

NOT MEASUREMENT
SENSITIVE

MIL-PRF-3150E

7 August 2008

SUPERSEDING

MIL-PRF-3150D

6 February 1997

PERFORMANCE SPECIFICATION

LUBRICATING OIL, PRESERVATIVE, MEDIUM

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

1. SCOPE.

1.1 Scope. This specification covers one grade of preservative lubricating oil.

1.2 Identification. This lubricant is identified by Military Symbol PL-M and North Atlantic Treaty Organization (NATO) Code Number O-192 (see 6.9).

1.3 National stock numbers (NSNs). The following is a list of NSNs which correspond to the lubricating oil container sizes:

Table I. NSN and corresponding minimum container size

Size designation	National Stock Number (NSN)	Container size
01	9150-00-271-8427	4 ounces
02	9150-00-231-2361	1 quart
03	9150-00-231-2356	5 gallons
04	9150-00-231-2357	55 gallons

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 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>

Diagram illustrating the components of the symbol M3150-PL-M:

- M3150: "M" prefix and specification number
- 31: Dash number from Table I indicating container size
- 50: PL-M is Military Symbol

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.

2.2.1 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.

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

MIL-PRF-680 - Degreasing Solvent

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 cited in the solicitation or contract.

CODE OF FEDERAL REGULATIONS (CFR)

Title 29

Labor

(Copies of this document is available from U.S. Government Printing Office, P.O.Box 979050, St. Louis, MO 63197-9000 or by calling (866) 512-1800, (if in DC area, call (202) 512-1800, or online at www.gpo.access.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.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Threshold Limit Values (TLV) and Biological Exposure Indices (BEI).

(Copies of the above document may be ordered from American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, Ohio 45240, 513-742-2020, or online at www.acgih.org.)

ASTM INTERNATIONAL (ASTM), American Society for Testing and Materials

ASTM B117	- Standard Practice for Operating Salt Spray (Fog) Apparatus
ASTM D97	- Standard Test Method for Pour Point of Petroleum Products
ASTM D130	- Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test
ASTM D445	- Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and calculation of Dynamic Viscosity)
ASTM D446	- Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers
ASTM D972	- Standard Test Method for Evaporation Loss of Lubricating Greases and Oils
ASTM D1152	- Standard Specification for Methanol (Methyl Alcohol)
ASTM D1748	- Standard Test Method for Rust Protection by Metal Preservatives in the Humidity Cabinet

(Copies of these documents may be obtained from the ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, or ordered online at www.astm.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. Lubricants furnished under this specification shall be products that are authorized by the qualifying activity for listing in the applicable qualified products database (QPD) before contract award (see 4.1.1 and 6.3).

3.1.1 Conformance inspection. When specified by the qualifying authority and/or the purchasing requisition, a sample of this oil shall be subjected to a qualification conformance inspection (see 4.1.2 and TABLE III). Any change in the formulation of a qualified product shall necessitate its requalification.

3.2 Materials. The contractor shall formulate the oil that fully meets the support and ownership, interface, environmental, and operational requirements as specified herein (see 3.3, 3.4, 3.5, and 3.6).

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 (see 4.2.1).

3.3 Support and ownership requirements.

3.3.1 Tolerances. The finished oil properties shall fall within permissible tolerances assigned by the qualifying activity to the product receiving qualification (see 4.3.1).

3.3.2 Toxicity. The lubricating oil shall have no adverse effects on human health when it is used as intended (see 4.3.3).

3.3.2.1 Toxicity warning label. Marking shall be in accordance with the requirements and specified herein. However, each unit, intermediate and exterior container, shall be marked in such a manner as to warn against use in food-processing or food-handling equipment, on surfaces that may contact food, and contaminating foodstuffs (see 4.3.2.1).

3.3.3 Workmanship. The oil shall be uniform in appearance and free from suspended matter, grit, or other foreign matter when examined visually through a 40 lumen transmitted light (see 4.3.3).

3.4 Interface requirements.

3.4.1 Copper strip corrosion. The oil shall not tarnish the copper strip exceeding the value of 2a on the ASTM Copper Strip Corrosion Standards incorporated in ASTM D130 Standard Test Method for Corrosiveness to Copper From Petroleum Products by Copper Strip Test (see 4.4.1).

3.4.2 Removability. When tested as specified in paragraph 4.4.2, the oil shall leave no visual evidence of oil residue, stain or discoloration on test panels after testing.

3.5 Environmental requirements.

3.5.1 Humidity protection. When tested as specified in paragraph 4.5.1, the oil shall provide protection against corrosion such that not more than three corrosion dots, of which, the lengths, widths, or diameters shall not be greater than one millimeter shall be evident on the test panels after 30 days (720 hours) exposure in the humidity cabinet. The total of such corrosion dots on all three test panels shall not exceed three. Corrosion on the outer 6 mm of the panels shall not be cause for rejection (see 4.5.1).

3.5.2 Salt-spray resistance. When tested as specified in paragraph 4.5.2, the oil, when applied to three test panels, shall provide salt-spray resistance so that not more than three corrosion dots, of which, the lengths, widths, or diameters are not greater than one millimeter after 48 hours exposure to a spray of 5% salt solution or the oil fails to pass. The total of such corrosion dots on all three test panels shall not exceed nine or the oil fails to pass. Corrosion on the outer 6 mm of the panels shall not be cause for rejection (see 4.5.2).

3.5.3 Accelerated stability. When tested as specified in paragraph 4.5.3, the oil shall flow freely to its new level within 5 seconds and the viscosity shall not change more than $\pm 5\%$ from the original viscosity (see 4.5.3 and TABLE IV).

3.5.4 Low temperature stability. When tested as specified in paragraph 4.5.4, the oil shall flow freely to its new level within 5 seconds and the viscosity shall not change more than $\pm 5\%$ from the original viscosity (see 4.5.4 and TABLE V).

3.5.5 Storage stability. When tested as specified in paragraph 4.5.5, the oil shall meet all of the requirements specified in Table II, 3.3.3, 3.4.1, 3.4.2, 3.5.1, 3.5.2, 3.5.3, and 3.5.4 after completion of the 6-month storage stability test (see 4.5.5 and TABLE VI).

3.6 Operating requirements.

3.6.1 Physical properties. The kinematic viscosity of the oil shall be as specified in Table II.

TABLE II. Requirements

PHYSICAL PROPERTIES	METHOD	VALUES
Viscosity @ 40°C, Kinematic, (mm ² /s)	ASTM D445	95 to 125
Pour Point, °C, max.	ASTM D97	-6
Evaporation loss at 100°C, max.	ASTM D972	5%

3.6.2 Pour point. The maximum pour point of the oil shall be no greater than -6°C (see TABLE II and 4.5.2).

3.6.3 Evaporation loss. The maximum mass percent evaporation loss of the oil shall not be greater than 5% (see TABLE II and 4.5.3).

4. VERIFICATION.

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

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

TABLE III. Requirements/verification cross-reference matrix

Property	Section 3 Requirement	Section 4 Verification	Qualification Testing	Conformance Inspection
Materials	3.2	4.2		
Recycled, recovered, or environmentally preferable materials	3.2.1	4.2.1		
Tolerances	3.3.1	4.3.1	X	
Toxicity	3.3.2	4.3.2	X	
Toxicity warning label	3.3.2.1	4.3.2.1	X	
Workmanship	3.3.3	4.3.3	X	
Copper strip corrosion	3.4.1	4.4.1	X	X
Removability	3.4.2	4.4.2	X	
Humidity protection	3.5.1	4.5.1	X	
Salt-spray resistance	3.5.2	4.5.2	X	
Accelerated stability	3.5.3	4.5.3	X	
Low temperature stability	3.5.4	4.5.4	X	
Storage stability	3.5.5	4.5.5	X	
Viscosity, kinetic @ 40°C	TABLE II	4.6.2	X	X
Pour point	TABLE II	4.6.3	X	X
Evaporation loss	TABLE II	4.6.4	X	X

4.1.1 Qualification inspection. Qualification inspection shall consist of tests for all of the requirements as specified in Table III and may be conducted in any plant or laboratory approved by the qualifying activity (see 6.3).

4.1.2 Conformance inspection. Conformance inspection shall consist of tests for all of the requirements as specified in Table III and may be conducted in any plant or laboratory approved by the qualifying activity.

4.2 Materials. To determine conformance to 3.2, the lubricating oil shall be examined and tested in accordance with sections 4.3, 4.4, 4.5, and 4.6.

4.2.1 Recycled, recovered, or environmentally preferable materials. The Environmental Protection Agency (EPA) maintains an online list of toxic chemicals and hazardous substances at www.epa.gov/ebtpages/pollutants.html that shall be consulted to verify section 3.2.1.

4.3 Support and ownership verification.

4.3.1 Tolerances. Examine test data against assigned tolerances of the tests in Table II. If test values are outside the tolerance ranges, the material shall be rejected.

4.3.2 Toxicity. To determine conformance to 3.3.2, components of the oil's formulation shall be compared with the toxic limits established by 29 CFR 1910.1200 and ACGIH Threshold Limit Values (TLV) and Biological Exposure Indices (BEI). 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. The EPA maintains an online list of toxic chemicals and hazardous substances at www.epa.gov/ebtpages/pollutants.html and this list shall be used as guidance.

4.3.2.1 Toxicity warning label. Upon inspection container markings shall convey the following information:

WARNING!

Do not use this oil in food-processing or food-handling equipment on surfaces
that may contact food. Do not allow the oil to contaminate foodstuffs.

4.3.3 Workmanship. Place the oil in a 4-oz. translucent container and shake the container and contents for ten seconds. Allow the contents to settle for thirty seconds. Then, examine the container by holding it up to a 40 lumen transmitted light source. No residue shall be visible in the oil.

4.4 Interface verification.

4.4.1 Copper strip corrosion. To determine conformance to 3.4.1, the oil shall be tested in accordance with (IAW) ASTM D130 for 3 hours at 100°C. The copper strips shall exhibit a value not more than 2a IAW the ASTM Copper Strip Corrosion Standards.

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4.4.2 Removability. To determine conformance to 3.4.2, the oil shall be tested by completely immersing the three oil-coated test panels used for the humidity protection test (see 4.5.1) in a breaker containing degreasing solvent IAW MIL-PRF-680, Type II at 25°C and agitating the solvent slightly for not more than one minute. Then, repeat this process with methanol IAW ASTM D1152. After removal from the solvent, the test panels shall not show evidence of any oil residue, stain, or discoloration.

4.5 Environmental verifications.

4.5.1 Humidity protection. After 30 days (720 hours) of exposure to high humidity IAW ASTM D1748, visually examine the three test panels to which the oil was applied in compliance with requirements of 3.5.1.

4.5.2 Salt-spray resistance. Prepare the test panels by cleaning and sand-blasting as specified in ASTM D1748. Immerse the panels in the test oil for one minute with mild agitation and drain them for 2 hours ± 10 minutes at 24 ± 3 °C. Expose the panels for 48 hours to a spray of 5% salt (NaCl) solution as specified in ASTM B117. The panels shall be supported 10-20° angle from vertical with the 4 inch edge with the two holes facing down during exposure to the salt spray. Adjust the fog-collection rate to 0.75 to 2.0 ml per hour. At the completion of the exposure period, rinse the panels first in water, then in methanol as specified in D1152, and clean them by immersion in hexanes. Finally, rinse the panels in methanol and examine them to determine conformance to 3.5.2.

4.5.3 Accelerated stability. Fill a pour-point jar conforming to ASTM D97 to the mark with test oil, stopper it, and subject the oil to the following test sequence:

TABLE IV. Stability test sequence

TEMPERATURE	TIME(hours \pm 10 minutes)
$54 \pm 3^\circ\text{C}$	2
$4 \pm 3^\circ\text{C}$	2
$54 \pm 3^\circ\text{C}$	2
$4 \pm 3^\circ\text{C}$	2
$25 \pm 3^\circ\text{C}$	16
$54 \pm 3^\circ\text{C}$	8
$4 \pm 3^\circ\text{C}$	64
$25 \pm 3^\circ\text{C}$	4

At the completion of the test sequence, turn the pour-point jar to a horizontal position and observe the rate of flow. Then, pour the oil into an appropriate suspended level viscometer for transparent liquids conforming to those listed in ASTM D446 Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers and allow it to stand for one hour at 40 °C. Make consecutive viscosity determinations IAW ASTM D445 until three such determinations yield values that agree within 0.2 centistokes. Report the average value of these determinations as the viscosity of the oil (for the purpose of determining stability only). Then, compare the value to the initial viscosity of the oil to determined conformance to 3.5.3.

4.5.4 Low temperature stability. Fill a pour-point jar conforming to ASTM D97 to the mark with test oil, stopper it, and subject the oil to the following sequence:

TABLE V. Low-temperature test sequence

TEMPERATURE	TIME (hours \pm 10 minutes)
$-40 \pm 3^{\circ}\text{C}$	24
$25 \pm 3^{\circ}\text{C}$	24
$-18 \pm 3^{\circ}\text{C}$	24
$25 \pm 3^{\circ}\text{C}$	24

At the completion of the test sequence, turn the pour-point jar to a horizontal position and observe the rate of flow. Then, pour the oil into a standard viscosity tube conforming to ASTM D446, figure A 2.4 and allow it to stand for one hour at 40°C . Make consecutive viscosity determinations in accordance with ASTM D445 until three such determinations yield values that agree within 0.2 centistokes. Report the average values as the viscosity of the oil (for the purpose of determining stability only). Then, compare the value to the initial viscosity of the oil to determined conformance to 3.5.4.

4.5.5 Storage stability. Fill three 1-quart containers with the test oil to within approximately 6 mm of the top of the container. Seal all three containers tightly. Store each of the three sample containers at the temperatures and for the time periods indicated in TABLE VI:

TABLE VI. Storage-stability test sequence

SAMPLE #	TEMPERATURE	STORAGE PERIOD (MONTHS)
1 st	$-40 \pm 3^{\circ}\text{C}$	3
1 st	$-18 \pm 3^{\circ}\text{C}$	3
2 nd	$-18 \pm 3^{\circ}\text{C}$	3
2 nd	$25 \pm 3^{\circ}\text{C}$	3
3 rd	$25 \pm 3^{\circ}\text{C}$	3
3 rd	$54 \pm 3^{\circ}\text{C}$	3

At the end of the 6-month storage period, examine and test the samples for conformance to the requirements of 3.5.5.

4.6 Operating requirements verifications.

4.6.1 Physical properties. Physical properties shall be verified by the methods and values listed in TABLE II.

4.6.2 Viscosity, kinematic. To determine conformance to 3.5.1, the oil shall be tested in accordance with (IAW) ASTM D445, and exhibit a kinematic viscosity within the range specified in Table II.

4.6.3 Pour point. To determine conformance to 3.5.2, the oil shall be tested IAW ASTM D97, and shall exhibit a maximum pour point of -6°C .

4.6.4 Evaporation loss. To determine conformance to 3.5.3, the oil shall be tested at 100°C IAW ASTM D972, and shall exhibit a maximum mass percent evaporation loss of 5%.

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 material 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 that may be helpful, but is not mandatory.)

6.1 Intended use. Oil covered by this specification is intended for the preservation of ferrous and non-ferrous metals and as a general purpose and ordinance lubricant where light loads are anticipated. This oil is not intended for the protection of interior surfaces of internal combustion engines.

6.2 Acquisition requirements. Acquisition documents will specify the following:

- a. Title, number, and date of this specification, and its related QPL (see 6.3.1).
- b. Title, number, and date of all documents referenced (see 2.1).
- c. Quantity of oil required (for bulk deliveries, specify the quantity in U.S. gallons).
- d. Type and size of container (see 1.3).
- e. Conformance tests required (contact activity listed in 6.3).
- f. Packaging requirements (see 3.3.2.1 and 4.3.2.1 and 5.1).
- g. Toxicological Data Requirements (see 3.3.2 and 4.3.2 and 6.4).

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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 QPL 3150 whether or not such products have actually been 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: Department of the Army, U.S. RDECOM-TARDEC, F & L Technology Team, ATTN: AMSRD-TAR-D, MS110, Warren, Michigan 48397-5000.

6.3.1 QPD access. QPD is available to view or download at <http://assist.daps.dla.mil>. Note: The Qualified Products List (QPL) for MIL-PRF-3150 is now listed in QPD.

6.3.2 Product formulation disclosure. MIL-PRF-3150 suppliers must submit to the Qualifying Activity a detailed quantitative description of the product formulation, identifying each constituent material (base oil, additive, solvent, etc.) by percentages used in the finished product.

6.4 Toxicity clearance. Department of the Army (DA) administrative publications AR 40-5, "Preventive Medicine", AR 70-1, "Army Acquisition Policy", and DA Pamphlet 70-3, "Army Acquisition Procedures", require that all new chemicals and materials being added to the Army supply system have a Toxicity Clearance. This involves a toxicological evaluation of materials to assure the safety of their use. Address toxicity questions and the Toxicity Clearance request to: Commander, US ARMY Center for Health and Preventative Medicine (MCHB-TS-T), 5158 Blackhawk Road, Aberdeen Proving Ground, MD 21010-5403.

6.5 Container materials. Container material must be of a density sufficient to prevent migration of the product or any constituents through the container.

6.6 Definitions.

6.6.1 Removability. Process of eliminating oil from test panels after testing.

6.6.2 Bulk lot. An indefinite quantity of a homogeneous mixture of oil manufactured in a single plant run (not exceeding 24 hours), through the same processing equipment, with no change in the ingredient materials.

6.6.3 Packaged lot. An indefinite number of 55-gallon drums or smaller unit containers of identical size and type, offered for acceptance, and filled with homogeneous mixture of oil manufactured in a single plant run (not exceeding 24 hours), through the same processing equipment, with no change in the ingredient materials.

6.7 Subject term (key word) listing.

acceleration stability
corrosion
formulation
hexanes
humidity
low temperature stability
lubricating oil
methanol
petroleum
pour point
preservative
residue
viscosity

6.8 Storage conditions. Before use, the lubricating oil may be stored under conditions of covered or uncovered storage at temperatures ranging from +40 to -54°C.

6.9 International standardization. This specification implements NATO STANAGs 1135 and 7094. When amendment, revision, or cancellation of this specification is proposed, the preparing activity must coordinate the action with the U.S. National Point of Contact for the international standardization agreement, as identified in the ASSIST database at <http://assist.daps.dla.mil>.

6.10 Material safety data sheets (MSDS). The contracting officers will identify those activities requiring copies of completed MSDS prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in Section 5 of FED-STD-313.

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

6.12 Waste disposal instructions. The very first step in disposal is to coordinate with Defense Reutilization and Marketing Service (DRMS) for turn-in for disposal of any excess items of supply. Defense Materiel Dispositional Manual DOD 4160.21-M (with pertinent supplements/ messages) describes the requirements for such turn-ins. Variations exist as to whether the DRMS accepts physical custody of the disposal turn-in. The potential for DRMS acceptance and disposal processing is enhanced by comprehensive identification. If the DRMS 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.

DISCLAIMER

THE RECOMMENDED DISPOSAL INSTRUCTION IS FORMULATED FOR USE BY ELEMENTS OF THE DEPARTMENT OF DEFENSE. THE UNITED STATES OF AMERICA IN NO MANNER WHATSOEVER EXPRESSLY OR IMPLIEDLY WARRANTS, STATES, OR INTENDS SAID INSTRUCTION TO HAVE ANY APPLICATION, USE, OR VIABILITY BY OR TO ANY PERSON OR PERSONS OUTSIDE THE DEPARTMENT OF DEFENSE NOR ANY PERSON OR PERSONS CONTRACTING WITH ANY INSTRUMENT OF THE UNITED STATES OF AMERICA AND DISCLAIMS ALL LIABILITY FOR SUCH USE. ANY PERSON UTILIZING THIS INSTRUCTION WHO IS NOT A MILITARY OR CIVILIAN EMPLOYEE OF THE UNITED STATES OF AMERICA SHOULD SEEK COMPETENT PROFESSIONAL ADVICE TO VERIFY AND ASSUME RESPONSIBILITY FOR THE SUITABILITY OF THIS INSTRUCTION TO THEIR PARTICULAR SITUATION REGARDLESS OF SIMILARITY TO A CORRESPONDING DEPARTMENT OF DEFENSE OR OTHER GOVERNMENT SITUATION.

Custodians:

Army – AT
Navy - AS
Air Force – 11

Preparing Activity:

Army - AT
(Project 9150-2008-007)

Review Activities:

Army – AR, AV, MD MI
Navy – SA
Air Force –68
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>.