NOT MEASUREMENT SENSITIVE

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SUPERSEDING
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PERFORMANCE SPECIFICATION

PRESERVATIVE OIL, CONTACT AND VOLATILE CORROSION-INHIBITED

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

1. SCOPE

1.1 Scope. This specification covers two grades of water-displacing, contact and volatile, corrosion-inhibited preservative oil, known hereinafter as “oil”, for use in the preservation of material in enclosed systems.

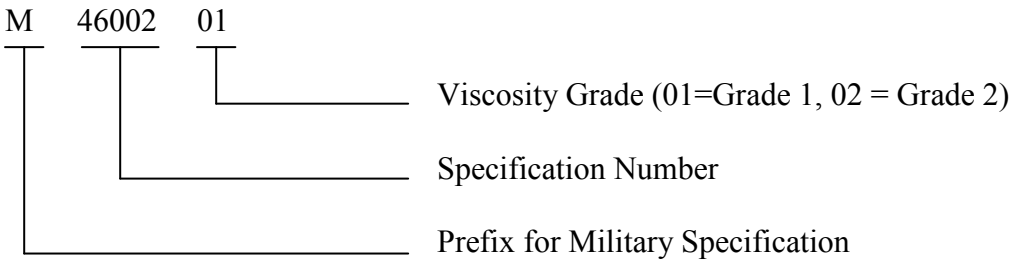
1.2 Classification and part identifying number (PIN).

1.2.1 Grades. The oils are of the following grades, as specified (see 6.2).

Grade 1 - light viscosity oil.
Grade 2 - medium viscosity oil.

1.2.2 PIN. Oils furnished under this performance specification are identified by a PIN consisting of; an "M" prefix and specification number, a single digit "Dash Number" which indicates the viscosity grade of the oil.

Comments, suggestions, or questions on this document should be addressed to U.S. Army RDECOM, Tank Automotive Research Development and Engineering Center, ATTN: RDTA-EN/STND/TRANS, MS# 268, 6501 E. 11 Mile Road, Warren, MI 48397-5000 or emailed to DAMI_STANDARDIZATION@conus.army.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil.



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 requirements in documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed cited in the solicitation or contract (see 6.2).

FEDERAL SPECIFICATIONS

A-A-51126 - Anodes, Cadmium.
A-A-52557 - Fuel Oil, Diesel; for Posts, Camps and Stations.

FEDERAL STANDARDS

FED-STD-791 - Lubricants, Liquid Fuels, and Related Products; Methods of Testing.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-680 - Degreasing Solvent.

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094)

2.2.2 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 of these documents are those listed cited in the solicitation or contract (see 6.2).

DEPARTMENT OF LABOR (DOL)

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

(Requests for copies of the Code of Federal Regulations (CFR) Guideline may be obtained from the Superintendent of Documents, US Government Printing Office, Washington, DC 20402 or www.gpoaccess.gov/cfr/.)

NATIONAL TOXICOLOGY PROGRAM

Annual Report on Carcinogens.

(Requests for copies should be addressed to the Annual Report on Carcinogens, National Toxicology Program, PO Box 12233, Research Triangle Park, NC 27709 or http://ntp.niehs.hih.gov/.)

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 these documents are those cited in the solicitation or contract (see 6.2).

ASTM INTERNATIONAL

ASTM A1008/1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable
ASTM B90/90M - Magnesium-Alloy Sheet and Plate (DoD Adopted).
ASTM B152/152M - Copper Sheet, Strip, Plate, and Rolled Bar (DoD Adopted).
ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate (DoD Adopted).
ASTM D91 - Precipitation Number of Lubricating Oils (DoD Adopted).
ASTM D92 - Flash and Fire Points by Cleveland Open Cup (DoD Adopted).
ASTM D97 - Pour Point of Petroleum Products (DoD Adopted).
ASTM D130 - Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test (DoD Adopted).
ASTM D445 - Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity) (DoD Adopted).

ASTM D972	- Evaporation Loss of Lubricating Greases and Oils (DoD Adopted).
ASTM D1152	- Methanol (Methyl Alcohol).
ASTM D1193	- Reagent Water (DoD Adopted).
ASTM D1748	- Rust Protection by Metal Preservatives in the Humidity Cabinet (DoD Adopted).

(Application for copies should be addressed to ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or http://www.astm.org/.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE-AMS 4375	- Sheet and Plate, Magnesium Alloy 3.0 Al –1.0 Zn - 0.20 Mn (AZ 31B-0) Annealed and Recrystallized (DoD Adopted)

(Application for copies should be addressed to Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096 or http://www.sae.org/.)

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 4.1.

3.2 Materials. Unless otherwise specified herein, the chemical formula of the oil is the prerogative of the contractor as long as all articles submitted to the Government fully meet the operating, interface, support and ownership, and environmental requirements specified.

3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Operating requirements.

3.3.1 Kinematic viscosity. The kinematic viscosity of the oil shall be as specified in Table I (see 4.2.2.1).

TABLE I. Kinematic viscosity.

Kinematic viscosity, centistokes (cSt)	Grade 1	Grade 2
@ 100 degrees Celsius (ºC) minimum.	-	8.25
Maximum.	-	16.60
@ 40°C minimum.	11	83.45
Maximum.	-	111.20
@ -40°C minimum.	-	-
Maximum.	10,000	-

3.3.2 Corrosion protection.

3.3.2.1 Corrosion protection (humidity cabinet). The oil shall protect metal to the extent that no more than a combined total of three corrosion dots, none of which exceed 1 millimeter (mm) in diameter, occur on the panels (see 4.2.2.2.1).

3.3.2.2 Corrosion protection (vapor phase). The oil shall protect metal to the extent that no more than a combined total of three corrosion dots, none of which exceed 1 mm in length, width or diameter, occur on the panels (see 4.2.2.2.2).

3.3.2.3 Corrosion protection (vapor phase after evaporation). The oil shall protect metal to the extent that no more than a combined total of three corrosion dots, none of which exceed 1 mm in length, width or diameter, occur on the panels (see 4.2.2.2.3).

3.3.3 Acid neutralization. The oil shall protect metal to the extent that no more than a combined total of three corrosion dots, none of which exceed 1 mm in length, width or diameter, occur on the panels (see 4.2.2.3).

3.3.4 Water displacement and water stability. The oil, after storage in contact with water, shall satisfactorily displace water as evidenced by the absence of rust, mottling, or surface stains on the panels (see 4.2.2.4).

3.4 Interface requirements.

3.4.1 Copper strip corrosion. The oil shall not tarnish the copper strip exceeding the value of 2c on the ASTM D130 Copper Strip Classification scale (see 4.2.3.1).

3.4.2 Metal protection (immersion). The oil shall not produce corrosion effects as shown by weight gain or loss more than as specified in Table II (see 4.2.3.2).

TABLE II. Metal protection requirements.

Metal	Weight change in milligrams/square centimeter (mg/cm^2)
Aluminum	0.2
Steel	0.5
Copper	1.0
Magnesium	0.2
Cadmium	0.5

3.4.3 Vapor phase copper protection. The oil shall not tarnish the copper strip exceeding the number 3 rating on the ASTM D130 Copper Strip Classification scale (see 4.2.3.3).

3.5 Support and ownership requirements.

3.5.1 Precipitation number and hydrocarbon solubility.

3.5.1.1 Solid sediment. The oil shall generate not more than 0.5 milliliters (mL) mean total volume of sediment (see 4.2.4.1.1).

3.5.1.2 Oil separation. The oil shall not show evidence of stratification or separation of the oil or its additives from the test solution after 24 hours storage at 25°± 3 degrees Celsius (°C) (see 4.2.4.1.2).

3.5.2 Toxicity. The oil shall have no adverse (injurious or damaging) effects on human health when it is used as intended (see 6.1). Blenders, formulators, and suppliers shall follow the guidelines of OSHA 29 CFR 1910.1200, the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values and Biological Indices, and the most current National Toxicology Program's Annual Report on Carcinogens (see 4.2.4.2).

3.6 Environmental requirements.

3.6.1 Flash point. The minimum flash point of the oil shall be 115.5°C for Grade 1 and 120°C for Grade 2 (see 4.2.5.1).

3.6.2 Pour point. The maximum pour point of the oil shall be –45.5°C for Grade 1 and -23.5°C for Grade 2 (see 4.2.5.2).

3.6.3 Evaporation loss. The maximum mass percent evaporation loss of the oil shall be 25 percent (%) for Grade 1 and 5% for Grade 2 (see 4.2.5.3).

3.6.3.1 Viscosity change after evaporation loss. The viscosity change of the oil at 40°C after the evaporation loss shall be not more than a 5% decrease or a 20% increase (see 4.2.5.3.1).

4. VERIFICATION

4.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.1.1.

4.1.1 First article inspection. First article inspection shall consist of tests for all of the requirements specified in section 3 and may be performed in any plant or laboratory approved by the qualifying activity or its designated agent (see 6.4).

4.1.2 First article sample. The first article sample shall be 5 gallons of the oil formulation for which first article approval is sought.

4.2 Verification methods. Acceptable verification methods included in this section are visual inspection, and measurement, sample tests, full-scale demonstration tests, simulation, modeling, engineering evaluation, component properties analysis, and similarity to previously approved or previously qualified designs.

4.2.1 Verification alternatives. The manufacturer may propose alternative test methods, techniques, or equipment, including the application of statistical process control, tool control, or cost effective sampling procedures to verify performance. See the contract for alternatives that replace verification methods required by this specification (see 6.2).

4.2.2 Operating requirements verifications.

4.2.2.1 Kinematic viscosity. To determine conformance to 3.3.1, the oil shall be tested in accordance with ASTM D445, and exhibit a kinematic viscosity within the range specified in table I.

4.2.2.2 Corrosion protection.

4.2.2.2.1 Corrosion protection (humidity cabinet). To determine conformance to 3.3.2.1, the oil shall be tested in accordance with ASTM D1748 for a duration of 300 hours, and shall pass.

4.2.2.2.2 Corrosion protection (vapor phase).

4.2.2.2.2.1 Test panels. Prepare three panels measuring 76 x 51 x 3.2 mm of the same material and cleaned in the same manner as specified for the humidity cabinet test (see 4.2.2.2.1).

4.2.2.2.2.2 Polishing test panels. Polish the unnumbered side of the test panels to a surface finish of 380 ± 130 nanometers using a 240-grit aluminum oxide or silicon carbide abrasive, with either cloth or paper backing. Do not use “wet or dry”, waterproof, or iron oxide abrasive. After abrading, clean the panels immediately, using the following procedure:

a. Wipe the abraded faces of the panels with clean surgical gauze to remove superficial dust.

b. Remove the remaining residue and contamination by holding the panels in a rack at 20 degrees from the vertical and spraying downward with naphtha. Flush the surfaces progressively downward, spraying first the test surfaces, then the backs of the panels and finally the test surfaces again.
c. Heat the panels in boiling naphtha for 5 to 10 minutes.
d. Rinse the panels in boiling anhydrous methanol defined by ASTM D1152.
e. Inspect the panels carefully under a bright light to determine if any surface residues remain.
f. Desiccate the panels at 25 ± 3°C and place in use within 2 hours.

NOTE: Naphtha, hexane and methanol are flammable and toxic. Do not heat either solvent with an open flame. Avoid contact with skin and inhalation of vapor. Perform procedures under b, c, and d in an efficient laboratory hood.

4.2.2.2.2.3 Test apparatus. The test apparatus shall consist of a screw top, wide-mouth jar, 100 mm in height and 90 mm in diameter, as illustrated in figure 1. Bend a length of stainless steel or Monel (TM) metal into simple framework on which the steel panel can be suspended in a vertical position on one side of the jar. Remove any cardboard seal in the jar lid and replace it with several pieces of filter paper to seal the jar. Use fresh filter papers for each test. The filter paper shall be of high quality and acid-free.

4.2.2.2.2.4 Cleaning of apparatus before the test.

4.2.2.2.2.4.1 Jar lids. The jar lids shall be washed thoroughly in a water-detergent solution, then rinsed with running water, followed by another rinse with reagent water defined by ASTM D1193, and then wiped dry with a clean, absorbent tissue.

4.2.2.2.2.4.2 Jars, watch glasses and Monel (TM) metal framework. These items shall be cleaned as specified below:

a. Rinse with solvent conforming to MIL-PRF-680, Type II.
b. Soak in water-detergent solution for one hour, followed by a rinse with hot, running tap water.
c. Add 5 - 10 mL of concentrated hydrochloric acid to the jars, swirl and allow to stand for 1 hour.
d. Expose the Monel (TM) metal framework to hydrochloric acid vapors and soak the watch glasses in the acid.
e. Soak in water-detergent solution followed by a rinse with hot, running tap water.
f. Rinse with reagent water and dry with fresh, absorbent tissue.

4.2.2.2.2.5 Test procedure. Prepare three test assemblies for each grade of oil. Weigh a quantity of oil, as listed in table III, onto a small, cleaned and tared watch glass, 51 to 64 mm in diameter. The temperature of the oil and the test assemblies shall be 25 ± 1°C before the test.

TABLE III. Oil weight vapor phase.

Oil	Oil weight, grams (g)
Grade 1	2.5
Grade 2	4.0

Immediately after weighing, place the watch glass and oil in the test jar and add 50.0 ± 0.5 mL of reagent water. Place the lid on the jar, then swirl the jar and contents vigorously for one minute. Be careful to prevent any of the mixtures from splashing onto the inside surface of the jar lid. Mount the steel panel on the Monel (TM) metal framework, place the panel in the jar and replace the jar lid immediately. Mount the panel so that the polished side faces the center or the jar. Maintain the temperature of the test unit at 25 ± 3°C for 10 to 15 minutes, place the unit in a mechanical convection oven at 54 ± 3°C for 16 hours, then expose it for 6 hours at 4 ± 3°C, followed by 18 hours at 54 ± 3°C. Position the jars in the oven so that the polished surface of the panel is facing toward the direction of airflow. After the specified period examine the panels for corrosion dots, disregarding any corrosion appearing within 6 mm of any edge, or any surface stain that can be removed by absorbent tissue and naphtha. The panels shall exhibit a combined total of not more than three corrosion dots, none of which exceed 1 mm in length, width or diameter (see 3.3.2.2).

4.2.2.2.3 Corrosion protection (vapor phase after evaporation).

4.2.2.2.3.1 Test panels. Prepare three panels measuring 76 x 51 x 3.2 mm of the same material and cleaned in the same manner as specified for the humidity cabinet test (see 4.2.2.2.1).

4.2.2.2.3.2 Polishing test panels. Polish the test panels in accordance with the procedure specified for the vapor phase protection test (see 4.2.2.2.2.2).

4.2.2.2.3.3 Test apparatus. Use the test apparatus specified for the vapor phase protection test (see 4.2.2.2.2.3).

4.2.2.2.3.4 Cleaning of apparatus before the test. Clean the test apparatus in accordance with the procedure specified for the vapor phase protection test (see 4.2.2.2.2.4).

4.2.2.2.3.5 Test procedure. Evaluate a 15.00 ± 0.05 g sample at 100 ± 3°C in accordance with ASTM D972, except that the exposure period shall be 6 hours instead of the 22-hours period specified. At the completion of the test, transfer the sample to a glass container, stopper the container, and permit the sample to cool. Then evaluate the oil in accordance with the procedure specified for the vapor phase protection test (see 4.2.2.2.2.5), using the quantity of oil specified in Table IV.

TABLE IV. Oil weight, vapor phase after exhaustion.

Oil	Oil weight, g
Grade 1	3.0
Grade 2	5.0

After the specified period, examine the panels for corrosion dots, disregarding any corrosion appearing within 6 mm of any edge, or any surface stain that can be removed by absorbent tissue and naphtha. The panels shall exhibit a combined total of not more than three corrosion dots, none of which exceed 1 mm in length, width or diameter (see 3.3.2.3).

4.2.2.3 Acid neutralization.

4.2.2.3.1 Test panels. Prepare three panels measuring 76 x 51 x 1.6 mm of the same material and cleaned and polished in the same manner as specified for the humidity cabinet test (see 4.2.2.2.1).

4.2.2.3.2 Test procedure. Using forceps, totally immerse each of three test panels for not more than one second in a 0.1 ± 0.01 weight percent aqueous hydrobromic acid solution. Without draining excess acid from the panels, immediately transfer the panel from the hydrobromic acid to a 400-ml beaker containing the sample of the oil being tested. Totally immerse the panel and remove it from the oil twelve times in 60 seconds. Change the position of the tips of the forceps for each immersion, to assure of the oil to all surfaces of the panel. Set all three panels in a slotted wooden block support and store them at 25 ± 3°C for 4 hours. At the completion of the storage period, remove the coatings from the panels with hexane and examine them for corrosion dots, disregarding any corrosion or staining appearing within 3 mm of any edge of a panel or within 3 mm of the line of contact of a panel and the upper surface of the slot in the wooden block support. The panels shall exhibit a combined total of not more than three corrosion dots, none of which exceed 1 mm in length, width or diameter (see 3.3.3).

4.2.2.4 Water displacement and water stability. To determine conformance to 3.3.4, the oil shall be tested in accordance with method 3007 of FED-STD-791. There shall be no evidence of rust, mottling, or surface stains on the panels following the test.

4.2.3 Interface requirements verifications.

4.2.3.1 Copper strip corrosion. To determine conformance to 3.4.1, prepare a blend composed of 5% by volume of the oil and 95% by volume of diesel fuel oil conforming to A-A-52557. Test this blend in accordance with ASTM D130. Perform the test at 100 ± 1°C for 6 hours ± 5 minutes in an oven with one exception: Use 20 ml of the blend in a sample tube (25 x 150 mm) and 10 mL of the blend in another sample tube. Carefully immerse a polished copper strip partially in the tube containing 20 mL of the blend and carefully partially immerse another polished copper strip in the tube containing 10 mL of the blend. Place the tubes in the copper strip corrosion test bombs. After the test withdraw the copper strips and wash them and examine them for evidence of corrosion or tarnishing. The copper strips shall exhibit a value not more than 2c in accordance with the ASTM D130 Copper Strip Corrosion Standards.

4.2.3.2 Metal protection (immersion).

4.2.3.2.1 Test specimens. Test specimens shall consist of one each of the following metals in Table V, and measuring 51 x 25 x 5.4 mm.

TABLE V. Metal protection test specimens.

Metal	Specification
Aluminum	ASTM B209
Steel	ASTM A1008/1008M, class 1, bright finish
Copper	ASTM B152/152M
Magnesium	AMS 4375 or ASTM B90/90M
Cadmium	A-A-51126

4.2.3.2.2 Preparation of test specimens. Clean the five test specimens described in 4.2.3.2.1 in accordance with ASTM D1748. Polish the test specimens with a slow speed, horizontal, metallurgical polishing wheel. Perform the final polishing with 240-grit silicon carbide or aluminum oxide paper moistened with naphtha. Hold the specimen in a suitable holder to avoid contact with the hands. Then clean the specimens with boiling hexane and rinse them in boiling anhydrous methanol defined by ASTM D1152. Rinse the magnesium specimen very briefly in the methanol. When the specimens are dry, store them in a desiccator and use them within a 24 hour period.

4.2.3.2.3 Test procedure. Weigh each specimen and place it in a wide mouth jar approximately 76 mm in diameter and fitted with a screw cap. Use a suitable device or procedure to insure that the specimens do not touch each other. Cover the specimen with 300 mL of the test oil. Seal the jar and place it in an oven maintained at 54 ± 3°C for seven days. On completion of the test, remove the compound and any corrosion products from the specimens by swabbing with hexane, followed by methanol, using surgical gauze pads. Follow each swabbing operation with a rinse in a clean solvent. Reweigh the specimens and calculate the change in weight. The samples shall not exhibit weight gains or losses more than as specified in table II (see 3.4.2).

4.2.3.3 Vapor phase copper protection.

4.2.3.3.1 Test strips. The test strips shall be copper (see ASTM D130 for description of specimen). Three strips shall be used for each test.

4.2.3.3.2 Polishing the strips. Polish the three test strips in accordance with 4.2.2.2.2.2, with the exceptions that the residue shall be removed with hexane rather than naphtha (see 4.2.2.2.2.2b), and that the strips will be heated in boiling hexane rather than naphtha (see 4.2.2.2.2.2c).

4.2.3.3.3 Test apparatus. Use the test apparatus specified for the vapor phase protection test (see 4.2.2.2.2.3).

4.2.3.3.4 Cleaning of apparatus before the test. Clean the test apparatus according to the procedure specified for the vapor phase protection test (see 4.2.2.2.2.4).

4.2.3.3.5 Test procedure. Three test assemblies for each grade of oil shall be tested in accordance with the vapor phase protection test (see 4.2.2.2.2.5), with the exception that following the test, the test strips shall be rated in accordance with the Copper Strip Classification of ASTM D130. The test strips' ratings shall not be more than number 3 (see 3.4.3).

4.2.4 Support and ownership requirements verifications.

4.2.4.1 Precipitation number and hydrocarbon solubility.

4.2.4.1.1 Solid sediment. To determine conformance to 3.5.1.1, the oil shall be tested in accordance with ASTM D91, and shall generate not more than 0.5 mL mean total volume of sediment.

4.2.4.1.2 Oil separation. To determine conformance to 3.5.1.2, after the completion of the solid sediment test (see 4.2.4.1.1), store the sample for 24 hours at 25 ± 3°C. After the 24 hours, the oil shall not show evidence of stratification or separation of the oil or its additives from the test solution. Slight suspension is permitted if recentrifuging does not increase the precipitation number or cause layer formation.

4.2.4.2 Toxicity. To determine conformance to 3.5.2, components of the oil's formulation shall be compared with the toxic limits established by the guidelines of OSHA 29 CFR 1910.1200, the American Conference of Governmental Industrial Hygienists' Threshold Limit Values and Biological Indices and the most current National Toxicology Program's Annual report on Carcinogens. Oils with components exceeding the toxic limits shall be disqualified. Methods of quantitative determination shall be selected at the discretion of both the qualifying activity and the manufacture/blender.

4.2.5 Environmental requirements verifications.

4.2.5.1 Flash point. To determine conformance to 3.6.1, the oil shall be tested in accordance with ASTM D92, and shall exhibit minimum flash points of 115.5°C for Grade 1 and 120°C for Grade 2.

4.2.5.2 Pour point. To determine conformance to 3.6.2, the oil shall be tested in accordance with ASTM D97, and shall exhibit maximum pour points of –45.5°C for Grade 1 and -23.5°C for Grade 2.

4.2.5.3 Evaporation loss. To determine conformance to 3.6.3, the oil shall be tested at 100°C in accordance with ASTM D972, with one exception: Use a 15.00 ± 0.05 g sample. The oil shall exhibit maximum mass percent evaporation losses of 25% for Grade 1 and 5% for Grade 2.

4.2.5.3.1 Viscosity change after evaporation loss. To determine conformance to 3.6.3.1, after completing the evaporation loss test (see 4.2.5.3), determine the viscosity of the oil sample

at 40°C. The calculated viscosity change, based on the original viscosity of the oil, shall be not more than a 5% decrease or a 20% increase.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of material is to be performed by DoD or in-house contractor 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 Service or Defense Agency, or within the military service's system commands. 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. The oils covered by this specification are intended for use in the preservation of enclosed systems where the volatile components will provide protection above the oil level. It can also be effectively used as a contact preservative. This material is not to be used in the preservation of any engine or vehicle fuel system (including fuel tanks) or other fuel storage tanks. It is not intended for use as an operational preservative oil and should not be used in applications where elastomeric components are present. It is not effective unless an adequate reservoir of oil can be maintained. A minimum of 5 liters (L) of grade 1 or 8.4 L of grade 2 oil should be used for each cubic meter (1,000 L) of volume to be protected (U.S. customary equivalents: 5 fluids ounces of grade 1 or 8 fluid ounces of grade 2 for each cubic foot of volume). The oil is considered military unique, as it provides protection and preservation of non-wetted surface with volatile components in addition to preservation by direct contact, for which there is no commercial equivalent.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Grade of oil required (see 1.2.1).
c. If required, the specific issue of individual documents referenced (see 2.2.1, 2.2.2 and 2.3).
d. If first article testing is required (see 3.1 and 4.1).
e. Location of verification testing (see 4.1).
f. If alternative verification methods are available (see 4.2.1).
g. Packaging requirements (see 5.1).

6.3 Compatibility. The blending of different manufacturers' volatile corrosion inhibited oils procured by this specification is not recommended. The permissible variation in chemical composition of several manufacturers might cause serious compatibility problems.

6.4 First article inspection. Information and instruction regarding first article inspection under this specification may be obtained from the following activity: Fuels and Lubricants Team, AMSTA-TR-D/210, U.S. Army Tank-automotive and Armaments Command, Warren, Michigan 48397-5000.

6.6 Waste disposal instructions.

6.6.1 Recovery (RC). The very first step in disposal is to coordinate with Defense Property Disposal Office (DPDO) for turn-in for disposal of any excess items of supply. Defense Disposal Manual DOD 4160.21-M (with pertinent supplements/messages) describes the requirements for such turn-ins. Variations exist whether the DPDO accepts physical custody of the disposal turn-in. The potential for DPDO acceptance and disposal processing is enhanced by comprehensive identification. If the DPDO does not accept the item for disposal (accountability) or returns the item to the generator for disposal, the manufacturer/supplier should be contacted for chemical recovery before proceeding with ultimate disposal management procedures.

6.7 Material Safety Data Sheets (MSDS). Contracting officers will identify those activities requiring copies of MSDS's prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in FED-STD-313; and 29 CFR 1910.1200 requires that the MSDS for each hazardous chemical used in an operation must be readily available to personnel using the material. Contracting officers will identify the activities requiring copies of the MSDS.

6.8 Subject term (key word) listing.

Lubricating oil
Water-displacing

6.9 Changes from 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.

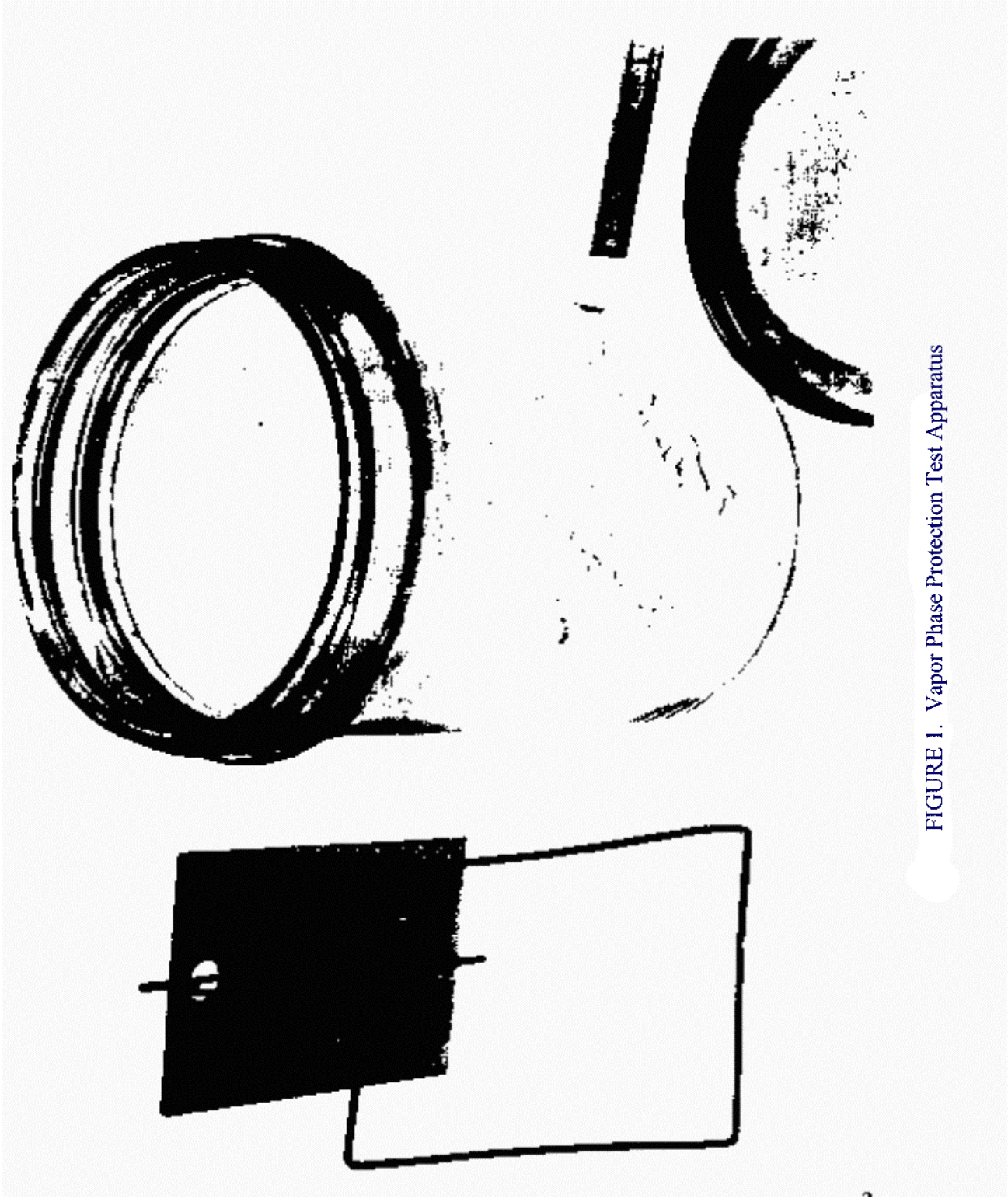


FIGURE 1. Vapor Phase Protection Test Apparatus

Custodians:
Army - AT
Navy - OS
Air Force - 68

Preparing Activity:
Army - AT

(Project 9150-2010-003)

Review Activities:
Army - MD, AR, SM
Air Force - 11
DLA - GS

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.