

[INCH-POUND]  
O-M-232K  
14 October 1998  
SUPERSEDING  
O-M-232J  
19 November 1990

## FEDERAL SPECIFICATION

### METHANOL (METHYL ALCOHOL)

The General Services Administration has authorized the use of this federal specification by all federal agencies.

#### 1. SCOPE AND CLASSIFICATION

1.1 Scope. This federal specification covers three grades and four unit quantities of methanol.

1.2 Classification. Methanol shall be of the following grades and units of issue (see 6.2):

##### 1.2.1 Grade.

Grade A - Synthetic, 99.85 percent by weight (solvent use)

Grade AA - Synthetic, 99.85 percent by weight (hydrogen-carbon dioxide generation use)

Grade C - Wood alcohol (denaturing grade)

##### 1.2.2 Unit quantity.

Unit 1-Qt - 1 quart

Unit 1-Gal - 1 gallon

Unit 5-Gal - 5 gallons

Unit 54-Gal - 54 gallons

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent by letter to: Defense Supply Center Richmond, (DSCR), ATTN: DSCR-VBD, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610.
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AMSC N/A

FSC 6810

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## 2. APPLICABLE DOCUMENTS

2.1 Government publications. The issues of the following documents, in effect on the date of invitation for bids or request for proposal, forms a part of this specification to the extent specified herein.

Federal Standards

FED-STD-123 - Marking for Shipment (Civil Agencies)

FED-STD-595 - Colors Used in Government Procurement

Commercial Item Description

A-A-1558 Paint, Stencil

(Activities outside the Federal Government may obtain copies of federal specifications, standards and commercial item descriptions as specified in the General Information section of the Index of Federal Specifications, Standards and Commercial Item Descriptions. The index is for sale on a subscription basis from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification, and other federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from the General Services Administration, Federal Supply Service Bureau, Specification Section, Suite 8100, 470 L'Enfant Plaza, SW, Washington, DC 20407.)

(Federal Government activities may obtain copies of federal standardization documents and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military Standards

MIL-STD-129 - Military Marking

(Copies of military specifications required by contractors in connection with specific procurement functions are obtained from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

Code of Federal Regulations (CFR)

27 CFR 21 - Formulas for Denatured Alcohol and Rum

29 CFR 1910.1200 - Occupational Safety and Health Standard on Hazard Communication

49 CFR 171 to 199 - Hazardous Materials Regulations

(The Code of Federal Regulations and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the federal agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bids or request for proposal shall apply.

International Civil Aviation Organization (ICAO)

“Technical Instructions for the Safe Transportation of Dangerous Goods by Air”

(Application for copies should be addressed to the International Civil Aviation Organization, 1000 Sherbrooke Street West, Suite 400, Montreal, Quebec, Canada H3A 2R2.)

(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

International Maritime Organization (IMO)

“International Maritime Dangerous Goods Code”

(Application for copies should be addressed to the International Maritime Organization, 101-104 Piccadilly, London, W1V 0AE, England.)

(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

American Society for Testing and Materials (ASTM) Standards:

- D 1193 - Standard Specification for Reagent Water (DoD Adopted)
- D 1296 - Standard Test Method for Odor of Volatile Solvents and Diluents (DoD Adopted)
- D 1353 - Standard Test Method for Nonvolatile Matter in Volatile Solvents for Use in Paint, Varnish, Lacquer, and Related Products (DoD Adopted)
- E 346 - Standard Test Method for Analysis of Methanol (DoD Adopted)
- D 4956 - Standard Specification for Retroreflective Sheeting for Traffic Control (DoD Adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

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(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from the Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 Grades A and AA methanol shall conform to the chemical and physical characteristics of Table I when tested as specified therein.

3.2 Grade C methanol shall comply with the requirements for methyl alcohol used as a denaturant in 27 CFR 21.

### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the government. The government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the government to accept defective material.

4.1.2 Contractor assurance of compliance. The contractor's quality program or detailed inspection system shall provide assurance of compliance with all characteristics of the applicable drawing and specification requirements using, as a minimum, the conformance criteria specified herein.

TABLE I. Chemical and physical characteristics of Grades A and AA methanol.

Characteristic	Requirements		Test paragraph/ method
	Grade A	Grade AA	
Acetone, percent by weight, maximum	0.003	0.002	4.2.1.1
Acidity (as acetic acid), percent by weight, maximum	0.003	0.003	ASTM E 346
Appearance	Free of opalescence, suspended matter, and sediment	Free of opalescence, suspended matter, and sediment	4.2.1.2
Carbonizable impurities, color, Platinum-Cobalt (Pt-Co), maximum	No. 30	No. 30	ASTM E 346
Color, Pt-Co, maximum	No. 5	No. 5	ASTM E 346
Distillation range at 760 mm, maximum	1.0°C (and shall include 64.6 +/- 0.1 °C)	1.0°C (and shall include 64.6 +/- 0.1 °C)	ASTM E 346
Ethanol, percent by weight, maximum	---	0.001	ASTM, E 346 <sup>(1)</sup>
Nonvolatile matter, mg per 100 mL, maximum	10	10	ASTM D 1353
Odor	Characteristic, nonresidual	Characteristic, nonresidual	ASTM D 1296
Permanganate time	No discharge of color in 30 minutes	No discharge of color in 30 minutes	ASTM E 346
Specific gravity at 20/20°C, maximum	0.7928	0.7928	ASTM E 346
Water, percent by weight, maximum	0.15	0.10	ASTM E 346

<sup>(1)</sup>For Grade AA only, convert the parts per million ethanol to percent by weight ethanol.

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4.1.3 Alternative inspection provisions. Alternate inspection procedures, methods or equipment, such as statistical process control, tool control, and other types of sampling procedures may be used by the contractor when they provide, as a minimum, the level of quality assurance required by the inspection provisions specified herein. Prior to applying such alternative procedures, methods, or equipment, the contractor shall describe them in a written proposal submitted to the government for evaluation and approval. When required, the contractor shall demonstrate that the effectiveness of each proposed alternative is equal to or better than the quality assurance provisions specified herein. In cases of dispute as to whether the contractor's proposed alternative provides equal quality assurance, the provisions of this specification shall apply. All approved alternative inspection provisions shall be specifically incorporated into the contractor's quality program or detailed inspection system, as applicable.

4.2 Test methods.

4.2.1 Methanol tests. Water, in accordance with ASTM D 1193, and reagent grade chemicals shall be used throughout the tests. Tests shall be conducted as follows:

4.2.1.1 Acetone. Determine the percent by weight acetone in the specimen in accordance with the procedures for acetone in ASTM E 346. For Grade AA methanol, use 1.5 mL of sample and 3.5 mL of water instead of 1 mL of sample and 4 mL of water. Report the acetone content as less than or greater than 0.002 percent by weight.

4.2.1.2 Appearance. Dilute 15 mL of the specimen to 45 mL with water in a Nessler tube. Visually examine the solution for opalescence, suspended mater, and sediment during 30 minutes of standing.

## 5. PACKAGING

5.1 General requirements. The packaging requirements shall be as specified herein unless modified by the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

5.2 Marking and labeling.

5.2.1 Container compliance markings. Each shipping container shall be marked in accordance with International Civil Aviation Organization "Technical Instructions for Safe Transportation of Dangerous Goods by Air" (ICAO-TDGA) or the International Maritime Organization "International Maritime Dangerous Goods Code" (IMO-IMDGC), as applicable.

5.2.2 Civil agencies. In addition to the markings required in 5.2.1, shipments shall be marked in accordance with FED-STD-123 and shall show the date of manufacture and lot or batch number of the methanol.

5.2.3 Military activities. In addition to the markings required by 5.2.1, shipments shall be marked in accordance with MIL-STD-129 and shall show the date of manufacture and lot or batch number of the methanol.

5.2.4 Hazard class label. Each shipping container and pallet load shall be labeled in accordance with 49 CFR 171 to 199 and either ICAO-TDGA or IMO-IMDGC, as applicable.

5.2.5 Proper shipping name. Each shipping container and pallet load shall be marked with the proper shipping name in accordance with 49 CFR 171 to 199 and either ICAO-TDGA or IMO-IMDGC, as applicable.

5.2.6 Special identification markings. Special identification markings shall be applied to all Department of Defense shipments and, when specified (6.2), to civil agency shipments. Special identification markings shall consist of NATO Code No., nomenclature, specification number, grade, and national stock number. Letters and numerals shall be in blue conforming to color No. 35109 of FED-STD-595 over a yellow reflective background. The marking system shall be as specified in 5.2.6.1 or 5.2.6.2.

5.2.6.1 Preprinted marking on yellow reflective preprinted sheeting. The numerals and letters shall be preprinted on yellow reflective sheeting conforming to color yellow of ASTM D 4956, protected by a removable liner.

5.2.6.2 Marking on yellow reflective coating. The yellow reflective coating shall conform to color No. 33538 of FED-STD-595. The marking shall be applied with stencil paint conforming to class 1 of A-A-1558. The stencil paint shall not be overcoated.

5.2.6.3 Five-gallon (20-liter) pails. A 3-inch wide band of yellow reflective preprinted sheeting or yellow reflective coating shall be applied completely around the top area of the pail sides. The identification markings shall be applied on one side of the pail. The letters and numerals for the NATO Code No. shall be 3/4 inch in height. The remaining letters and numerals shall be 1/2 inch in height.

5.2.6.4 Fifty-five gallon (220-liter) drums. An 8-inch wide band of yellow reflective preprinted sheeting or yellow reflective coating shall be applied completely across the diameter of the drum head, and a 6-inch wide band of yellow reflective preprinted sheeting or yellow reflective coating shall be applied completely around the top area of the drum sides. The identification markings shall be applied in 1-inch high letters and numerals, once on the drum head, and three times on the drum side, equally spaced around the circumference of the drum. When preprinted sheeting is used, the 6-inch wide sheeting may be in three pieces of equal length with the required identification markings centrally preprinted on each piece. The three pieces shall be of sufficient length to completely encircle the drum when applied.

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5.2.7 Precautionary marking. Each unit and shipping container shall be marked or labeled, as applicable, in accordance with 29 CFR 1910.1200(f) to show the required precautionary information. Each unit shall be marked to show the skull and crossbones poison symbol and the word "POISON." Each outer container shall be marked to show the top of the container by use of an arrow and the word "UP."

## 6. NOTES

INFORMATION FOR GUIDANCE ONLY. This section contains information of a general or explanatory nature which is helpful, but is not mandatory.

6.1 Intended use. Grade A methanol is intended for use as an industrial solvent. Grade AA methanol is intended for use in the generation of hydrogen and carbon dioxide. Grade C methanol (wood alcohol) is a product of the destructive distillation of wood and is intended for use as a denaturant.

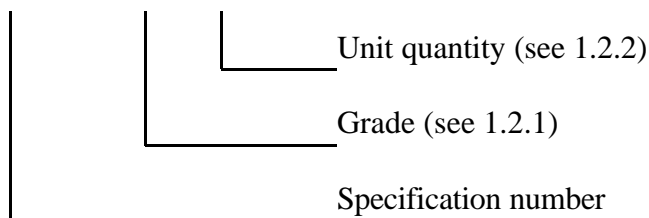
6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Grade of methanol required (see 1.2.1).
- c. Unit quantity required (see 1.2.2).
- d. Level of packing required (see 5.1).
- e. If special identification marking is required for civil agency shipments (see 5.2.6).

6.3 Material safety data sheets (MSDS). Material safety data sheets for methanol shall be prepared and submitted by the contractor in accordance with FED-STD-313. Contracting officers will identify those activities requiring copies of MSDS. The pertinent mailing addresses for submission of data are listed in FED-STD-313.

6.4 Part identification number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. This example describes a part numbering system for specification O-M-232K.

O-M-232K-XX-XXXXXX Example of PIN: O-M-232K-A-1-QT





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6.5 Subject term (key word) listing.

Denaturant  
Industrial solvent  
Wood alcohol

MILITARY INTERESTS:

Custodians

Army - EA  
Air Force - 68  
Navy - OS

Reviewers

Army - AR, GL, MD1, MI  
Navy - AS

CIVIL AGENCY  
COORDINATING ACTIVITY:

GSA - 10FTE

Preparing Activity:  
DLA - GS

(Project 6810-1408)