

METRIC  
MIL-P-83800A  
1 July 1983  
SUPERSEDING  
MIL-P-83800 (USAF)  
31 July 1974

MILITARY SPECIFICATION

1,2 - PROPANEDIOL (METRIC)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of 1,2 - PROPANEDIOL, hereinafter referred to as Propylene Glycol.

2. APPLICABLE DOCUMENTS

2.1 Government documents. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

O-C-265                   Chemicals, Analytical, General Specification for

MILITARY

MIL-D-43703             Drum, Molded Polyethylene  
MIL-P-15011             Pallets, Material Handling, Wood, Post Construction,  
                          4 - Way Entry

STANDARDS

FEDERAL

FED-STD-313             Material Safety Data Sheets, Preparation and Sub-  
                          mission of

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: San Antonio ALC/SFTT Kelly AFB TX 78241, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 6810

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## MILITARY

MIL-STD-105	Sampling Procedures and Table for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

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

2.2 Other Publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS

## ASTM STANDARDS

D 92	Test for Flash and Fire Points by the Cleveland Open Cup Method.
D 270	Sampling Petroleum and Petroleum Products.
D 941	Method of Test for Density and Specific Gravity of Liquids by Lipkin Bicapillary Pycnometer.
D 1078	Method of Test for Distillation Range of Volatile Organic Fluids.
D 1193	Specification for Reagent Water.
D 1209	Method of Test for Color of Clear Liquids (Platinum- Cobalt Scale).
D 1613	Method of Test for Acidity in Volatile Solvents and Chemical Intermediates Used in Paint, Varnish, Lacquer and Related Products.
E 202	Standard Method for Analysis of Ethylene Glycols and Propylene Glycols.
E 203	Method of Test of Water Using Karl Fischer Reagent.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103).

## UNIFORM CLASSIFICATION COMMITTEE

## UNIFORM FREIGHT CLASSIFICATION RULES

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606).

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

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## 3. REQUIREMENTS

3.1 Chemical and physical requirements. The chemical and physical requirements of the propylene glycol shall be as specified in Table I.

TABLE I  
CHEMICAL AND PHYSICAL REQUIREMENTS

REQUIREMENTS	LIMITS		TEST
	MIN	MAX	
Color (Pt-Co Scale)	---		4.3.2.1.
Specific Gravity at 25 deg./25 C	1.0351	1.0366	4.3.2.2.
Distillation deg. C			
IBP	185	----	4.3.2.3
Dry Point	190	----	
Acidity (as Acetic Acid (% by wt))	---	0.003	4.3.2.4
Moisture (% by wt)	---	0.20	4.3.2.5
Ash (% by wt)	---	0.005	4.3.2.6
Iron (ppm)	---	0.5	4.3.2.7
Chlorides (ppm)	---	1.0	4.3.2.8
Flash Point, deg. C	105	---	4.3.2-9

3.2 Workmanship. The propylene glycol shall be water white, an homogeneous liquids, free from dirt, sediment, and other suspended foreign matter when examined visually by transmitted light.

## 4. QUALITY ASSURANCE PROVISION

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

4.1.1 Lotting. A lot shall consist of the material produced by one manufacturer in not more than a 24-hour period under essentially the same manufacturing conditions and with no change of materials, providing the operation is continuous and submitted for inspections at the same time. In the event the process is a batch operations, each batch shall constitute a lot.

#### 4.2 Sampling methods.

4.2.1 Sampling. Sampling from tank cars shall be conducted in accordance with ASTM D 270. Sampling from smaller containers shall be conducted as follows. A random sample shall be taken from each lot in accordance with MIL-STD-105, Inspection Level S-2, Acceptance number zero. If there are fewer than three containers in a lot, each container shall be selected. A 500 milliliter (ml) specimen shall be removed from each container in the sample and placed in a clean, dry container. The container shall be labeled to identify the lot and container from which it was taken.

4.2.2 Test specimens. A composite specimen shall be made with equal portions from each specimen, and the composite specimen shall be tested as specified in 4.3. If there are fewer than three specimens, each one shall be tested as specified in 4.3.

4.3 Quality conformance inspection. The material shall be subjected to all the following inspections and tests for acceptance. When specified in the contract (see 6.2), the supplier shall submit a report listing the results obtained for all inspections and tests performed and certified statement that the lot meets all the requirements of this specification. Unless otherwise specified, all chemicals shall be ACS grade in accordance with and distilled water shall be used. Where applicable, blank determinations shall be run and corrections applied where significant. Safety apparel will be worn at all times.

4.3.1 Visual inspection. All samples shall be visually inspected to determine conformance to the workmanship requirements of 3.2.

#### 4.3.2 Test methods.

4.3.2.1 Color. The color of the propylene glycol shall be determined in accordance with ASTM D 1209.

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4.3.2.2 Specific gravity. Specific gravity shall be determined for 25 deg./25 deg. C according to ASTM D 941.

4.3.2.3 Distillation. Distillation shall be conducted on the propylene glycol according to ASTM D 1078 with the following exceptions:

a. Distillation shall be conducted at a pressure of 760 millimeters (mm) of mercury or corrected thereto by adding 0.043 deg. C for each mm under 760 mm or subtracting for every mm over 760 mm.

b. Use an ASTM Partial Immersion Thermometer having a range of +/-5 deg. to +/-300 deg. C.

4.3.2.4 Acidity. Acidity shall be determined by ASTM D 1613.

4.3.2.5 Moisture content. Moisture content shall be determined in accordance with ASTM E 203 except 10 to 40 grams of sample, depending on the anticipated moisture content, shall be used.

4.3.2.6 Ash residue. Ash residue shall be determined by measuring 50 ml of the sample in a graduate and transferring to a 125 ml platinum dish which has been ignited to constant weight, cooled in a desiccator, and tared to the nearest 0.1 milligram (mg). The dish shall be heated until the vapors continue to burn after the flame is withdrawn. The combustion shall be protected from drafts and the vapors allowed to burn spontaneously until the liquid is consumed. The dish shall then be ignited to a dull red heat, allowed to cool in a desiccator, and weighed to the nearest 0.1 mg. The ash residue per 100 ml shall be calculated as follows for both types:

$$\text{gm ash per 100 ml} = (\text{gm residue}) \times 2$$

4.3.2.7 Iron. Iron shall be determined according to ASTM E 202, Sec 15-22.

4.3.2.8 Chlorides.

4.3.2.8.1 Standard chloride solution. Dissolve 0.458 gm of ACS Grade sodium chloride in distilled water and dilute to 1000 ml in a volumetric flask. Pipet 10 ml of this solution into a 100-ml volumetric flask, dilute to the mark with distilled water, and mix thoroughly. A 1.0 ml portion of the second dilution is equivalent to one ppm Cl when a 25 ml sample is used.

4.3.2.8.2 Procedure. Introduce 25 ml of the sample into one of two 100 ml short form Nessler tubes.

a. Into the second tube pipet 1.0 ml of the standard chloride solution. Reserve as the standard.

b. Add 5 drops of concentrated ACS Grade nitric acid to each tube and dilute to the mark with distilled water.

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c. Add 2 ml of 10 percent aqueous silver nitrate solution to each tube and mix thoroughly.

d. Compare the turbidity of the sample with that of the standard by reviewing down through the tubes against a dark background. If the turbidity of the sample is greater than that of the standard, the chloride content is in excess of one ppm.

4.3.2.9 Flash point. The flash point shall be determined according to ASTM D 92, except that the fire point need not be determined.

4.3.2.10 Rejection criteria. Failure of any sample to meet any requirement of this specification shall be cause to reject the lot or batch.

## 5. PACKAGING

5.1 Packaging. Packaging shall be level A, or industrial, as specified (see 6.2). The container used shall be compatible with propylene glycol and shall not rust nor show any interior deterioration during normal use and storage. The contracting activity shall identify any unique container requirements not covered by this specification. Closures shall have cap seals applied.

5.1.1 Level A. Propylene glycol shall be packaged in drums conforming to Size 4 of MIL-D-43703.

5.1.2 Industrial. The propylene glycol shall be packaged in uniform quantities in such a manner as to assure carrier acceptance and afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. Containers used shall comply with Uniform Freight Classification Rules or other carrier regulations applicable to the mode of transportation. Containers shall be of uniform size, shape, and material.

5.2 Packing. Drums packaged as specified in 5.1.1 required to further packing.

5.3 Markings. In addition to any special markings required by the contract, unit packages and shipping containers shall be marked in accordance with MIL-STD-129.

5.4 Additional markings. All containers shall be marked with the following additional information.

PROPYLENE GLYCOL  
1, 2-PROPANEDIOL  
FOR F-111 AIRCRAFT ENVIRONMENTAL CONTROL SYSTEM  
DO NOT TAKE INTERNALLY

5.5 Material Safety Data Sheet. A material safety data sheet shall be furnished as required by FED-STD-313.

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## 6. NOTES

6.1 Intended Uses. Propylene glycol covered by this specification is intended for use as an aircraft antifreeze mixture for the F-111 aircraft's environment control system.

## 6.2 Procurement requirements.

- a. Title, number and date of this specification.
- b. Level of packaging required (see 5.1).
- c. Type of containers or tank car used for shipment.
- d. Special markings required, as applicable (see 5.2 and 5.3).
- e. Certified analysis and/or test reports required.
- f. Material safety data sheet required.

6.3 Contact Data Requirements. The items of deliverable data which are required for procurement by this specification are cited in 4.3.

Data Requirement	Applicable DID*
Test Report	DI-T - 2072
Certified Analysis	

[\*]DIDs (Data Item Descriptions/DD Form 1664) for the above data requirements are documented in the applicable ADL (Authorized Data List.) Such data will be delivered as identified on complete (numbered) DIDS when specified on DD Form 1423 (Contract Data Requirements Lists) and incorporated into applicable contracts.

## CUSTODIAN:

## PREPARING ACTIVITY

NAVY - OS

AIR FORCE - 68

AIR FORCE - 68

PROJECT NUMBER 6810-B389

## REVIEWERS:

AIR FORCE - 11, 80

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