

**O-D-306a****NOVEMBER 17, 1955****SUPERSEDING****Int. Fed. Spec. O-D-00306a (GSA-FSS)****November 29, 1954 and****Fed. Spec. O-D-306****August 24, 1953****FEDERAL SPECIFICATION****DIACETONE ALCOHOL, TECHNICAL  
(ACETONE-FREE)**

*This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.*

**1. SCOPE AND CLASSIFICATION**

**1.1 Scope.**—Diacetone alcohol covered by this specification is intended for use in the manufacture of organic protective coatings, as a constituent of hydraulic fluid, and as a special solvent.

**1.2 Classification.**—This specification covers one type and one grade of commercially pure diacetone alcohol known as the "acetone-free grade."

**2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS**

**2.1 Specifications.**—The following Federal Specifications, of the issue in effect on date of invitation for bids, forms a part of this specification:

TT-P-141—Paint, Varnish, Lacquer, and Related Materials; Methods of Inspection, Sampling, and Testing.

VV-L-191—Lubricants, Liquid Fuels, and Related Products; Methods of Inspection, Sampling, and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards as outlined under General Information in the Index of Federal Specifications and Standards, and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

(Single copies of this specification and other product specifications required by activities outside the Federal

Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.)

(Federal Government activities may obtain copies of Federal Specifications and Standards and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

**2.2 Other publications.**—The following publications, of the issues in effect on date of invitation for bids, form a part of this specification:

Standard Methods for the Examination of Water and Sewage by the American Public Health Association and the American Water Works Association.

(Copies of this publication may be obtained from the American Public Health Association, 1790 Broadway, New York 19, New York.)

*Interstate Commerce Commission Specification:*

**17 E**

(Copies of this publication are obtainable from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

**2.3 Specifications and standard applicable only to individual departments are listed in section 7.**

**3. REQUIREMENTS**

**3.1 Appearance.**—The diacetone alcohol shall be clear, free from suspended matter, and have a color not darker than 25 platinum-cobalt units of water-whiteness. (See 4.3.1.)

**O-D-306a**

**3.2 Odor.**—The odor shall be characteristic of diacetone alcohol. No residual odor shall remain after drying from filter paper. (See 4.3.2.)

**3.3 Water solubility.**—The diacetone alcohol shall be completely miscible in all proportions with distilled water at 20°C. (See 4.3.3.)

**3.4 Dryness.**—The diacetone alcohol shall show no turbidity when mixed with 19 volumes of API gasoline at 20°C.

**3.5** The diacetone alcohol shall conform to the requirements of table I.

TABLE I.—Requirements for diacetone alcohol

Property	Test requirement	Test method paragraph
Specific gravity at 20/20°C. ....	0.937 to 0.942	4.3.5
Index of refraction at 20°C. ....	1.4150 to 1.4250	4.3.6
Acidity, as acetic acid, maximum percent ..	0.01	4.3.7
Alkalinity, as sodium hydroxide, maximum percent .....	0.001	4.3.8

#### 4. SAMPLING, INSPECTION, AND TEST PROCEDURES

**4.1 Lot size.**—A lot shall consist of 5,000 pounds, maximum.

**4.2 Sampling.**—A representative sample shall be taken from each lot and forwarded to the laboratory for test. The sample shall be not less than 1 quart nor more than 2 gallons.

##### 4.3 Tests.

**4.3.1 Appearance.**—Pour some of the sample, thoroughly mixed, into a test tube and allow to stand stoppered and undisturbed until bubbles have entirely disappeared. With the sample at room temperature (20° to 30°C.), examine for clarity and sediment. Examine for color, using the method described in the publication "Standard Methods for Examination of Water and Sewage" (see 2.2 and 3.1).

**4.3.2 Odor.**—Examine some of the sample for the characteristic odor of diacetone alcohol. Dip strips of heavy filter paper of uniform shape

and size in the sample, remove, and allow to dry for 2 hours in a well-ventilated room at 20° to 30°C. Examine for residual odor. (method 440.1 Federal Specification TT-P-141).

**4.3.3 Water solubility.**—Slowly add in successive portions a 25-milliliter portion of the sample to 25 milliliters of distilled water at 20° to 25°C. contained in a small Erlenmeyer-type flask. Shake well during each addition. Repeat the procedure, adding the water to the sample. Examine for turbidity during the additions.

**4.3.5 Dryness.**—Transfer 5 ml. of the sample to a 250-ml. Erlenmeyer flask. Slowly add 95 ml. of API gasoline at 20°C., shaking the flask contents thoroughly during the addition, and examine for turbidity after all the gasoline portion has been added.

**4.3.5 Specific gravity.**—Determine the specific gravity at 20°C. (method 418.3, section 5, of Federal Specification TT-P-141).

**4.3.6 Index of refraction.**—Determine the index of refraction at 20°C. with a standardized Abbe refractometer or other equally accurate instrument. (method 437.1, Federal Specification TT-P-141).

**4.3.7 Acidity.**—Place 50 milliliters of distilled water in a 250-milliliter Erlenmeyer flask, add phenolphthalein indicator and titrate with approximately N/100 NaOH or KOH solution to a faint pink color. Into another 250-milliliter flask measure 50 milliliters of the diacetone alcohol, place on a hot plate, and boil for 1 to 2 minutes to expel any carbon dioxide which may be present. Cool the alcohol rapidly to room temperature, pour into the neutral water and again titrate to a faint pink color.

Calculate the percentage acidity in the sample as acetic acid as follows:

$$\text{Percentage acetic acid} = \frac{0.12 \text{ VN}}{G}$$

where:

V = milliliters of alkali required to titrate the alcohol water solution

N = normality of alkali solution

G = specific gravity of the alcohol.

**4.3.8 Alkalinity.**—Mix a carefully measured 50-milliliter portion of the sample with 100 milliliters of distilled water and titrate with  $N/100 \text{ H}_2\text{SO}_4$  using methyl red as an indicator. Calculate any alkalinity present as percentage sodium hydroxide as follows:

$$\text{Percentage sodium hydroxide} = \frac{0.08 \text{ VN}}{G}$$

where:

$V$  = milliliters of acid required to titrate the alcohol

$N$  = normality of acid used

$G$  = specific gravity of the alcohol.

## 5. PREPARATION FOR DELIVERY

**5.1 Packaging.**—Unless otherwise specified, commercial packages conforming to ICC Specification 17E for 5 and 55 gallon containers, are acceptable under this specification.

**5.2 Packing.** — Unless otherwise specified, diacetone alcohol shall be delivered in substantial commercial containers of the type, size, and kind commonly used for the purpose, so constructed as to insure acceptance and safe delivery by common or other carriers, at the lowest rate, to the point of delivery called for in the invitation for bids.

**5.3 Marking.**— Unless otherwise specified, shipping containers shall be marked with the name of the material and the quantity contained therein, as defined by the contract or order under which the shipment is made, the name of the contractor, and the number of the contract or order.

**5.4 Warning label.**—Diacetone alcohol shall be labeled as follows:

DIACETONE ALCOHOL  
WARNING FLAMMABLE

Keep away from heat and open flame.

Keep container closed.

Use with adequate ventilation.

Avoid prolonged breathing of vapor.

Avoid prolonged or repeated contact with skin.

## 6. NOTES

**6.1 Ordering data.**—Purchasers should exercise any desired options offered herein. (See 5.1, 5.2, 5.3, and 7.2.6.)

### 6.2 Transportation description.

**6.2.1 Transportation description applicable to these items is:**

Diacetone Alcohol

Carload weight 30,000 pounds.

Truckload weight 30,000 pounds.

Minimum weights shown apply when material is transported at classification ratings. They will vary when material moves on commodity rates. When in doubt consult General Services Administration Regional Traffic Manager.

**Patent notice.**—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

## 7. DEPARTMENTAL REQUIREMENTS

**7.1** The following departmental specifications and standards, of the issues in effect on date of invitation for bids, and special requirements, form a part of this specification for purchases made under this specification by the respective departments.

### 7.2 Army and Navy.

#### 7.2.1 Applicable specifications and standard.

*Federal Specification:*

PPP-D-729—Drums; Metal, 55-Gallon (for Shipment of Noncorrosive Materials).

*Military Specifications:*

JAN-P-106—Packaging and Packing for Overseas Shipment—Boxes, Wood, Nailed.

**O-D-306a**

**MIL-B-107—Boxes, Wood, Wirebound (Overseas Type).**

**MIL-C-124—Containers (Cans, Pails, and Drums) Metal (for Other Than Subsistence Items).**

**Military Standard:**

**MIL-STD-129—Marking for Shipment and Storage.**

(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

**7.2.2 Inspection.**—The contractor shall furnish all samples and shall be responsible for accomplishing the inspection tests. When inspection is conducted at the contractor's plant, all inspection and testing shall be under the supervision of the Government inspector. Contractors not having laboratory testing facilities satisfactory to the Government shall engage the services of a commercial testing laboratory acceptable to the procuring service. The contractor shall furnish test reports, in duplicate, showing quantitative results for all tests required by this specification, and signed by an authorized representative of the contractor or laboratory as applicable. Acceptance or approval of the material during course of manufacture shall in no case be construed as a guaranty of the acceptance of the finished product.

**7.2.3 Packaging (for domestic shipment and storage or overseas shipment).**—Diacetone alcohol shall be furnished in 5-gallon cans or 55-gallon drums, as specified in the contract or order. The unit is the U. S. gallon at 60°F. (15.5°C). A U. S. gallon of diacetone alcohol weighs 7.8 pounds at 60°F. (15.5°C).

**7.2.3.1** Five-gallon cans shall conform to the requirements for type I of Military Specification MIL-C-124.

**7.2.3.2** Fifty-five gallon drums shall conform to the requirements of Federal Specification PPP-D-729, type II.

**7.2.4 Packing (for domestic shipment and storage or overseas shipment).**

**7.2.4.1** Two 5-gallon cans shall be packed in a nailed wood box or wirebound wood box conforming to the requirements of Military Specifications JAN-P-106 and MIL-B-107, respectively. Pads shall be used between the 5-gallon containers and the MIL-B-107 exterior containers. The pads shall be made of W-board, compliance symbol W6, of Military Specification JAN-P-108, and so cut as to completely separate the metal containers from the inner surfaces of the MIL-B-107 box.

**7.2.4.2** Fifty-five gallon drums will require no overpacking.

**7.2.5 Marking.**—In addition to any special marking required by the contract or order, marking of interior packages and shipping containers shall be in accordance with the requirements of Military Standard MIL-STD-129. The nomenclature shall read as follows:

Diacetone Alcohol (Acetone-Free)  
Federal Specification O-D-306

**7.2.6 Ordering information.**—Purchase documents should specify the size of container required, see 7.2.3.

## **7.3 AIR FORCE**

**7.3.1** The following departmental specifications, and standards, of the issue in effect on date of invitation for bids, and special requirements, form a part of this specification for purchases made under this specification by the respective department.

**Federal Specification:**

PPP-D-729—Drums; Metal, 55-Gallon (For Shipment of Noncorrosive Materials).

**Military Specification:**

MIL-C-124—Containers (Cans, Pails, and Drums) Metal (For Other Than Subsistence Items).

**Military Standard:**

MIL-STD-129—Marking for Shipment and Storage.

**O-D-306a**

**7.3.2 Inspection.**—The contractor shall furnish all samples and shall be responsible for accomplishing the inspection tests. When inspection is conducted at the contractor's plant, all inspection and testing shall be under the supervision of the Government inspector. Contractors not having laboratory testing facilities satisfactory to the Government shall engage the services of a commercial testing laboratory acceptable to the procuring service. The contractor shall furnish test reports, in duplicate, showing quantitative results for all tests required by this specification, and signed by an authorized representative of the contractor or laboratory as applicable. Acceptance or approval of the material during course of manufacture shall in no case be construed as a guaranty of the acceptance of the finished product.

**7.3.3 Packaging (For Domestic Shipment and storage or overseas Shipment).**—Diacetone alcohol shall be furnished in 5-gallon cans or 55-

gallon drums conforming to the requirements for type V of Military Specification MIL-C-124 and Federal Specification PPP-D-729.

**7.3.4 Packing.**—The 5-gallon cans and 55-gallon drums do not require overpacking.

**7.3.5 Marking.**—In addition to any special marking required by the contract or order, marking of interior packages and shipping containers shall be in accordance with the requirements of Military Standard MIL-STD-129. The nomenclature shall read as follows:

Diacetone Alcohol (Acetone-Free)  
Federal Specification O-D-306a

**7.3.6 Ordering information.**—Purchase documents should specify the size of container required, see 7.3.3.

**MILITARY INTERESTS:**

Army—C E M O Q  
Air Force.

