

**METRIC**

MIL-PRF-6083G

26 April 2013

SUPERSEDING

MIL-PRF-6083F

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## PERFORMANCE SPECIFICATION

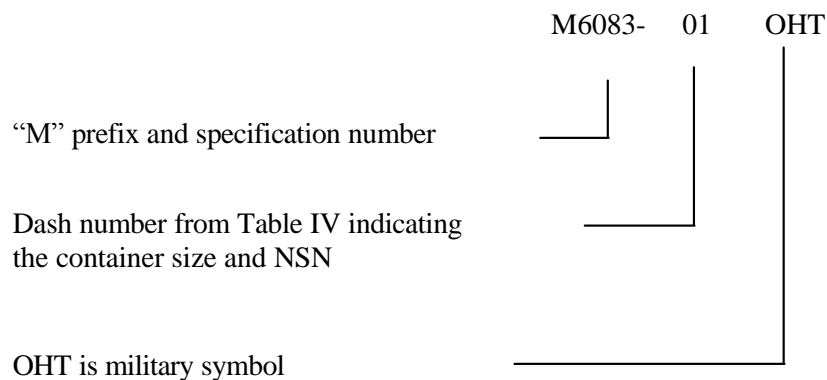
HYDRAULIC FLUID, PETROLEUM BASE,  
FOR PRESERVATION AND OPERATION

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

## 1. SCOPE

1.1 Scope. This specification describes the characteristics and provides the requirements for one grade of petroleum base hydraulic fluid for use in the -54°C to +135°C temperature range (see 6.1). This fluid is rust inhibited and used both as a preservative for hydraulic systems and components as well as being an operational fluid. This hydraulic fluid will not be used for aircraft systems, aircraft ground support equipment, or the preservation of aircraft components. The hydraulic fluid is identified by Military Symbol OHT and NATO Symbol C-635.

1.2 Part identifying number (PIN). The PIN to be used for hydraulic oil acquired to this specification is created as follows:



Comments, suggestions, or questions on this document should be addressed to the Commander, U.S. Army Tank-Automotive and Armaments Command, ATTN: RDTA-EN/STND, MS-268, Warren, MI 48397-5000, or emailed to [usarmy.detroit.rdecom.mail.tardec-standardization@mail.mil](mailto:usarmy.detroit.rdecom.mail.tardec-standardization@mail.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

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## 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 section 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 cited in the solicitation or contract.

## FEDERAL SPECIFICATION

TT-T-656 -Tricresyl Phosphate

## FEDERAL STANDARDS

FED-STD-791 -Testing Method of Lubricants, Liquid Fuels, and Related Products

## DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-PRF-5606 - Hydraulic Fluid, Petroleum Base; Aircraft, Missile, and Ordnance.  
 MIL-PRF-46170 - Hydraulic Fluid, Rust Inhibited, Fire Resistant, Synthetic Hydrocarbon Base, NATO Code Number H-544.  
 MIL-PRF-83282 - Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537.  
 MIL-PRF-87257 - Hydraulic Fluid, Fire Resistant, Low Temperature, Synthetic Hydrocarbon Base, Aircraft and Missile.

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

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.

## ASTM INTERNATIONAL

ASTM D93 - Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester (DoD Adopted).  
 ASTM D97 - Standard Test Method for Pour Point of Petroleum Products (DoD Adopted).  
 ASTM D130 - Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test (DoD Adopted).  
 ASTM D445 - Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity) (DoD Adopted).  
 ASTM D664 - Standard Test Method for Acid Number of Petroleum Products by

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|            |  |
|------------|--|
|            | Potentiometric Titration (DoD Adopted).  |
| ASTM D892  | - Standard Test Method for Foaming Characteristics of Lubricating Oils (DoD Adopted).  |
| ASTM D972  | - Standard Test Method for Evaporation Loss of Lubricating Greases and Oils (DoD Adopted).   |
| ASTM D1193 | - Standard Specification for Reagent Water (DoD Adopted)   |
| ASTM D1298 | - Standard Test Method for Density, Relative Density, or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method (DoD Adopted)             |
| ASTM D1500 | - Standard Test Method for ASTM Color of Petroleum Products (ASTM Color Scale) (DoD Adopted).  |
| ASTM D1748 | - Standard Test Method for Rust Protection by Metal Preservatives in the Humidity Cabinet (DoD Adopted).   |
| ASTM D2273 | - Standard Test Method for Trace Sediment in Lubricating Oils (DoD Adopted).   |
| ASTM D2603 | - Standard Test Method for Sonic Shear Stability of Polymer-Containing Oils (DoD Adopted)  |
| ASTM D4057 | - Standard Practice for Manual Sampling of Petroleum and Petroleum Products (DoD Adopted).   |
| ASTM D4172 | - Standard Test Method for Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method) (DoD Adopted).  |
| ASTM D4175 | - Standard Terminology Relating to Petroleum, Petroleum Products, and Lubricants (DoD Adopted).  |
| ASTM D4177 | - Standard Practice for Automatic Sampling of Petroleum and Petroleum Products (DoD Adopted).  |
| ASTM D4289 | - Standard Test Method for Elastomer Compatibility of Lubricating Greases and Fluids (DoD Adopted).  |
| ASTM D4636 | - Standard Test Method for Corrosiveness and Oxidation Stability of Hydraulic Oils, Aircraft Turbine Engine Lubricants, and Other Highly Refined Oils (DoD Adopted). |
| ASTM D4898 | - Standard Test Method for Insoluble Contamination of Hydraulic Fluids by Gravimetric Analysis (DoD Adopted).  |
| ASTM D6304 | - Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration                       |
| ASTM D6547 | - Standard Test Method for Corrosiveness of Lubricating Fluid to Bimetallic Couple   |
| ASTM D6793 | - Standard Test Method for Determination of Isothermal Secant and Tangent Bulk Modulus   |

(Copies of these documents are available from ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or at [www.astm.org](http://www.astm.org)).

SAE International

|               |   |
|---------------|---|
| SAE AMS3217/2 | - Test Slabs, Acrylonitrile Butadiene (NBR-L), Low Acrylonitrile, 65-75 |
|---------------|---|

(Copies of this document are available from SAE World Headquarters, 400 Commonwealth Drive, Warrendale, PA 15096-0001, or at <http://www.sae.org>.)

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2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 Qualification. Hydraulic fluids furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.1.1 Qualification period. All hydraulic fluid which satisfy the requirements of this specification shall be qualified for a period not exceeding five (5) years from the date of its original qualification. Any change in the formulation of a qualified product will necessitate its requalification.

3.1.2 Tolerances. The hydraulic fluid supplied under contract shall have the same formulation as when qualified. The finished oil properties shall fall within permissible tolerances assigned by the qualifying activity to the product receiving qualification.

3.2 Materials. The hydraulic fluid shall be derived from petroleum fractions. These may be virgin or re-refined (recycled or reclaimed) stocks or a combination thereof. Re-refined stocks shall be as defined in ASTM D4175. The base stock shall contain functional additives (anti-wear, oxidation inhibitors, corrosion inhibitors, etc.) as are necessary to meet the specified requirements. The material shall have no adverse effect on the health of personnel when used for its intended purpose.

3.3 Additive materials. There shall be no restriction on the types of materials used as additives in the fluid except for those listed and those imposed by technical requirements of this specification. Pour point depressants shall NOT be used.

3.3.1 Viscosity/temperature coefficient improvers. If necessary, only acrylic polymeric materials may be added to the base oil in quantities not to exceed 20 percent by weight of active ingredient in order to adjust the viscosity of the finished fluid to the values specified in 3.4 and Table I.

3.3.2 Oxidation inhibitors. Oxidation inhibitors shall be added to the base oil in quantities not to exceed two (2) percent by weight.

3.3.3 Corrosion inhibitors. Corrosion inhibiting materials shall be added to the blend in quantities necessary to comply with the requirements of this specification.

3.3.4 Anti-wear agent. A maximum of  $0.5 \pm 0.1$  percent of anti-wear agents, such as tricresyl phosphate (TCP) conforming to TT-T-656, shall be blended in sufficient quantity to permit the finished oil to meet the lubricity requirements specified in 3.4 and Table I. When TCP is used, the finished fluid shall not contain more than 0.03 weight percent of the ortho-isomer.

3.3.5 Red Dye. The fluid shall contain red dye in a concentration not greater than 1 part of dye per 10,000 parts of oil by weight.

3.4 Hydraulic fluid properties. The properties of the hydraulic fluid shall be as specified in Table I, Table II, and 3.4.1 through 3.4.10.

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TABLE I. Hydraulic Fluid Properties and Test Methods.

| Property   | Test Limits   | Test Method                 |                     |
|--|---|-----------------------------|---------------------|
|  |   | ASTM Method                 | FED-STD-791         |
| Acid Number, mgKOH/g (max)   | 0.20  | D664                        |                     |
| API Gravity @ 15.6°C/15.6°C  | See 3.4.1   | D1298                       |                     |
| Color, ASTM Color Scale (max)  | See 3.4.2   | D1500                       |                     |
| Compatibility  | See 3.4.3   | See 4.5.1                   |                     |
| Copper Strip Corrosion (72 hours at 100 ± 1°C), ASTM Standard (max)  | 2e  | D130                        |                     |
| Corrosion Protection (Humidity Cabinet)<br>Sand-blasted (3 panels) and Polished Panels (3 panels)<br>(100 ± 1 hours at 48.9 ± 1.1°C air temperature)   | See 3.4.4   | D1748                       |                     |
| Corrosiveness (Bimetallic Couple)  | See 3.4.5   | D6547                       |                     |
| Corrosiveness and Oxidation Stability<br>(168 hrs at 121 ± 0.5°C)<br>Metal specimen weight change, mg/cm <sup>2</sup> (max) <sup>(1)</sup><br>Cadmium Anod <sup>(2)</sup><br>Steel Grade 1010<br>Aluminum Alloy<br>Magnesium<br>Copper <sup>(3)</sup><br>Percent change in viscosity at 40°C<br>Change in acid number (max)<br>Separation of insoluble materials or gumming of the fluid | <br><br><br>±0.2<br>±0.2<br>±0.2<br>±0.2<br>±0.6<br>-5 to +20<br>0.20<br>None | <br><br><br>D4636<br>Proc 2 |                     |
| Evaporation Loss (22 hours at 100 ± 0.5°C), % by weight (max)  | 75  | D972                        |                     |
| Flash Point, °C (min)  | 82  | D93                         |                     |
| Foaming Characteristics<br>Foaming Tendency<br>Foam volume (mL) at end of 5 minute blowing period (max)<br>At 24°C<br>At 94°C<br>At 24°C after test at 94°C<br>Foam Stability<br>Foam volume (mL) at end of 10 minute setting period (max)<br>At 24°C<br>At 94°C<br>At 24°C after test at 94°C   | <br><br><br>65<br>65<br>65<br><br><br>0<br>0<br>0                             | <br><br><br>D892            |                     |
| Isothermal secant bulk modulus @ 40°C and 27.6 MPa (4000 psig), MPa (psi) (minimum)  | 1379<br>(200,000)   | D6793                       |                     |
| Low Temperature Stability (-54 ± 1°C for 72 hrs)   | See 3.4.6   |                             | 3458                |
| Particulate Contamination <sup>(4)</sup><br>Particle Count<br>Gravimetric method, mg/100 mL (max)  | See 3.4.7<br>See Table II<br>0.5  | D4898                       | 3012 <sup>(5)</sup> |
| Pour Point (°C) max  | -59   | D97                         |                     |
| Rubber Swell, Standard Synthetic Rubber <sup>(6)</sup> , NBR-L, %<br>(168 ± 0.5 hours at 70 ± 2.5°C)   | 19.0 to 31.0  | D4289                       |                     |

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| Property   | Test Limits | Test Method             |             |
|--|-------------|-------------------------|-------------|
|  |             | ASTM Method             | FED-STD-791 |
| Shear Stability  | See 3.4.8   | D2603 <sup>(7)(8)</sup> |             |
| Steel-on-Steel wear (average wear scar), mm in diameter (max) <sup>(9)</sup> | 1.0         | D4172                   |             |
| Storage Stability (24 ± 3°C for 12 months)                                   | See 3.4.9   |                         | 3465        |
| Trace Sediment, mL (max)   | 0.005       | D2273                   |             |
| Viscosity, mm <sup>2</sup> /s  |             |                         |             |
| At -54°C (max)   | 3300        | D445                    |             |
| At -40°C (max)   | 700         |                         |             |
| At 40°C (min)  | 13.2        |                         |             |
| At 100°C (min)   | 4.6         |                         |             |
| Water, mass % (max)  | 0.05        | D6304                   |             |

- (1) There shall be no pitting, etching, or visible corrosion on the surface of any of the metals when viewed under magnification of 20 diameters.
- (2) A slight discoloration is permitted.
- (3) Any corrosion (discoloration) produced on the surface of the copper shall be not greater than No.3 of the ASTM D130 Copper Corrosion Standard.
- (4) The container shall be thoroughly shaken immediately prior to withdrawing the sample. Two determinations per sample are required. Each determination shall be made on 100mL portions of the sample.
- (5) Hexane shall be used instead of ozone depleting solvents.
- (6) Use standard synthetic rubber NBR-L (as referenced in latest revision of SAE AMS3217/2) within 6 months of date of manufacture. Store rubber under 60°F.
- (7) Control Fluid is ASTM Reference Fluid B
- (8) See 4.5.2
- (9) Test Condition B

3.4.1 API Gravity. The API Gravity of the hydraulic fluid shall be determined and reported, but not limited during qualification inspection. For conformance inspections, the API Gravity of the hydraulic fluid shall be the value obtained during qualification inspection ±0.008.

3.4.2 Color. The hydraulic fluid shall be clear and transparent and shall not contain dye in greater concentration than one (1) part of dye per 10,000 parts of fluid by weight and shall not be darker than ASTM Color 5.0.

3.4.3 Compatibility. The hydraulic fluid shall be compatible in all concentrations with each of the fluids approved under this specification. The hydraulic fluid shall be miscible with MIL-PRF-5606, MIL-PRF-46170, MIL-PRF-83282, and MIL-PRF-87257 fluids in all proportions from -54°C to 135°C. No formation of gums, sludge, or insoluble material shall occur. (See 4.5.1)

3.4.4 Corrosion Protection (Humidity Cabinet). The hydraulic fluid shall protect specially prepared steel test panel surfaces (sand blasted and polished) to the extent that no more than three (3) corrosion dots, no one of which is larger than 1millimeter (mm) in diameter, occur on any of the

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surfaces of the prepared panels.

3.4.5 Corrosiveness (Bimetallic Couple). The hydraulic fluid shall prevent corrosion, etching, pitting, or staining on the steel disks covered with a brass clip. The fluid shall be deemed failing if either of the following are met:

- a). the test areas of more than one disk show signs of corrosion, pitting, or other attack.
- b). if two disks are free of corrosion, but the third shows more than three affected spots.

3.4.6 Low Temperature Stability. The hydraulic fluid shall show no evidence of gelling, crystallization, solidification, or separation of ingredients. The presence of a dense cloud that does not settle shall not be cause for failure.

3.4.7 Particulate Contamination.

3.4.7.1 Particle Count. The number of solid particles per 100mL of the hydraulic fluid shall not exceed the number specified in Table II. The particle count of the hydraulic fluid shall be measured by the use of an automatic particle counter employing the light interruption principle. The operating directions in the manual for the respective instrument shall be used.

TABLE II. Particle Count.

| Particle size range, (largest dimension),<br>micrometers | Allowable number (max) each<br>determination, automatic count |
|--|---|
| 5-25   | 10 000  |
| 26-50  | 250   |
| 51-100   | 50  |
| over 100   | 10  |

3.4.7.2 Gravimetric Method. Gravimetric determination shall be made in accordance with ASTM D4898 with the following additional requirements:

Exposure of the filter to open air shall be minimized. While the filter is in the petri dish, the lid shall remain on at all times.

- a). Select two (2), white, 0.45-micron, polypropylene membrane filters (such as Pall-Gelman, GH-Polypro). Place each filter in a clean petri dish, cover, and put both dishes in a desiccator for at least 15 minutes.
- b). Remove petri dishes containing filters from the desiccators. Take a filter from its petri dish, pass it through an ionizer for 10 seconds, and then weigh it. After weighing, immediately return the filter to its petri dish. Repeat with the second filter.
- c). Mark one filter as the control filter and one filter as the test filter. Stack the test filter on top of the control filter and place on the filtration apparatus.
- d). After filtering and drying on a filtration apparatus, dry the filters in their covered petri dishes for 15 minutes in a 75°C oven. Do not use other drying methods. Remove closed petri dish from the oven; allow filters to equilibrate to ambient room conditions in a desiccator for 15 minutes before weighing.

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3.4.8 Shear stability. The decrease in viscosity of the hydraulic fluid, measured in centistokes at 40°C, shall not be more than 2.0 percent greater than the decrease in viscosity of the ASTM Reference Fluid B. The viscosity shall be measured in accordance with ASTM D445.

3.4.9 Storage stability. After 12 months of storage, the fully blended product shall show no separation of ingredients or evidence of crystallization. The fully blended product shall be clear and transparent when examined visually, and shall conform to the requirements of section 3, except particulate contamination.

3.4.10 Workmanship. The hydraulic fluid shall be a clear, transparent product, homogeneous in appearance, and free from visible sediment and suspended matter.

3.5 Cleaning. Prior to filling, all containers shall be thoroughly cleaned, rinsed with clean filtered fluid and examined to insure absolute absence of loose solder, dirt, fibers, lint, metal particles, seaming compound, corrosion products, water, or other foreign contaminants. The bottom seam shall show no extruded seaming compound and there shall be no seaming compound on the body immediately adjacent to the side seam. Visible seaming compound, evenly distributed and forming a very fine edge at the point of contact of the seam with the body, shall not be considered a defect. When a soldered seam is used in the fabrication of the can, residual soldering flux shall not be present on the inside seam of the container.

3.6 Marking and labeling requirements. Labeling of unit and exterior containers shall be in accordance with all government regulations and shall contain the following information:

“Military Symbol OHT NATO Code  
Number C-635”

**INSTRUCTIONS:** This fluid is not interchangeable with any other type or grade of hydraulic fluid. It is compatible with MIL-PRF-5606, MIL-PRF-87257, MIL-PRF-46170, and MIL-PRF-83282. This fluid can be mixed (compatible) with MIL-PRF-5606, MIL-PRF-87257, MIL-PRF-46170 and MIL-PRF-83282; it cannot be used as a substitute (interchangeable) for the above named hydraulic fluids.

**WARNING:** This fluid may contain less than trace amounts of the ortho isomer of tricresyl phosphate, which is neurotoxic. For the safe use of this product, appropriate protective measures (e.g. gloves, clothing, respirators) should be taken. Avoid inhalation, ingestion, or contact with the skin. Do not reuse containers.”

3.6.1 Hazard warning label. Unit and exterior containers shall be marked with a hazard warning label prepared in accordance with the Hazard Communication Standard, 29 CFR 1910.1200. The appropriate warning shall convey the specific physical and health hazards including target organ effects of the material.



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## 4. VERIFICATION

4.1 Classification of inspections.

- a. Qualification inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 Qualification inspection.

4.2.1 Qualification inspection sample. Qualification samples shall consist of a one (1) gallon container of hydraulic fluid. The qualifying activity may request samples of the basestock and additives used in the formulation. The qualifying activity will request data as listed in TARDEC's Guide for Qualification of Hydraulic Fluids, Greases, Solid Film Lubricants, Solvent, Preservatives, & Stabilizer Additives.

4.2.2 Qualification Tests. Qualification sample(s) shall be subjected to all tests specified in Section 3 and Tables I and II.

4.2.3 Retention of Qualification. The government reserves the right to re-examine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specification requirements. Requalification is required every 5 years. Changes in formulation or materials shall require requalification.

4.3 Conformance inspections. Conformance inspections shall consist of tests for all of the requirements specified in section 3, except the following:

- a. Corrosiveness and oxidation stability
- b. Shear stability
- c. Storage stability

Unless otherwise specified (see 6.2), the sample representative of each fifth batch shall be subjected to tests for all of the requirements specified in section 3 except the following:

- d. Shear stability
- e. Storage stability

4.4 Sampling.

4.4.1 Sampling for tests (except particulate contamination). Samples for tests, except particulate contamination, shall be taken in accordance with ASTM D4057 or D4177.

4.4.2 Sampling for determination of particle size contamination. The sample size and number of determinations per sample for the respective containers shall be as specified in table III. Should the particle count on any individual determination be considered excessive, two additional determinations on another sample from the same container may be used. The container shall be thoroughly shaken for approximately one minute immediately prior to withdrawing each 100mL portion for all determinations. The arithmetic average of the two closer particle counts shall be considered the particle count for the sample.

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TABLE III. Sampling for particle size contamination.

| Container size                 | Sample size, mL | Determinations per sample |
|--------------------------------|-----------------|---------------------------|
| 1 pint (pt) (0.473 liters (L)) | 100             | 1                         |
| 1 quart (qt) (0.946 L)         | 100             | 1                         |
| 1 gallon (gal) (3.785 L)       | 200             | 2                         |
| 5 gal (18.9 L)                 | 300             | 3                         |
| 55 gal (208.2 L)               | 600             | 6                         |

4.4.3 Examination of filled containers. Filled containers shall be examined with regard to fill, closure, sealing, and leakage. Any container having one or more defects or under the required fill shall be rejected.

4.5 Methods of inspection and test. Qualification inspection shall consist of the tests for all of the requirements specified in Section 3 and Table I. Tests shall be in accordance with Table I and with 4.5.1 through 4.5.2 as applicable. Unless otherwise specified (see 6.2), reagent water conforming to the requirements for type III of ASTM D1193 and reagent-grade chemicals shall be used in all tests. Blank determinations shall be run and corrections applied when necessary.

4.5.1 Compatibility. Samples of the candidate hydraulic fluid in amounts of 20mL, 100mL, and 180mL shall be mixed with samples from each of the fluids previously qualified under this specification. Total volume of each mixture shall be 200mL. Mixtures shall be prepared in 250mL flasks with stoppers. The flasks shall be thoroughly agitated and then stored in an oven at 135°C for 3 hours. At the end of this time, none of the mixtures shall show any sign of sediment, turbidity, or crystallization. The samples shall then be stored at -54°C for a period of 3 hours. Slight turbidity after this time, which later disappears, will be permitted in the samples. Compatibility tests described herein shall also be conducted with representative fluids qualified to MIL-PRF-5606, MIL-PRF-46170, MIL-PRF-83282, and MIL-PRF-87527.

4.5.2 Shear stability.

4.5.2.1 Calibration of the instrument shall be conducted in accordance with ASTM D2603 using ASTM Reference Fluid B. Repeat, as needed, to determine the proper power settings to produce a viscosity change of 15.0% at 40°C. The viscosity shall be measured in accordance with ASTM D445.

4.5.2.2 After successful calibration of the instrument, the control fluid (ASTM Reference Fluid B) and test fluid shall be analyzed on the same day. The fluids shall be tested at 0°C for 30 minutes.

## 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 requisite packaging

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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. The hydraulic fluid is intended for use as an operational fluid from -54°C to +135°C where corrosion protection is required and a determination has been made that MIL-PRF-46170 (FRH) hydraulic fluid cannot be used. This includes use in recoil mechanisms and hydraulic systems for rotating weapons or aiming devices of tactical and support ordnance equipment, except combat armored vehicles/equipment which require FRH.

6.1.1 Cleaning agents.

6.1.1.1 Isopropyl alcohol. Isopropyl alcohol should not be used as a cleaning agent on components containing any parts which may have come in contact with hydraulic fluid. A sticky acrylic resin is formed which may be detrimental to the proper operation of hydraulic components. If isopropyl alcohol must be used as part of a cleaning sequence, it is essential that the components be thoroughly dried to remove all traces of the alcohol.

6.1.1.2 Chlorinated solvents. Chlorinated solvents should not be used for cleaning hydraulic components. Residual solvent contaminates the hydraulic fluid and may cause corrosion damage.

6.1.1.3 Recommended solvents. The recommended solvents are MIL-PRF-680, type II, or other petroleum distillate type solvents.

6.1.2 Storage conditions. Prior to use in the intended equipment, the product may be stored under conditions of covered or uncovered storage in geographic areas ranging in temperatures from -57°C to +49°C (-70°F to +120°F).

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. If sample for conformance inspection should be tested other than as specified (see 4.3).
- c. If water and/or chemicals used are other than specified (see 4.5).
- d. Method of determining particle size (see 4.5.6.1).
- e. Packaging requirements (see 5.1).
- f. Type, PIN, and quantity of oil required (see 6.4).

6.2.1 List of Qualified Products. Products considered acceptable under this specification are listed in QPL-6083.

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6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL No. 6083 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products and the QPL may be obtained from US Army TARDEC, 6501 E 11 Mile Rd, RDTA-SIE-ES-FPT, MS 110, Attn: Fuels and Lubricants Technology Team, Warren, MI 48397 or by email: [tardec.pol.help@us.army.mil](mailto:tardec.pol.help@us.army.mil)

6.4 National Stock Numbers (NSNs). The following is a list NSNs which correspond to the hydraulic fluid container sizes:

TABLE IV. NSN and corresponding minimum container size.

| Size designation | National Stock Numbers - NSN | Size containers |
|------------------|------------------------------|-----------------|
| 01               | 9150-00-935-9807             | 1 qt            |
| 02               | 9150-00-159-4472             | 1 pint          |
| 03               | 9150-00-935-9808             | 1 gal           |
| 04               | 9150-00-935-9809             | 5 gal           |
| 05               | 9150-00-935-9810             | 55 gal drum     |

6.5 Fluid handling. Owing to the difficulty of preventing contamination after the opening of a container, it is recommended that the hydraulic fluid be purchased in 16-ounce (oz), 1-qt, and 1 gal containers by all users. If the fluid is dispensed from larger containers, strict procedures must be employed to exclude and remove moisture, solid particles or other contaminants from the fluid.

6.6 International standardization. Certain provisions of this specification are the subject of international standardization agreements (NATO STANAG 1135, STANAG 3713, STANAG 4714, STANAG 7093). 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 the agreement or make other appropriate accommodations.

6.7 Interchangeability and compatibility. MIL-PRF-6083 fluids are not substitutable for (interchangeable with) any other fluids. MIL-PRF-6083 fluids should not be mixed (regarded as compatible) with any other fluids except those conforming to MIL-PRF-5606, MIL-PRF-87257, MIL-PRF-46170, and MIL-PRF-83282.

#### 6.8 Disposal actions.

6.8.1 Background. The product may contain 0.5 percent tricresyl phosphate, where not more than 0.03 percent may be present as the ortho isomer. If this ortho isomer of tricresyl phosphate is absorbed through the skin or taken internally it may cause paralysis. Accumulated waste liquids should have the exterior of the outer pack marked as containing tricresyl phosphate to assist disposal facilities to manage the product according to regulations promulgated by the US Environmental Protection

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Agency under Public Law 94580, Resource Conservation and Recovery Act of 1976.

6.8.2 Handling and safety precautions. Personnel handling the product should wear appropriate impervious clothing to prevent repeated or prolonged skin contact. Local appraisal is required for exact health and safety implications and compliance with OSHA regulations. Product labeling and Material Safety Data Sheets (MSDS) information should be used by safety and health office of using activity to prescribe precise application of protective measures. If skin or clothing becomes moistened with the product, personnel should promptly wash with soap or mild detergent and water. Respirators are not required unless there is an inhalation exposure to mists. Personnel should wear protective clothing when using the product and when cleaning up spills.

6.8.3 Disposal.

6.8.3.1 Field operations. Depending on the size of spills, paper towels or absorbent should be used to absorb the liquid. Contaminated soil should be removed and placed in a box with absorbent or towels. This box with spill clean-up wastes should either be buried along with ordinary refuse at a rate not to exceed 10 lbs of clean-up waste per spill event or be incinerated in a permitted municipal waste incinerator. Bulk wastes and contaminated liquids should not be landfilled. Partially full containers or contaminated product should be collected centrally for commercial recycling by a commercial reprocessing firm. Recycling by DoD military field activities, including depot-type operations, are not authorized at this time. Liquid products used for heat recovery are regulated by the Environmental Protection Agency under Public Law 94580, Resource Conservation and Recovery Act of 1976. Heat recovery is required to meet the Standard in 40 CFR 266, subpart E, Used Oil, burned energy recovery.

6.8.3.2 Container disposal. Tops from one-time-use containers should be discarded with ordinary refuse. Containers should be made as empty as possible using gravity draining, after which they should be crushed and buried in an authorized sanitary landfill or incinerated with general refuse. No special decontamination procedures are required for empty containers or their lids.

6.9 Recommended maximum blending temperature. At no time during compounding process or any operations subsequent thereto, should the temperature of any of the ingredients of the liquid, or the fluid itself, be greater than 149° C.

6.10 Material safety data sheets. Contracting officers should identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission are listed in appendix B of FED-STD-313.

6.11. Samples.

6.11.1 Reference Fluid for Shear Stability Test. The sample (1 pint) of shear stability reference fluid for the test specified in Table I may be obtained from RohMax USA, Inc 732 Electronic Dr., Horsham, PA 19044-2228.

6.11.2 Synthetic Rubber. Test slabs of standard synthetic rubber, NBR-L, should be made in accordance with SAE AMS3217/2. A suggested source is Rubber-Tech, 5208 Wadsworth Road, Dayton, OH 45414 or email [rti@dnaco.net](mailto:rti@dnaco.net).

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6.12 Subject term (key word) listing.

Additive  
Anti-wear  
Bulk modulus  
C-635  
Lubricant  
OHT  
Oxidation  
Shear Stability  
Tricresyl phosphate  
Viscosity

6.13 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.

Custodians  
Army - AT  
Navy - AS  
Air Force - 68

Preparing Activity  
Army-AT

(Project 9150-2013-004)

Review Activities:

Army - AR, MD, MI  
Navy - OS, MC, SA, SH  
DLA - GS, PS

International Interest

NATO

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 <https://assist.dla.mil/>.