only to the test methods portion, Section 5, described in this specification: *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.*

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

1.4 The following applies to all specified limits in this standard; for purposes of determining conformance with this standard, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand digit used in expressing the specification limit, in accordance with the rounding-off method of Practice E 29.

1.5 The values stated in SI units are to be regarded as the standard.

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

D 482 Test Method for Ash from Petroleum Products<sup>3</sup>

D 1078 Test Method for Distillation Range of Volatile Organic Liquids<sup>4</sup>

D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)<sup>4</sup>

D 1613 Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer,

and Related Products<sup>4</sup>

D 1722 Test Method for Water Miscibility of Water-Soluble Solvents<sup>3</sup>

D 4052 Test Method for Density and Relative Density of Liquids by Digital Density Meter<sup>3</sup>

D 4176 Test Method for Free Water and Particulate Contamination in Distillate Fuels (Visual Inspection Procedures)<sup>3</sup>

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E 202 Test Methods for Analysis of Ethylene Glycols and Propylene Glycols<sup>4</sup>

E 300 Practice for Sampling Industrial Chemicals

E 1064 Test Method for Water in Organic Liquids by Coulometric Karl Fischer Titration<sup>5</sup>

E 1615 Test Method for Iron in Trace Quantities Using the FerroZine Method<sup>5</sup>

E 2193 Test Method for Ultraviolet Transmittance of Monoethylene Glycol (Ultraviolet Spectrophotometric Method)<sup>5</sup>

E 2313 Test Method for Aldehydes in Mono-, Di-, and Triethylene Glycol (Spectrophotometric Method)<sup>5</sup>

E 2409 Test Method for Glycol Impurities in Mono-, Di-, Tri- and Tetraethylene Glycol (Gas Chromatographic Method)<sup>5</sup>

E 2469 Test Method for Chloride in Monoethylene Glycol by Ion Chromatography<sup>5</sup>

## 3. Requirements

3.1 Polyester grade ethylene glycol shall conform to the specification chemical and physical requirements (see Table 1).

## 4. Sampling

4.1 Sample ethylene glycol in accordance with the appropriate sections of Practice E 300 for liquid samples.

## 5. Test Methods

5.1 Test each composite sample for chemical and physical requirements using the test methods specified in 3.1. Many of these test methods, along with alternative test methods and

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and is the direct responsibility of Subcommittee E15.02 on Product Standards.

Current edition approved Jan. 1, 2007. Published January 2007.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The precision estimates for the analysis of glycols using these test methods has not been determined.

<sup>4</sup> The precision estimates for the analysis of glycols using these test methods are based on an interlaboratory study performed in 1962/62. Specific information for each method can be found in Test Methods E 202.

<sup>5</sup> The precision estimates for the analysis of glycols using these test methods are to be determined or updated in an Interlaboratory Study planned for 2006/07.

**TABLE 1 Chemical and Physical Specification Requirements**

| Specification Requirements                     | min      | max          | ASTM Test Method |
|------------------------------------------------|----------|--------------|------------------|
| Acidity as Acetic Acid, % mass (m/m)           | —        | 0.002        | <b>D 1613</b>    |
| Aldehydes as Acetaldehyde, ug/g                | —        | not reported | <b>E 2313</b>    |
| Appearance, Clear & Free from Suspended Matter | pass     | —            | <b>D 4176</b>    |
| Chloride as Cl, ug/g                           | —        | 0.2          | <b>E 2469</b>    |
| Color, platinum cobalt                         | —        | 5            | <b>D 1209</b>    |
| Glycols                                        |          |              | <b>E 2409</b>    |
| Ethylene glycol, % mass (m/m)                  | 99.9     | —            |                  |
| Diethylene glycol, % mass (m/m)                | —        | 0.05         |                  |
| Iron, ug/g                                     | —        | 0.1          | <b>E 1615</b>    |
| Ultraviolet Transmittance                      |          |              | <b>E 2193</b>    |
| at 220 nm, %T                                  | 70       | —            |                  |
| at 250 nm, %T                                  | 90       | —            |                  |
| at 275 nm, %T                                  | 94       | —            |                  |
| at 350 nm, %T                                  | 98       | —            |                  |
| Water, % mass (m/m)                            | —        | 0.05         | <b>E 1064</b>    |
| Typical Properties                             | min      | max          | ASTM Test Method |
| Ash, % mass (m/m)                              | —        | 0.004        | <b>D 482</b>     |
| Distillation Range                             |          |              | <b>D 1078</b>    |
| Initial Boiling Point, C                       | 196      | —            |                  |
| Dry Point, C                                   | —        | 200          |                  |
| Relative Density at                            |          |              |                  |
| 20/20 C                                        | 1.1151   | 1.1156       | <b>D 4052</b>    |
| or                                             | or       | or           |                  |
| 25/25 C                                        | 1.1129   | 1.1134       |                  |
| Water Miscibility                              | miscible | —            | <b>D 1722</b>    |

technologies, can be found in Test Methods **E 202**. In case of a dispute, test methods identified in **3.1** of this specification shall be the preferred test methods.

## 6. Packaging, Package Markings, and Transportation

6.1 The packaging, labeling, and transportation of commercial quantities shall conform to applicable federal, state, and

local regulation. Conformance is the responsibility of the manufacturer and the shipper.

## 7. Keywords

7.1 ethylene glycol; polyester grade

*ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).*