



Standard Test Methods for Odor of Ethylene Glycol, Diethylene Glycol, Triethylene Glycol, Propylene Glycol, and Dipropylene Glycol and Taste of Propylene Glycol¹

This standard is issued under the fixed designation E 1075; 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 These test methods cover procedures for observing odors of glycols and estimating their odor acceptability. These test methods apply to ethylene, diethylene, triethylene, propylene, and dipropylene glycols. A method for observing the taste and estimating the intensity of the taste of propylene glycol is also included.

1.2 *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. Significance and Use

2.1 These test methods can be used to characterize the odors of ethylene, diethylene, triethylene, propylene, and dipropylene glycol and estimating the intensity of the odor. The products are compared to previously established standards. The acceptability of the product for a specific end use can be determined with this information.

2.2 A procedure which can be used to characterize the taste of propylene glycol and establish the intensity of this taste relative to a previously established standard is delineated. The acceptability of the product for a specific end use can be determined with this information.

2.3 These tests may be used to qualify the suitability of these products for use in a customer-producer relationship.

3. Panel

3.1 A panel of at least five trained judges led by a qualified supervisor or coordinator is recommended for these evaluations.

3.2 The panel may be selected and trained in accordance with the methods outlined in ASTM STP 758.² Since discrimination tests are involved, panel members must have a complete understanding of the nature of the judgments required, the test procedures, and test controls required. During the training period panelists should examine both acceptable and unacceptable products to become familiar with the range of acceptability.

4. Reference Samples

4.1 Reference samples of the products to be tested, having odor and taste (propylene glycol only) characteristics satisfactory to the customer and producer, are required.

4.2 The standards must be examined periodically to assure their continued quality and acceptability, and replaced when necessary.

5. Test Unit

5.1 The tests described may be performed in a single panel session on a single sample.

6. Procedure A—Odor Character by Filter Paper

6.1 Apparatus:

6.1.1 *Rapid Qualitative Filter Paper*, 2.5 by 7.5-cm strips, odor free.

NOTE 1—Perfumer's blotters may replace filter paper, if desired. The primary consideration is that the paper be odor-free.

6.1.2 *Glass Containers*, odor-free, with fitted closures.

6.2 *Sample Preparation*—Each panelist pours a few millilitres of the sample on a piece of clean odor-free filter paper.

6.3 Sample Evaluation:

6.3.1 For characterization, panelists should observe the odor of the filter paper immediately.

6.3.2 Panel members should record individual results as outlined in 12.1.

¹ These test methods are under the jurisdiction of ASTM Committee E18 on Sensory Evaluation of Materials and Products and are the direct responsibility of Subcommittee E18.06 on Food and Beverage Evaluation.

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² *Selection and Training of Sensory Evaluation Panels*, ASTM STP 758, ASTM International, 1981.

7. Procedure B—Odor Character Intensity, Undiluted

7.1 *Apparatus:*

7.1.1 *Glass Containers*, odor-free 250 mL with fitted closures.

7.2 *Sample Preparation*—Pour 50 mL of the sample into a clean, odor-free 250-mL flask and cover with an appropriate closure (glass, aluminum, or stainless steel). Prepare the reference standard in the same manner.

8.3 *Sample Evaluation*—Remove closure from the standard and without agitating, take three short sniffs to evaluate. Repeat, if necessary. Swirl the standard three times (gently in order not to incorporate air) and smell once more to detect any additional odor characteristics not observed initially. Repeat this procedure for the sample. Before proceeding to the next sample, replace closures on flasks and record characterization as compared to standard as outlined in 12.1.

8. Procedure C—Odor Character Intensity by Dilution

8.1 *Sample Preparation*—Add 50 mL of sample to a 250-mL flask containing 50 mL of odor-free water. Swirl to mix and cover with an appropriate closure (see 7.2). Prepare a reference standard in the same manner.

8.2 *Sample Evaluation*—Remove closure from the standard and without agitating, take three short sniffs to evaluate. Repeat, if necessary. Swirl the standard three times (gently in order not to incorporate air in the sample) and smell once more to detect any additional odor characteristics not observed initially. Repeat this procedure for the sample. Before proceeding to the next sample, replace closures on flasks, report total intensity of aroma of the sample as compared to the standard, and list odor character, as outlined in 12.2.1 and 12.2.2.

9. Procedure D—Odor Character at Elevated Temperature

9.1 *Sample Preparation*—Pour 50 mL of sample into a clean, odor-free 250-mL flask, cover with an appropriate closure (see 7.2), place on a closed electric hot plate, and heat until white fumes are evolved. Prepare a reference standard in the same manner.

9.2 *Sample Evaluation*—Remove the standard from the hot plate and remove closure. Without agitating, carefully observe the odor by passing the flask by the nose. Repeat, if necessary. Swirl the standard three times (gently in order not to incorporate air in the sample) and smell once more to detect any additional odor characteristics not observed initially. Repeat this procedure for the sample. Before proceeding to the next test, replace closures on flasks, report total intensity of aroma of sample as compared to standard, and list odor character, as outlined in 12.2.1 and 12.2.2.

10. Procedure E—Taste (Propylene Glycol Only)

10.1 *Sample Preparation*—Pipet 2 mL of sample into a 250-mL flask and dilute to 100 mL with odor and taste-free water. Swirl to mix and cover with an appropriate closure (see 7.2). Prepare a reference standard in the same manner.

10.2 *Sample Evaluation*—Using a small paper cup, rinse mouth with odor and taste-free water. Remove closure from standard and transfer from 10 to 15 mL to the cup. Transfer approximately 5 mL of test solution to mouth and hold a few seconds, then expectorate into the sink. Rinse mouth again with odor and taste-free water. Then evaluate sample in the same manner, rinsing mouth between samples. Before proceeding to the next sample, replace closures on flasks, report the taste intensity of the sample compared to the standard, and list taste character, as outlined in 12.3.1 and 12.3.2.

11. Interpretation of Results

11.1 Evaluating the test panel’s response, resolving disagreements in judgments, and reporting results are the responsibility of the panel supervisor. Acceptance will depend upon the intended use of the glycol and should be based upon negotiation between customer and producer. Acceptance or rejection is based upon comparison of standard and sample and statistical analysis of data is not involved.

12. Reporting of Odor and Taste Evaluation

12.1 *Characteristic Odor*—Report the odor as “characteristic” if, upon immediate evaluation, the odor of the filter paper containing the sample is the same as the odor of the filter paper containing the standard. Report the odor as “noncharacteristic” of the odor of the sample if different from the standard.

12.2 *Odor Character Intensity:*

12.2.1 *Rating Scale*—Panelists should be instructed to give each sample a numerical rating of the intensity of the observed odor. There are many possible rating scales. A scale such as the following is widely used:

Overall Intensity of Odor	Numerical Rating
None	0
Very much less than standard	1
Much less than standard	2
Less than standard	3
Equal to reference standard	4
More than standard	5
Much more than standard	6
Very much more than standard	7

12.2.2 *Qualitative Description of a Perceived Off-Odor*—After determining intensity, each panel member should attempt to characterize any off-odor as to type and probable chemical nature, based on prior knowledge and experience. Panelists should record their observations on a report form. This information may be useful in determining the source of any foreign odor.


12.3 *Taste Character Intensity:*

12.3.1 *Rating Scale*—Use the same procedure and scale as used for odor in 12.2.1.

12.3.2 *Qualitative Description of a Perceived Off-Taste*—Report any off-taste in the same manner as off-odor is reported in 12.2.2.

13. Precision and Bias

13.1 No statement is made about either the precision or the bias since the result merely states whether there is conformance to the criteria for success specified in the procedure.

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