



Designation: D3620 – 04 (Reapproved 2023)

Standard Specification for Glacial Acetic Acid¹

This standard is issued under the fixed designation D3620; 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 glacial (99.8 %) acetic acid for use in paint, varnish, lacquer, and related products.

1.2 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 E29.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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 For specific hazard information and guidance, see the supplier’s Safety Data Sheet for materials listed in this specification.

1.6 *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

D2191 Test Method for Acetaldehyde Content of Vinyl Acetate

D3546 Test Method for Formic Acid in Glacial Acetic Acid

¹ This specification is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

Current edition approved July 1, 2023. Published August 2023. Originally approved in 1977. Last previous edition approved in 2017 as D3620 – 04 (2017). DOI: 10.1520/D3620-04R23.

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.

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals (Withdrawn 2009)³

E300 Practice for Sampling Industrial Chemicals

E302 Test Methods for Monobasic Organic Acids (Withdrawn 2001)³

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

2.2 *U.S. Federal Specification:*

PPP-C-2020 Chemicals, Liquid, Dry, and Paste: Packaging of⁴

3. Properties

3.1 Glacial acetic acid shall conform to the following requirements:

Acetic acid, weight %, min	99.8
Freezing point, °C, min	16.2
Color, Pt-Co scale, max	10
Water content, weight %, max	0.16
Iron, ppm (mg/kg), max	0.40
Acetaldehyde, weight %, max	0.05
Formic acid, weight %, max	0.09

4. Sampling

4.1 The material shall be sampled in accordance with Practice E300.

5. Test Methods

5.1 The properties enumerated in this specification shall be determined in accordance with the following ASTM test methods:

5.1.1 *Purity*—Test Methods E302 estimates the purity from the freezing point.

5.1.2 *Freezing Point*—Test Methods E302.

5.1.3 *Color*—Test Methods E302.

5.1.4 *Water*—Test Methods E302.

5.1.5 *Iron*—Test Method E394, using a 20 mL specimen diluted to 80 mL with water.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, http://quicksearch.dla.mil.

5.1.5.1 *Report*—Report the iron content to the nearest 0.01 ppm (mg/kg). Duplicates that agree within 0.07 ppm absolute are acceptable for averaging (95 % confidence level).

5.1.5.2 *Precision*⁵—The precision statements are based upon an interlaboratory study in which one operator in eight different laboratories analyzed two samples of acetic acid in duplicate on two different days. The results were treated in accordance with Practice E180. The within-laboratory coefficient of variation was 3.05 % with 14 df and the between-laboratory coefficient of variation was 6.00 % with 6 df. Based upon these coefficients of variation, the following criteria should be used for judging the acceptability of results at the 95 % confidence level.

5.1.5.3 *Repeatability*—Two results, each the mean of duplicates, obtained by the same operator on different days should be considered suspect if they differ by more than 9.2 % relative.

5.1.5.4 *Reproducibility*—Two results, each the mean of duplicates, obtained by operators in different laboratories should be considered suspect if they differ by more than 20.6 % relative.

5.1.5.5 *Bias*—Bias cannot be determined for this specification because there is no available material having an accepted reference value.

5.1.6 *Acetaldehyde*—Test Method D2191, using 100 mL of sodium bisulfite and a 25 mL specimen.

5.1.6.1 *Report*—Report the acetaldehyde content to the nearest 0.001 %. Duplicates that agree within 0.007 % absolute are acceptable for averaging (95 % confidence level).

⁵ Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D01-1010. Contact ASTM Customer Service at service@astm.org.

5.1.6.2 *Precision*—The precision statements are based upon an interlaboratory study in which one operator in eight different laboratories analyzed two samples of acetic acid in duplicate on 2 different days. The results were treated in accordance with Practice E180. The within-laboratory standard deviation was 0.0055 with 14 df, and the between-laboratory standard deviation was 0.0094 with 6 df. Based upon these standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level.

5.1.6.3 *Repeatability*—Two results, each of the mean of duplicates, obtained by the same operator on different days should be considered suspect if they differ by more than 0.017 % absolute.

5.1.6.4 *Reproducibility*—Two results, each the mean of duplicates, obtained by operators in different laboratories should be considered suspect if they differ by more than 0.032 % absolute.

5.1.6.5 *Bias*—Bias cannot be determined for this specification because there is no available material having an accepted reference value.

5.1.7 *Formic Acid*—Test Method D3546 uses formic acid as a calibration standard. The test method measures all reducing acids as formic acid.

6. Packaging and Package Marking

6.1 Package size shall be agreed upon between the purchaser and the supplier.

6.2 Packaging shall conform to applicable carrier rules and regulations or when specified shall conform to Fed. Spec. PPP-C-2020.

7. Keywords

7.1 glacial acetic acid

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). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; <http://www.copyright.com/>