

NOT MEASUREMENT
SENSITIVE

MIL-PRF-12070E
30 September 1998
SUPERSEDING
MIL-F-12070D
14 October 1992

PERFORMANCE SPECIFICATION

FOG OIL

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

1. SCOPE

1.1 Scope. This performance specification covers the requirements for one grade and type of fog oil (see 6.1) with Military Symbol SGF-2 and NATO Code F-62.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirement documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Tank-automotive and Armaments Command, Attn: AMSTA-TR-E/BLUE, Warren, MI 48397-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 9150

DISTRIBUTION STATEMENT A. Approved for public release, distribution is unlimited.

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2.2 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF LABOR (DOL)

OSHA 29 CFR 1910.1200 - Hazard Communication Interpretation Regarding Lubricating Oils.

(Guideline CPL-2-2.38 may be obtained from OSHA Publication Office, Room S-4203, 200 Constitution Avenue, NW, Washington, DC 20210.)

FOOD AND DRUG ADMINISTRATION

21 CFR, Part 3620 - White Oil Purity Test, Chapter 178, Subpart B, Food and Drugs.

(Application for copies should be addressed to the superintendent of Documents, U.S. Government Printing office, Washington, DC 20402.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents, which are DoD adopted, are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 92 - Flash and Fire Point by Cleveland Open Cup. (DoD Adopted)
ASTM D 97 - Pour Point of Petroleum Oils. (DoD Adopted)
ASTM D 445 - Kinematic Viscosity of Transparent and Opaque Liquids (And the Calculation of Dynamic Viscosity) (DoD Adopted)
ASTM D 524 - Ramsbottom Carbon Residue of Petroleum Products. (DoD Adopted)
ASTM D 974 - Acid and Base Number by Color-Indicator Titration. (DoD Adopted)
ASTM D 1796 - Water and Sediment in Crude Oils and Fuel Oils by the Centrifuge Method (Laboratory Procedure). (DoD Adopted)
ASTM D 2270 - Calculating Viscosity Index from Kinematic Viscosity at 40°C and 100°C. (DoD Adopted)
ASTM E 1687 - Determining Carcinogenic Potential of Virgin Base Oils in Metalworking Fluids.

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

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2.4 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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Material. The fog oil shall be of overhead petroleum fraction(s) and shall contain no additives. Products that require a hazard label or warning label according to Hazard Communication Standard (HSC) 29 CFR 1910.1200 shall not be acceptable.

3.3 Appearance. The fog oil shall be free from water, sediment, suspended particles, grit, and other foreign matter.

3.4 Chemical and physical characteristics. The fog oil shall conform to the applicable chemical and physical characteristics of table I (see 4.5).

TABLE I. Chemical and physical characteristics.

Characteristic	Value
Flash Point, °C minimum	160
Viscosity, Kinematic at 100°C minimum	3.40
maximum	4.17
Neutralization number, maximum	0.1
Pour Point, °C minimum	-40
Ramsbottom carbon, % vol. maximum	0.2
Water and Sediment, % vol. maximum	0.06

3.5 Mutagenicity and carcinogenicity. The fog oil shall not demonstrate any toxic effect or carcinogenic or potentially carcinogenic effect (see 4.5.3).

3.5.1 Carcinogenicity. Fog oil shall not produce more malignant tumors in mice than in controls at the site of application or at any other part of the body (see 4.5.3.1).

3.5.2 Mutagenicity. Fog oil shall have a mutagenicity index equal to or less than 1.0 (see 4.5.3.2).

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3.6 White oil purity. The product shall have an absorbance value of less than 200 units at 280 to 290 nanometers (nm) (see 4.5.3.3).

3.7 Item identification. Unless otherwise specified (see 6.2), marking shall be permanent and legible and as a minimum, shall include marking identification code (CAGE), the contract number and National Stock Number (NSN).

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspections (see 4.2).
- b. Conformance inspections (see 4.3).

4.2 First article inspection. First article inspections shall be performed on one or more lots (see 4.4 and 6.3). The actual quantity of lots (see 6.3) to be inspected shall be as specified in the contract or order (see 6.2). Inspections for first article of individual lots (see 6.3) shall be as specified in table II.

4.3 Conformance inspection. Inspections shall be performed in accordance with table II.

Table II. Classification of Inspections and tests.

Title	Requirement	Inspection	Tests	
			Conformance	First article
Materials	3.2	4.5.2	X	X
Appearance	3.3	4.5.1	X	X
Chemical & physical characteristics	3.4	4.5	X (see table III)	X (see table III)
Carcinogenicity ¹	3.5.1	4.5.3.1	X	X
Mutagenicity ¹	3.5.2	4.5.3.2	X	X
FDA White oil purity ¹	3. 6	4.5.3.3	X	X

¹ If the carcinogenicity test is not available, then the mutagenicity and white oil purity tests shall be performed on the lot/batch being supplied or inspected as in 4.5.3, or historical information shall be used as indicated in contract or order in lieu of these inspections (see 6.4).

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Table III. Chemical and physical tests.

Test	ASTM Method
Flash point, °C	D 92
Viscosity kinematic At 100 °C minimum maximum	D 445
Neutralization number , maximum	D 974
Pour point, °C	D 97
Ramsbottom carbon, % wt. maximum	D 524
Water and Sediment, % vol. maximum	D 1796

4.4 Sampling.

4.4.1 Sampling for the examination of filled containers. A random sample shall be taken from each lot (see 6.3).

4.5 Test methods. Perform tests in accordance with table III.

4.5.1 Appearance. Visually examine the specimen for water, sediment, suspended particles, grit and other foreign matter. The sample shall be clear and bright.

4.5.2 Materials. Verify the product does not require labeling as in 3.2.

4.5.3 Carcinogenicity and mutagenicity test.

4.5.3.1 Carcinogenicity test. A mouse skin bioassay shall be performed as specified in Appendix requirements for mouse skin study. However, historical informations may be used in lieu of this as indicated in contract or order (see 6.2 and 6.4).

4.5.3.2 Mutagenicity test. An *invitro* genotoxicity test shall be performed in accordance with ASTM E 1687.

4.5.3.3 White oil purity test. The fog oil shall be tested to estimate the aromatic content. A content and absorbance value in excess of 200 units at 280 to 290 nanometers shall be cause for rejection. The test shall be conducted in accordance with FDA 21 CFR Part 3620-White Oil Purity Test, Chapter 178, Subpart B. Laboratory shall state the dilution factor used in the test.

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5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain 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.

6. NOTES

(This section contains information of a general or explanatory nature, which may be helpful, but is not mandatory.)

6.1 Intended use. Fog oil covered by this specification is military unique. It will be used in military smoke generator to create smoke cloud to cover large areas for extended period of time to obscure personnel and equipment movement in the field. No other commercial specification is available to cover this military application.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title number, and date of the specification.
- b. Issue of DoDISS to be cited in the solicitation and if required, the specific issue of individual documents referenced (see 2.3).
- c. When first article required (see 3.1).
- d. Type of marking requirement (see 3.7).
- e. Quantity of lots to be inspected (see 4.2).
- f. Applicability of historical information (see 4.5.3 and 6.4).
- g. Packaging requirements (see 5.1).

6.3 Definitions.

6.3.1 Bulk lot. A bulk lot is an indefinite quantity of fog oil offered for acceptance in a single, isolated container, or manufactured in a single plant run (not to exceed 24 hours), through the same processing equipment, with no change in the ingredient materials.

6.3.2 Packaged lot. A packaged lot is an indefinite number of 55-gallon drums or smaller unit containers. Containers should be of identical size and type, offered for acceptance, and filled with fog oil from a single, isolated container, or filled with fog oil manufactured in a single plant run (not to exceed 24 hours), through the same processing equipment, with no change in the ingredient materials.

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6.3.3 Batch. A batch is defined as the quantity of material that has been manufactured by a chemical process or subjected to some physical mixing operation. And intended to make the final product substantially uniform, and manufactured in a single plant run (not to exceed 24 hours), through the same processing equipment, with no change in the ingredient materials.

6.4 Historical information. In lieu of providing test results from section 4.5.3, historical information may be provided, derived from a minimum of three batches of oil which were manufactured within the last twelve months. This information ensures the ability of the plant to meet the carcinogenicity requirements of section 4.5.3.

6.5 Carcinogenicity test references. The tests in section 4.5.3 are advised for use in the following journal articles.

Ames, B., J McCann and E Yamasaki, "Methods for Detecting Carcinogens and Mutagens with the *Salmonella*/Mammalian-Microsome Mutagenicity Test", Mutation Research 31: 347-364, 975.

Blackburn, G., et.al. "Estimation of the Dermal Carcinogenic Activity of Petroleum Fractions Using a Modified Ames Assay", Cell Biology and Toxicology 1: 67-80, 1984.

Blackburn, G., et.al. "Predicting Carcinogenicity of Petroleum Distillation Fractions Using a Salmonella Mutagenicity Assay", Cell Biology and Toxicology 2: 63-84, 1986.

6.6 International agreement. Certain provisions of this specification are the subjects of international standardization agreement (NATO STANAG 1135). When amendment, revision or cancellation of this specification is proposed which will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels, including departmental standardization offices, to change agreement or make other appropriate accommodations.

6.7 Changes for previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

6.8 Subject term (key word) listing.

Carcinogenicity
Smoke
Mutagenicity
Overhead petroleum fractions

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APPENDIX

REQUIREMENTS FOR MOUSE SKIN STUDY

1. SCOPE

1.1 Scope. This appendix details the procedure for mouse skin painting studies, which are to be conducted in accordance with the general procedures outlined in the National Toxicology Program "(Specifications for the conduct of studies to evaluate the toxic and carcinogenic potential of chemical, biological and physical agents in laboratory animals. Revised August 1992 including any later modifications)". In addition, the FDA or EPA Good Laboratory Practices listed in section 2.1 is to be strictly adhered to. This appendix is a mandatory part of this specification.

2. APPLICABLE DOCUMENTS

2.1 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

- | | |
|------------------|---|
| 40 CFR, Part 792 | - Toxic Substance Control Act (TSCA), Good Laboratory Practice Standards. Federal Register, Vol.54, 158, August 17, 1989. |
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FOOD AND DRUG ADMINISTRATION

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|-----------------|---|
| 21 CFR, Part 58 | - Non Clinical Laboratory Studies. Good Laboratory Practice Regulations. Federal Register, Vol.52, No. 172, September 4, 1987 and later amendments. |
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(Application for copies should be addressed to the superintendent of Documents, U.S. Government Printing office, Washington, DC 20402.)

NATIONAL TOXICOLOGY PROGRAM

Specifications for the conduct of studies to evaluate the toxic and carcinogenic potential of chemical, biological and physical agents in laboratory animals for the National Toxicology Program (NTP).

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APPENDIX

(Application for copies should be addressed to the Central Data Management National Toxicological Program, P.O Box 12233, Research Triangle Park, NC 27709-2233.)

3. Procedure. Specific details concerning the design of the mouse skin painting cancer bioassays are as follows.

3.1 Test mice. Male Swiss or C3H mice (other strains routinely used in mouse skin cancer bioassays are acceptable) will be used. Mice should be observed for 14 days before the studies begin and should be 6 to 8 weeks old when the first dose is applied.

3.2 Control groups. A negative untreated control group and a positive control group (the positive control will be treated with either a known carcinogenic mineral oil or with benzo (a) pyrene) will be included. The dose group and controls will contain 50 mice each.

3.3 Dosing. Undiluted test oil and positive controls will be applied directly to the interscapular skin in either 37.5 μL aliquots twice weekly or 25 μL aliquots 3 times weekly to yield a total weekly dose of 75 μL . Fur in the area of the skin receiving the dose application will be clipped once every week. Animals are to be sacrificed after two years of treatment unless they become moribund or a squamous cell carcinoma is grossly diagnosed before that time.

3.4 Examination. Mice will be housed individually throughout the studies and will receive food and water *ad libitum*. Animals will be examined twice weekly for the appearance of dermal tumors. Mice will be examined twice daily for mortality, changes in appearance or behavior, and signs of toxicologic or pharmacologic effects.

3.5 Clinical findings. Clinical findings will be recorded weekly for the first 13 weeks, then at 4-week intervals thereafter until the end of the study. Body weights will be recorded weekly for the first 12 weeks, then every 4 weeks until the end of the study.

3.6 Necropsy. Complete necropsies will be performed on all mice. During necropsy all organs and tissues will be examined for gross lesions. Histopathologic examination will be performed on skin from all mice and on any gross lesions observed during necropsy.

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Custodians:

Army - AT
Navy - AS
Air Force - 68

Preparing Activity:

Army - AT

Review Activities:

Navy - SA
Air Force - 03
DLA - GS, PS

(Project 9150-1234)

Industry associations:

ASTM
ANSI

Civil Agency Coordinating Activity:

GSA/FSS - 10FTE

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. 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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-12070E	2. DOCUMENT DATE (YYMMDD) 980930
3. DOCUMENT TITLE <p style="text-align: center;">FOG OIL</p>		
4. NATURE OF CHANGE <i>(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)</i>		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME <i>(Last, First, Middle Initial)</i>	b. ORGANIZATION	
c. ADDRESS <i>(Include Zip Code)</i>	d. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (2) AUTOVON <i>(If applicable)</i>	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME	b. TELEPHONE <i>(Include Area Code)</i> (1) Commercial (810) 574-8745 (2) AUTOVON 786-8745	
c. ADDRESS <i>(Include Zip Code)</i> Commander U.S. Army Tank-automotive and Armaments Command ATTN: AMSTA-TR-E/BLUE Warren, MI 48397-5000	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403 Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	