



Designation: D4416 – 09 (Reapproved 2023)

Standard Specification for Acrylic Acid¹

This standard is issued under the fixed designation D4416; 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 acrylic acid² (99.0 % grade) 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 standard. No other units of measurement are included in this standard.

1.4 For hazard information and guidance, see the supplier’s Safety Data Sheet.

1.5 *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.* For specific hazard statements, see Section 6.

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:*³

D1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)

D1364 Test Method for Water in Volatile Solvents (Karl

Fischer Reagent Titration Method)

D3125 Test Method for Monomethyl Ether of Hydroquinone in Colorless Monomeric Acrylate Esters and Acrylic Acid (Withdrawn 2021)⁴

D4415 Test Methods for Determination of Dimer in Acrylic Acid (Withdrawn 2011)⁴

D5386 Test Method for Color of Liquids Using Tristimulus Colorimetry

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

E300 Practice for Sampling Industrial Chemicals

E301 Test Method for Total Acidity of Organic Acids (Withdrawn 2001)⁴

2.2 *U.S. Federal Specification:*⁵

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

3. Properties

3.1 Glacial acrylic acid shall conform to the following requirements:

Acrylic acid, weight %, min	99.0
Water, weight %, max	0.20
Color, Pt-Co scale, max (Note 1)	20
Inhibitor, monomethyl ether of hydroquinone, ppm ⁴	200 ± 20
Appearance	clear, transparent, with no sediment
Dimer, as shipped, weight %, max	1.0

⁴ or as agreed upon between the buyer and the seller. Content below 180 ppm is not recommended as a safety precaution.

NOTE 1—Instrumental Pt-Co color determined by Test Method D5386 have been shown to have no statistically significant difference from Pt-Co color determined by Test Method D1209. However, it is not known whether acrylic acid was part of the sample set included in the interlaboratory study.

4. Sampling

4.1 Sample the material in accordance with Practice E300. Use brown glass sample bottles and protect samples from light and heat at all times.

⁴ The last approved version of this historical standard is referenced on www.astm.org.

⁵ Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>.

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 1984. Last previous edition approved in 2017 as D4416 – 09 (2017). DOI: 10.1520/D4416-09R23.

² This compound is also known as propenoic acid and vinyl formic acid.

³ 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.

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 Method **E301**.
- 5.1.2 *Water*—Test Method **D1364**.
- 5.1.3 *Color*—Test Method **D1209** (see **Note 1**).
- 5.1.4 *Inhibitor*—Test Method **D3125**.
- 5.1.5 *Dimer*—Test Methods **D4415**.

6. Hazards

6.1 Avoid contamination that may cause violent reactions and dangerous pressures. Acrylic acid freezes at 12.3 °C. Store between 15 °C and 25 °C. If material freezes, exercise extreme

caution in thawing, because rapid and violent polymerization may occur if frozen acrylic acid is exposed to excessive localized heat.

6.2 Use with adequate ventilation.

7. Packaging and Package Marking

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

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

8. Keywords

8.1 acrylic acid

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