NOT MEASUREMENT SENSITIVE

MIL-PRF-32073A
5 April 2007

SUPERSEDING
MIL-PRF-32073
9 March 2001

PERFORMANCE SPECIFICATION

HYDRAULIC FLUID, BIOBASED

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

1. SCOPE

1.1 Scope. This specification covers hydraulic fluids made with renewable resources for use in environmentally sensitive areas (see 6.1).

1.2 Classification. Hydraulic fluids are of the following grades (see 6.2):

Grade 1 – ISO VG 15
Grade 2 – ISO VG 22
Grade 3 - ISO VG 32
Grade 4 – ISO VG 46
Grade 5 – ISO VG 68

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 the list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSRD-TAR-E/268, MS-268, Warren, MI 48397-5000 by letter or emailed to standardization@tacom.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.

2.2.1 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.

STANDARDS

FEDERAL

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

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Document Automation and Production Service, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094, or at http://assist.daps.dla.mil/quicksearch).

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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 92 - Standard Test Method for Flash and Fire Points by Cleveland Open Cup.

ASTM D 97 - Standard Test Method for Pour Point of Petroleum Products .

ASTM D 130 - Standard Test Method for Corrosiveness to Copper from Petroleum Products by the Copper Strip Test.

ASTM D 445 - Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids and the Calculation of Dynamic Viscosity.

ASTM D 664 - Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration.

ASTM D 665 - Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water.

ASTM D 892 - Standard Test Method for Foaming Characteristics of Lubricating Oils.

ASTM D 2270 - Standard Practice for Calculating Viscosity Index From Kinematic Viscosity at 40 and 100°C.

ASTM D 2273 - Standard Test Method for Trace Sediment in Lubricating Oils.

ASTM D 4172 - Standard Test Method for Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method).

ASTM D 4289 - Standard Test Method for Elastomer Compatibility of Lubricating Greases and Fluids.

ASTM D 5864 - Standard Test Method for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Components.

ASTM D 6186 - Standard Test Method for Oxidation Induction Time of Lubricating Oils by Pressure Differential Scanning Calorimetry (PDSC).

ASTM D 6304	- Standard Test Method for Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fisher Titration.
ASTM D 6351	- Standard Test Method for Determination of Low Temperature Fluidity and Appearance of Hydraulic Fluids.
ASTM D 6547	- Standard Test Method for Corrosiveness of Lubricating Fluid to Bimetallic Couple.
ASTM D 6731	- Standard Test Method for Determining the Aerobic, Aquatic Biodegradability of Lubricants or Lubricant Components in a Closed Respirometer
ASTM E 1131	- Standard Test Method for Compositional Analysis by Thermogravimetry.

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or at http://www.astm.org).

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 4406 - Hydraulic Fluid Power –Fluids - Method for Coding the Level of Contamination by Solid Particles.

(Application for copies should be addressed to the International Organization for Standardization, 1 Rue De Varembe CP 56, 1211 Geneve 20, Switzerland, or at http://www.iso.org/iso/en/ISOOnline.frontpage).

ORGANIZATION FOR ECONOMIC COOPERATION AND DEVELOPMENT (OECD)

OECD Guideline 203 - Testing of Chemicals.

(Application for copies should be addressed to the Organization for Economic Cooperation and Development, 2 Rue Andre Pascal, S-75775, Paris CEDEX 16, or at http://www.oecd.org/dataoecd/17/20/1948241.pdf).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE-AMS 3217/2B - Test Slabs, Acrylonitrile Butadiene (NBR-L), Low Acrylonitrile, 65-75 (DoD adopted).

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096, or at 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 Qualification. Biobased 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 4.1.1 and 6.3). Any change in the formulation of a qualified product will necessitate its re-qualification.

3.2 Design, materials, and manufacturing processes. Unless otherwise specified, the design, materials, and manufacturing process selection 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. Hydraulic fluids shall be made with biobased material from renewable resources capable of meeting the requirements herein.

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 Viscosity.

3.3.1.1 Viscosity at 40 degree Celsius (°C). The kinematic viscosity of the hydraulic fluid at 40°C shall be as specified in table I (see 4.3.3.1.1).

3.3.1.2 Viscosity at –15°C. The kinematic viscosity of the hydraulic fluid at –15°C shall be as specified in table I (see 4.3.3.1.2).

3.3.1.3 Viscosity index. The viscosity index of the hydraulic fluid shall be as specified in table I (see 4.3.3.1.3).

TABLE I. Viscosity requirements.

Property	Grade				
	1	2	3	4	5
Viscosity at 40°C, centistokes (cSt)	13.5 - 16.5	19.8 - 24.2	28.8 - 35.2	41.4 - 50.6	61.2 - 74.8
Viscosity at –15°C, cSt, maximum	300	500	1000	1600	2000
Viscosity index, minimum	135	135	184	184	184

3.3.2 Pour point. The pour point of the hydraulic fluid shall be as specified in table II (see 4.3.3.2).

3.3.3 Flash point. The flash point of the hydraulic fluid shall be as specified in table II (see 4.3.3.3).

TABLE II. Temperature requirements.

Property	Grade				
	1	2	3	4	5
Pour point, °C, maximum	-54	-42	–30	–25	–23
Flash point, °C, minimum	160	160	240	250	265

3.3.4 Foaming characteristics. The foaming characteristics of the hydraulic fluid shall be demonstrated by meeting the requirements of 3.3.4.1 and 3.3.4.2 (see 4.3.3.4).

3.3.4.1 Foaming tendency. The foam volume of the hydraulic fluid shall not exceed 65 milliliters (ml) following the 5-minute blowing period (see 4.3.3.4.1).

3.3.4.2 Foam stability. There shall be no foam remaining in the hydraulic fluid following the 10-minute settling period (see 4.3.3.4.2).

3.3.5 Lubricity. The lubricity of the hydraulic fluid shall be demonstrated by meeting the requirement of 3.3.5.1 (see 4.3.3.5).

3.3.5.1 Wear. The average size of the scar diameters shall not exceed 0.65 mm when the test load is 392 N (see 4.3.3.5.1).

3.3.6 Fluid clarity. The hydraulic fluid shall be clear and transparent, homogeneous in appearance, and free from visible sediment and suspended matter (see 4.3.3.6).

3.3.7 Acid number. The acid number of the hydraulic fluid shall not exceed 2.0 milligrams of potassium hydroxide per gram of hydraulic fluid (mg KOH/g) (see 4.3.3.7).

3.3.8 Trace sediment. The trace sediment of the hydraulic fluid shall not exceed 0.005 percent (%) by volume (see 4.3.3.8).

3.3.9 Solid contamination. The number of solid contamination particles per 1 ml of hydraulic fluid shall not exceed the number of particles specified at ISO code of 21/19/15 (see 4.3.3.9).

3.3.10 Water content. The water content of the hydraulic fluid shall not exceed 0.05% by weight (see 4.3.3.10).

3.4 Interface requirements.

3.4.1 Copper strip corrosion. After exposure to the hydraulic fluid, a copper test strip shall not exhibit more than Class 1b corrosion as defined in table 1 of ASTM D 130 (see 4.3.4.1).

3.4.2 Galvanic corrosion. After exposure to the hydraulic fluid, two of three steel test disks shall not exhibit any signs of corrosion, pitting or other attack, and none of the three disks shall exhibit more than three spots of corrosion (see 4.3.4.2).

3.4.3 Rust prevention. After exposure to the hydraulic fluid, two steel test rods shall be rust-free (see 4.3.4.3).

3.4.4 Effect on synthetic rubber. The average percent volume change of NBR-L standard synthetic rubber test sheets shall be within the range of 10.0 to 30.0% after exposure of the test sheets to the hydraulic fluid (see 4.3.4.4).

3.5 Support and ownership requirements.

3.5.1 Toxicity. The lethal concentration (LC50) of the hydraulic fluid shall not be less than 1000 milligrams/liter (mg/L). The hydraulic fluid shall have no adverse effects on human health when used as intended (see 4.3.5.1 and 6.1).

3.5.2 Carcinogenicity. The hydraulic fluid shall contain no chemicals listed as carcinogens in a concentration of 0.1% or greater by weight or volume (see 4.3.5.2 and 6.4).

3.5.3 Storage stability. The fully-blended hydraulic fluid shall show no evidence of cloudiness, sediment, suspended matter, discoloration or other change in homogeneity following storage at 24 ± 3°C for a period of one year (see 4.3.5.3). After this storage period, the hydraulic fluid shall also conform to the requirements of section 3, except solid contamination (see 3.3.9), toxicity (see 3.5.1) and biodegradability (see 3.6.4).

3.6 Environmental requirements.

3.6.1 Low temperature stability. The hydraulic fluid shall show no evidence of gelling, separation or crystallization after 72 hours of storage at the temperature specified in table III (see 4.3.6.1).

TABLE III Low temperature stability test temperatures.

	Grade				
	1	2	3	4	5
Storage temperature, nominal (°C)	–54	–40	–25	–15	–15

3.6.2 Oxidation stability. The oxidation induction time (OIT) of the hydraulic fluid shall not be less than 15 minutes (see 4.3.6.2).

3.6.3 Evaporation loss. The highly volatile matter content of the hydraulic fluid shall not exceed 1.5% (see 4.3.6.3).

3.6.4 Biodegradability. The biodegradability of the hydraulic fluid, expressed as a percentage of theoretical carbon dioxide (CO_2) production or oxygen (O_2) consumption, shall not be less than 60% in 28 days (see 4.3.6.4).

4. VERIFICATION

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

a. Qualification inspection (see 4.1.1).
b. Conformance inspection (see 4.1.2).

4.1.1 Qualification inspection. The qualification inspection shall consist of all tests specified herein.

4.1.2 Conformance inspection. Conformance inspection shall consist of all tests specified herein, except toxicity (see 4.3.5.1), storage stability (see 4.3.5.3) and biodegradability (see 4.3.6.4).

4.2 Order of inspection. Unless otherwise specified, the sequence in which the verifications are to be performed shall be determined by the manufacturer.

4.3 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.

4.3.1 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.

4.3.2 Inspection conditions. Unless otherwise specified, all examinations and tests shall be performed at a temperature of 25 ± 3°C and at a relative humidity of 50 ± 20%.

4.3.3 Operating requirements verifications.

4.3.3.1 Viscosity.

4.3.3.1.1 Viscosity at 40°C. Determine the kinematic viscosity of the hydraulic fluid at 40°C in accordance with (IAW) ASTM D 445 to verify conformance to 3.3.1.1. A kinematic viscosity outside of the ranges specified in table I shall constitute failure of this test.

4.3.3.1.2 Viscosity at –15°C. Determine the kinematic viscosity of the hydraulic fluid at –15°C IAW ASTM D 445 to verify conformance to 3.3.1.2. A kinematic viscosity greater than the values specified in table I shall constitute failure of this test.

4.3.3.1.3 Viscosity index. Determine the viscosity index of the hydraulic fluid IAW ASTM D 2270 to verify conformance to 3.3.1.3. A viscosity index less than the values specified in table I shall constitute failure of this test.

4.3.3.2 Pour point. Determine the pour point of the hydraulic fluid IAW ASTM D 97 to verify conformance to 3.3.2. A pour point greater than the values specified in table II shall constitute failure of this test.

4.3.3.3 Flash point. Determine the flash point of the hydraulic fluid IAW ASTM D 92 to verify conformance to 3.3.3. A flash point less than the values specified in table II shall constitute failure of this test.

4.3.3.4 Foaming characteristics. Subject a sample of the hydraulic fluid to the test procedure IAW ASTM D 892, and perform the measurements of 4.3.3.4.1 and 4.3.3.4.2 to verify conformance to 3.3.4.

4.3.3.4.1 Foaming tendency. Measure the volume of foam after the 5-minute blowing period in each test sequence IAW ASTM D 892 to verify conformance to 3.3.4.1. A foam volume greater than 65 ml in any test sequence shall constitute failure of this test.

4.3.3.4.2 Foam stability. Measure the volume of foam after the 10-minute settling period in each test sequence IAW ASTM D 892 to verify conformance to 3.3.4.2. Any remaining foam, exceeding a ring of bubbles around the edge of the test container, in any test sequence shall constitute failure of this test.

4.3.3.5 Lubricity. Using a 10.0 ± 0.5 ml sample of the hydraulic fluid, perform the wear test IAW ASTM D 4172, and perform the measurements of 4.3.3.5.1 to verify conformance to 3.3.5.

4.3.3.5.1 Wear. Measure the scar diameters IAW ASTM D 4172 to verify conformance to 3.3.5.1. An average scar diameter greater than 0.65 mm shall constitute failure of this test.

4.3.3.6 Fluid clarity. Visually examine the hydraulic fluid to verify conformance to 3.3.6. Any visible sediment, suspended matter, discoloration or other change in homogeneity shall constitute failure of this test.

4.3.3.7 Acid number. Determine the acid number of the hydraulic fluid IAW ASTM D 664 to verify conformance to 3.3.7. An acid number greater than 2.0 mg KOH/g shall constitute failure of this test.

4.3.3.8 Trace sediment. Determine the trace sediment of the hydraulic fluid IAW ASTM D 2273 to verify conformance to 3.3.8. A trace sediment greater than 0.005% by volume shall constitute failure of this test.

4.3.3.9 Solid contamination. Determine the quantity and size of the solid particles in a sample of the hydraulic fluid using an automatic particle counter (see 6.5) to verify conformance to 3.3.9. The fluid when tested in accordance with ISO 4406 shall have the following ISO code 21,19,15.

4.3.3.10 Water content. Determine the water content of the hydraulic fluid IAW ASTM D 6304 to verify conformance to 3.3.10. A water content greater than 0.05% by weight shall constitute failure of this test.

4.3.4 Interface requirements verifications.

4.3.4.1 Copper strip corrosion. Expose a copper test strip to the hydraulic fluid IAW ASTM D 130, then examine the strip for evidence of corrosion to verify conformance to 3.4.1. Corrosion greater than Class 1b tarnish shall constitute failure of this test.

4.3.4.2 Galvanic corrosion. Expose three steel test disks to the hydraulic fluid IAW ASTM D 6547, then examine the disks for evidence of corrosion to verify conformance to 3.4.2. Corrosion on more than one disk, or more than three spots of corrosion on any disk, shall constitute failure of this test.

4.3.4.3 Rust prevention. Expose two steel test rods to the hydraulic fluid IAW ASTM D 665, Procedure B, then examine the rods for evidence of corrosion to verify conformance to 3.4.3. Evidence of corrosion on both rods shall constitute failure of this test. If corrosion is noted on only one rod, repeat this test using two new test rods. Evidence of corrosion on either of these latter test rods shall constitute failure of this test.

4.3.4.4 Effect on synthetic rubber. Expose three test sheets of NBR-L standard synthetic rubber IAW SAE-AMS 3217/2B to the hydraulic fluid IAW ASTM D 4289, then determine the average percent volume change of the test sheets to verify conformance to 3.4.4. An average percent volume change less than 10.0% or greater than 30.0% shall constitute failure of this test.

4.3.5 Support and ownership requirements verifications.

4.3.5.1 Toxicity. Determine the toxicity level of the hydraulic fluid IAW OECD Guideline 203 to verify conformance to 3.5.1. An LC50 of less than 1000 mg/L shall constitute failure of this test. The qualifying activity (see 6.3) shall be consulted by the appropriate departmental medical service to verify that the hydraulic fluid does not adversely effect human health.

4.3.5.2 Carcinogenicity. The qualifying activity (see 6.3) shall be consulted by the appropriate departmental medical service to verify that the hydraulic fluid does not contain any carcinogens to verify conformance to 3.5.2. A concentration of 0.1% or greater by weight or volume of any carcinogen shall constitute the presence of that carcinogen, and therefore failure of this test (see 6.4).

4.3.5.3 Storage stability. Store a sample of the hydraulic fluid for one year at 24 ± 3°C IAW method 3465 of FED-STD-791. Following the storage period, visually examine the hydraulic fluid and perform the tests of 4.3, except for 4.3.3.9, 4.3.5.1 and 4.3.6.4, to verify conformance to 3.5.3. Any cloudiness, sediment, suspended matter, discoloration or other change in homogeneity, or the failure of any of the tests specified above, shall constitute failure of this test.

4.3.6 Operating environment requirements verifications.

4.3.6.1 Low temperature stability. Store a sample of the hydraulic fluid IAW ASTM D 6351 for 72 hours at the temperature specified in table III. Following the storage period, visually examine the hydraulic fluid to verify conformance to 3.6.1. Any evidence of gelling, separation or crystallization shall constitute failure of this test.

4.3.6.2 Oxidation stability. Determine the OIT of the hydraulic fluid IAW ASTM D 6186 to verify conformance to 3.6.2. The test temperature to be used for grades 1 and 2 shall be 180°C. The test temperature to be used for grades 3, 4 and 5 shall be 155°C. An OIT of less than 15 minutes shall constitute failure of this test.

4.3.6.3 Evaporation loss. Determine the highly volatile matter content (V) of the hydraulic fluid IAW ASTM E 1131 to verify conformance to 3.6.3. The test temperature to be used shall be 100°C, for a duration of 1 hour. A value of V greater than 1.5% shall constitute failure of this test.

4.3.6.4 Biodegradability. Determine the percent of theoretical CO_2 evolved (P) of the hydraulic fluid IAW ASTM D 5864 or O_2 consumption (D) according to ASTM D 6731 to verify conformance to 3.6.4. A value of P or D less than 60% in 28 days shall constitute failure of this test.

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 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 biobased hydraulic fluid covered by this specification is military unique due to the requirements for low temperature performance and storage stability. Military applications generally necessitate that the hydraulic fluid perform at lower temperatures than commercial applications, and the storage period of the hydraulic fluid for military applications can be significantly longer than the storage period for commercial applications. The hydraulic fluid is intended for use in the environmentally sensitive areas such as construction, forestry, river, and mining. They are applicable to use in the construction equipment, bridging, tactical vehicles, shipboard hydraulic systems, and hydraulic systems for metal tool applications. If used in any other equipment or hydraulic systems, a study should be made to determine its applicability in such mechanisms or systems, particularly in the area of elastomer compatibility and operation at high and low temperatures.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Quantity required. Material should be purchased by volume.
c. Grade of hydraulic fluid (see 1.2).
d. Packaging requirements (see 5.1).
e. Type and size of container (see 5.1).
f. PIN number (see 6.7).

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. 32073) 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

may be obtained from US Army Tank-automotive and Armaments Research, Development and Engineering Center (RDECOM-TARDEC), AMSRD-TAR-D/(MS-110), Warren, MI 48397-5000. Products will not be considered for inclusion in QPL-32073 until such time as appropriate departmental medical activity has reviewed all pertinent material safety data sheets (FED-STD-313).

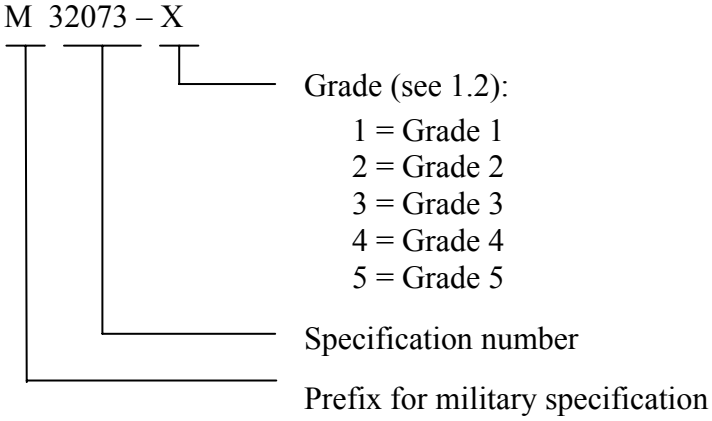
6.4 Carcinogens. The Occupational Safety and Health Administration (OSHA) definition of a carcinogen (see 3.5.2) is a chemical or process that is:

a. Regulated by OSHA as a carcinogen.
b. Listed under the category "known to be carcinogens" or "reasonably anticipated to be carcinogens" in the latest Annual Report on Carcinogens published by the National Toxicology Program (NTP).
c. Listed under Group 1, 2A and 2B by the International Agency for Research on Cancer (IARC).

6.5 Automatic particle counters. HIAC counter, models PC-202, PC-203, PC-305, PC-320 or equivalent, counting to the limits specified in ISO method 4406, may be used to determine solid particle contamination (see 4.3.3.9).

6.6 Material Safety Data Sheets (MSDS). Contracting officers should identify those activities requiring copies of MSDS's prepared IAW 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 should identify the activities requiring copies of the MSDS.

6.7 Part or Identifying Number (PIN). The PIN to be used for biodegradable hydraulic fluid acquired to this specification is created as follows:



6.8 Subject term (key word) listing.

Acid number
Biodegradability
Environmentally sensitive
Oxidation
Toxicity

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.

Custodians:
Army - AT
Navy - AS
Air Force – 68

Preparing Activity:
Army - AT

(Project 9150-2007-004)

Review Activities:
Army - AV, MD, MI, SM
Navy - MC, SA (Code 20), SH, OS
Air Force - 03
DLA - DS, DP, GS3

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.