

MIL-F- 81912 (AS)

14 February 1973

## MILITARY SPECIFICATION

### FUEL, EXPENDABLE TURBINE ENGINE

This specification has been approved by the Naval Air Systems Command, Department of the Navy.

#### 1. SCOPE

1.1 Scope. This specification covers one grade of aviation turbine fuel (See 6.1).

#### 2. APPLICABLE DOCUMENTS

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

#### STANDARDS

##### Federal

Fed. Test Method Std.  
No. 791

Lubricants, Liquid Fuels, and Related  
Products; Methods of Testing.

##### Military

MIL-STD-105

Sampling Procedures and Tables for  
Inspection by Attributes

MIL-STD-290

Packaging, Packing and Marking of  
Petroleum and Related Products

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

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

American Society for Testing and Materials Publications

ASTM Standards Parts 17 and 18

(Copies of ASTM publications may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

### 3. REQUIREMENTS

3.1 Materials. Except as otherwise specified herein, the fuel shall consist completely of hydrocarbon compounds.

3.2 Chemical and physical requirements. The chemical and physical requirements of the finished fuel shall conform to those listed in Table I. Requirements contained herein are not subject to corrections for test tolerances. If multiple determinations are made, results falling within any specified repeatability and reproducibility tolerances may be averaged.

TABLE I. Chemical and Physical Requirements and Test Methods.

Requirements	Fuel	Test Method ASTM Standards
Distillation:		D86 <u>1</u> /
Initial boiling point	<u>2</u> /	
Fuel recovered, 10 percent min at	400°F (204.4°C)	
Fuel recovered, 20 percent min at	<u>2</u> /	
Fuel recovered, 50 percent min at	<u>2</u> /	
Fuel recovered, 90 percent min at	<u>2</u> /	
End point, max	550°F (287.8°C)	
Residue, vol percent max	1-1/2	
Distillation loss, vol percent max	1-1/2	
Gravity °API - min (sp gr max)	36.0 (0.845)	D287
Gravity °API - max (sp gr min)	48.0 (0.788)	D287
Existent gum, mg/100 ml max	7	D381
Total potential residue, 16 hour aging, mg/100 ml max	14	D873
Sulfur, total, percent weight max	0.4	D1266
Mercaptan sulfur, percent weight max <u>3</u> /	0.001	D1219 or D1323

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Freezing point, max	-65°F (-54°C)	D2386
Heating Value:		
Net heat of combustion, BTU/lb, min	18,400	D240
or aniline-gravity product, min <sup>4/</sup>	5,000	D611 and D287
Viscosity, centistokes at - 60°F (-51.1°C)		
max	12.0	D445
Aromatics, vol percent max	25.0	D1319
Olefin, vol percent max	5.0	D1319
Smoke point, mm min	20	D1322 <sup>5/</sup>
or luminometer No., min	50	D1740
Explosiveness, percent max	50	6/
Flash point, min	140°F (60.0°C)	D93
Copper strip corrosion, (2hr at 212°F (100°C), max	No. 1	D130
Water separation index, modified min	85	D2550
Particulate matter, mg/liter, max	1.0	D2276

- 1/ A condenser temperature of 32° to 40°F (0° to 4°C) shall be used.
- 2/ To be reported - not limited
- 3/ The mercaptan sulfur determination may be waived at the option of the inspector if the fuel is "doctor sweet" when tested in accordance with the doctor test of ASTM D484.
- 4/ Aniline-gravity product is defined as the product of the gravity in °API and the aniline point in °F.
- 5/ That portion of D1322 pertaining to testing bottom fractions is not applicable.
- 6/ Test shall be performed in accordance with method 1151 of Fed. Test Method Std. No. 791.

3.3 Antioxidants. The following active inhibitors shall be blended separately or in combination into the fuel in total concentration not in excess of 8.4 pounds of inhibitor (not including weight of solvent) per 1,000 barrels of fuel (9.1g/100 gal (US), 24 mg/liter or 109 mg/gal (UK)) in order to prevent the formation of gum:

- (a) N,N' -diisopropyl-para-phenylenediamine
- (b) N,N' -disecundary butyl-para-phenylenediamine
- (c) N,secundary butyl,N' -phenyl ortho-phenylenediamine
- (d) 2,6-ditertiary butyl-4-methylphenol
- (e) 2,4-dimethyl-6-tertiary butylphenol
- (f) 72 percent min. 2,4-dimethyl-6-tertiary butylphenol  
28 percent max. monomethyl and dimethyl tertiary butylphenols
- (g) 55 percent min. 2,4-dimethyl-6-tertiary butylphenol  
15 percent min. 2,6-ditertiary butyl-4-methylphenol  
30 percent max. mixed monomethyl and dimethyl tertiary butylphenols
- (h) 2,6-ditertiary butylphenol

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- (i) 75 percent min. 2,6-ditertiary butylphenol  
25 percent max. mixed tertiary and tritertiary butylphenols
- (j) 60 percent min. 2,4-ditertiary butylphenol  
40 percent max. mixed tertiary butylphenols

3.4 Workmanship. The finished fuel shall be visually free from undissolved water, sediment, or suspended matter and shall be clean and bright at the ambient temperature or at 70°F, which ever is higher.

#### 4. QUALITY ASSURANCE PROVISIONS

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 use his own or any other facilities suitable for 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Quality conformance inspection. For acceptance purposes, individual lots shall be examined as specified herein and subjected to tests for all requirements cited in section 3.

##### 4.3 Inspection lot.

4.3.1 Bulk lot. A bulk lot shall consist of an indefinite quantity of a homogeneous mixture of material offered for acceptance in a single isolated container.

4.3.2 Packaged lot. A packaged lot shall consist of an indefinite number of 55-gallon drums or smaller unit packages of identical size and shape offered for acceptance and filled from one isolated tank containing a homogeneous mixture of material.

##### 4.4 Sampling.

4.4.1 Sampling for verification of product quality. Each bulk or packaged lot of material shall be sampled for verification of product quality in accordance with ASTM method D270. If the sample for tests fails any of the quality conformance tests, the inspection lot shall be rejected.

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4.4.2 Sampling for examination of filled containers for delivery. A random sample of filled containers shall be selected from each lot in accordance with MIL-STD-105 at inspection level II and acceptable quality level (AQL) of 2.5 percent defective. The samples shall be examined in accordance with 4.6.3.

4.5 Inspection. Inspection shall be performed in accordance with method 9601 of Fed. Test Method STD. No. 791

#### 4.6 Examinations.

4.6.1 Examination of product. Samples selected in accordance with 4.4.1 shall be visually examined for compliance with 3.4.

4.6.2 Examination of empty containers. Prior to filling, each empty unit container shall be visually inspected for cleanliness and suitability.

4.6.3 Examination of filled containers. Samples taken as specified in 4.4.2 shall be examined for conformance to MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing, and marking requirements. Any container having one or more defects or under the required fill shall be rejected. If the number of defective or underfilled containers exceeds the acceptance number for the appropriate plan of MIL-STD-105, the lot represented by the sample shall be rejected.

4.7 Test methods. Tests to determine conformance to chemical and physical requirements shall be conducted in accordance with ASTM standards, using the applicable methods as listed in Table I.

### 5. PREPARATION FOR DELIVERY

5.1 Packaging, packing, and marking. Packaging, packing, and marking shall be in accordance with MIL-STD-290.

### 6. NOTES

6.1 Intended use. The fuel covered by this specification is intended for use in gas turbine engine powered missiles.

6.2 Ordering Data. Procurement documents should specify:

- (a) Title, number, and date of this specification
- (b) Quantity required and size containers desired
- (c) Level of packaging and packing required (See 5.1).

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**STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL**OMB Approval  
No. 22-R255

INSTRUCTIONS: The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.

DOCUMENT IDENTIFIER AND TITLE MIL-F-81912(AS) FUEL, EXPENDABLE TURBINE ENGINE

NAME OF ORGANIZATION AND ADDRESS

CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT☐ SUBCONTRACT

1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A GIVE PARAGRAPH NUMBER AND WORDING

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID

3 IS THE DOCUMENT RESTRICTIVE?

☐ YES ☐ NO (If "Yes", in what way?)

4 REMARKS

SUBMITTED BY (Printed or typed name and address - Optional)

TELEPHONE NO

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**DD FORM 1426**  
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