



Standard Specification for Acetone^{1,2}

This standard is issued under the fixed designation D329; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers acetone (99.5 % grade).

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 *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.* Specific hazard statements are given in 1.5 and 4.1.

1.5 This specification specifies the use of a U.S. Occupational Safety and Health Administration (OSHA)-designated hazardous chemical, acetone. For hazard information and guidance see the supplier’s Material Safety Data Sheet.

2. Referenced Documents

2.1 *ASTM Standards:*³

D268 Guide for Sampling and Testing Volatile Solvents and Chemical Intermediates for Use in Paint and Related Coatings and Material

D1078 Test Method for Distillation Range of Volatile Organic Liquids

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

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.

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² The compound is also known under the names dimethyl ketone and 2-propanone.

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.

D1296 Test Method for Odor of Volatile Solvents and Diluents

D1353 Test Method for Nonvolatile Matter in Volatile Solvents for Use in Paint, Varnish, Lacquer, and Related Products

D1363 Test Method for Permanganate Time of Acetone and Methanol

D1364 Test Method for Water in Volatile Solvents (Karl Fischer Reagent Titration Method)

D1476 Test Method for Heptane Miscibility of Lacquer Solvents

D1613 Test Method for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer, and Related Products

D1614 Test Method for Alkalinity in Acetone

D1722 Test Method for Water Miscibility of Water-Soluble Solvents

D4052 Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

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

2.2 *U.S. Federal Specification:*

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

3. Properties

3.1 Acetone (99.5 % grade) shall conform to the following requirements:

Acidity (free acid as acetic) wt %, max	0.002 (equivalent to 0.019 mg of KOH/g of sample)
Aldehydes	passes test
Alkalinity (as ammonia) wt %, max	0.001
Apparent specific gravity: 20/20°C	0.7910 to 0.7930 or
25/25°C	0.7865 to 0.7885
Assay wt %, min	99.5

⁴ Available from Standardization Documents Order Desk, DODSSP, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA 19111-5098, <http://www.dodssp.daps.mil>.

Color Pt-Co, max (Note 1)	5
Distillation range 760 mmHg (Note 3)	shall distill entirely within a 1.0°C range which shall include 56.1°C
Nonvolatile matter mg/100 mL, max	5
Odor (Note 3)	nonresidual
Permanganate time	color of added KMnO_4 must be retained for at least 30 minutes at 25°C in the dark
Water wt %, max	0.5 (Note 2)
Water miscibility	passes test

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

NOTE 2—This quantitative water limit ensures that the material is miscible without turbidity with 19 volumes of 99 % heptane at 20°C. Test Method D1476 may serve as a useful alternative method to determine the presence of water. Because it is a qualitative test, its use would require agreement between user and supplier.

NOTE 3—Optional: Test only when agreed upon as necessary between the purchaser and the supplier.

4. Sampling

4.1 The material shall be sampled in accordance with Practice E300. **Warning:** Acetone is highly flammable.

5. Test Methods

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

5.1.1 *Acidity*—Test Method D1613.

5.1.2 *Aldehydes*—Dilute 2.5 mL of the specimen with water to 10 mL. Prepare a control containing 0.04 mg of formaldehyde in 10 mL of water. To both the specimen solution and the control, add 0.15 mL of a 5 % solution of 5,5-dimethyl-1,3-cyclohexanedione in alcohol. Evaporate each on a steam bath

until the acetone is volatilized. Dilute each to 10 mL and cool quickly in an ice bath with vigorous stirring. Any turbidity produced in the specimen solution shall be no greater than that produced in the control.

5.1.3 *Alkalinity*—Test Method D1614.

5.1.4 *Apparent Specific Gravity*—Determine the apparent specific gravity by any convenient method that is accurate to the fourth decimal place, the temperature of both specimen and water being 20 or 25°C. See Guide D268 and Test Method D4052.

5.1.5 *Assay*—Assay is determined by difference; 100 % minus (% water + % acidity), assuming that no other impurities are present.

5.1.6 *Color*—Test Method D1209 (see Note 1).

5.1.7 *Distillation Range*—Test Method D1078 using a temperature measuring device having a range of 48 to 102°C and a resolution of 0.1°C.

5.1.8 *Nonvolatile Matter*—Test Method D1353.

5.1.9 *Odor*—Test Method D1296.

5.1.10 *Permanganate Time*—Test Method D1363.

5.1.11 *Water*—Test Methods D1364.

5.1.12 *Water Miscibility*—Test Method D1722.

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 Federal Specification PPP-C-2020.

7. Keywords

7.1 acetone; aldehydes test; dimethyl ketone; 2-propanone; solvents

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