

INCH-POUND

MIL-STD-3003(AT)

9 July 2001

SUPERSEDING

MIL-V-62038E(AT)

1 March 1988

ATPD 2241

9 January 1998

**DEPARTMENT OF DEFENSE
STANDARD PRACTICE**

**VEHICLES, WHEELED: PREPARATION FOR SHIPMENT
AND STORAGE OF**



AMSC A7383

AREA PACK

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FOREWORD

1. This standard is approved for use by the U.S. Army Tank-automotive and Armaments Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.
2. The intent of this document is to provide standard practices for the preservation of trucks, truck-tractors, trailers, and trailer dollies for shipment and storage, and the packaging of Components of the End Item (COEI) and Basic Issue Items (BII) for the specific model vehicle.
3. 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: AMSTA-TR-E/IE, Warren, MI 48397-5000, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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1. SCOPE

1.1 Scope. This standard covers practices to protect wheeled vehicles against environmentally induced corrosion and deterioration and other forms of degradation during storage and shipment associated with the military distribution system. This document also provides the standard practices/processes for the military preservation, packaging, packing, and marking of Basic Issue Items (BII), Components-Of-The-End-Item (COEI), and On-Vehicle Equipment (OVE) shipped with automobiles, trucks, truck-tractors, trailers, trailer-dollies, and other wheeled vehicles. The model specific instructions will be documented on Equipment Preservation Data Sheets (EPDS). These EPDS will be used for vehicle shipment and storage in support of Storage and Maintenance of Army Prepositioned Stock Materiel and the Defense Transportation System, and will be reviewed and modified to accommodate the specific storage environment, storage period, and the amount of care of supplies in storage.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 and 5 of this standard. This section does not include documents cited in other sections of this standard or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirement documents cited in sections 3, 4 and 5 of this standard, 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 in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

A-A-52408	- Preservative Coating, Rubber: For Rubber Surfaces
A-A-52465	- Primer Coating, Synthetic, VOC Compliant (for Brake Drums).
A-A-52624	- Antifreeze, Multi-Engine Type.
A-A-55057	- Panels, Wood/Wood Based; Construction and Decorative.
A-A-59133	- Cleaning Compound, High Pressure (Steam) Cleaner.
A-A-59303	- Talc, Technical.
O-S-801	- Sulfuric Acid, Electrolyte (for Storage Batteries).
PPP-B-621	- Box, Wood, Nailed and Lock-Corner.

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MIL-B-117	- Bags, Sleeves and Tubing.
MIL-B-121	- Barrier Material, Greaseproofed, Waterproofed, Flexible.
MIL-PRF-680	- Degreasing Solvent.
MIL-PRF-2104	- Lubricating Oil, Internal Combustion Engine, Combat/Tactical Service.
MIL-PRF-2105	- Lubricating Oil, Gear, Multipurpose (Metric).
MIL-C-10382	- Corrosion Preventative, Petrolatum, Spraying Application: for Food Handling Machinery and Equipment.
MIL-PRF-10924	- Grease, Automotive and Artillery.
MIL-PRF-16173	- Corrosion Preventative Compound, Solvent Cutback, Cold-Application.
MIL-PRF-21260	- Lubricating Oil, Internal Combustion Engine, Preservative Break-In.
MIL-PRF-22191	- Barrier Materials, Transparent, Flexible, Heat Sealable.
MIL-PRF-23827	- Grease, Aircraft and Instrument, Gear and Actuator Screw, NATO Code Number G-354.
MIL-PRF-32033	- Lubricating Oil, General Purpose, Preservative, (Water Displacing, Low Temperature).
MIL-PRF-46002	- Preservative Oil, Contact and Volatile Corrosion-Inhibited.
MIL-C-53072	- Chemical Agent Resistant Coating (CARC) System Application Procedures and Quality Control Inspection.
MIL-D-81298	- Dye, Liquid, for the Detection of Leaks in Aircraft Fuel Systems.
MIL-C-81309	- Corrosion Preventative Compounds, Water Displacing, Ultra-Thin Film
MIL-PRF-81322	- Grease, Aircraft, General Purpose, Wide Temperature Range.
MIL-DTL-83133	- Turbine Fuels, Aviation, Kerosene Types, NATO F-34 (JP-8), NATO F-35 and JP-8+100.

STANDARDS

DEPARTMENT OF DEFENSE

MIL-STD-129	- Standard Practice for Military Marking.
MIL-STD-1366	- Interface Standard for Transportability Criteria
MIL-STD-2073-1	- Standard Practice for Military Packaging.

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HANDBOOKS

DEPARTMENT OF DEFENSE

MIL-HDBK-129 - Military Marking.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Documentation Automation and Production Service, Bldg. 4D, 700 Robbins Avenue, 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 are those cited in the solicitation.

ARMY OIL ANALYSIS PROGRAM MANAGEMENT OFFICE

Army Oil Analysis Program (AOAP) - Publication

(Copies of the Army Oil Analysis Program are available from the Commander, USAMC Logistic Support Activity, ATTN: AMXLS-LA, Building 3627, Redstone Arsenal, AL 35898-7466. They are also available on line at aoap@logsa.army.mil.)

CODE OF FEDERAL REGULATIONS (CFR)

Title 29 - Labor.
Title 40 - Protection of Environment.
Title 48 - Federal Acquisition Regulations (FAR)
- section 23.402
Title 49 - Transportation.

(Copies of Code of Federal Regulations are available from the Superintendent of Documents, U.S. Government Office, Washington DC 20402. They are also available on-line at <http://www.access.gpo.gov/nara/cfr>.)

INTERNATIONAL CIVIL AVIATION ORGANIZATION (ICAO)

Technical Instructions.

(Copies of ICAO are available from the ICAO, Document Sales Unit, 999 University Street, Montreal, Quebec H3C 5H7, Canada. They are also available on-line at <http://www.icao.int>.)

INTERNATIONAL MARITIME ORGANIZATION (IMO)

The International Maritime Dangerous Goods Code.

(Copies of IMO are available from IMO, 4 Albert Embankment, London SE1 7SR.)

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JOINT SERVICE MANUAL

AFJMAN24-204/TM38-250/NAVSUP

PUB 505/MCO P4030.19F/DLAM 4145.3 - Preparing Materials for
Military Air Shipments.

(Copies of Joint Service Manual are available from HQ AFMC/LGTP, 5215 Thurlow
Street, Wright-Patterson AFB, OH 45433-5540.)

VEHICLE ASSOCIATED PUBLICATIONS

- | | |
|------------------|---|
| FM 10-20 | - Organizational Maintenance of Military Petroleum,
Pipelines Tanks and Related Equipment. |
| FM 10-71 | - Petroleum Tank Vehicle Operations. |
| TB 43-0212 | - Purging, Cleaning and Coating Interior Ferrous and
Tene Sheet Vehicle Fuel Tanks. |
| TB 750-651 | - Use of Antifreeze Solutions, Antifreeze Extender,
Cleaning Compounds, and Test Kit in Engine Cooling
Systems. |
| TM 9-2330-356-14 | - Operator's, Unit, Direct Support and General Support
Maintenance Manual for Semitrailers Tank: 5000 Gallon
Bulk Haul, Self Load/Unload M967, M967A1; Fuel
Dispensing, Automotive M969, M969A1; Fuel
Dispensing, Under/Over Wing Aircraft M970, and
M970A1. |
| TM 9-6140-200-14 | - Lead-Acid Storage Batteries 12V/24V, Operator's Unit,
Direct Support and general Support Maintenance
Manual for. |

(Copies of national stock numbers and vehicle associated publications are available
from Commander, U.S. Army Tank-automotive and Armaments Command,
ATTN: AMSTA-TR-E/IE, Warren, MI 48397-5000.)

NORTH ATLANTIC TREATY ORGANIZATION (NATO)

STANAG 2895, Cycle A3 - Climatic Conditions and Derived Conditions for Use in
Defining Design/Test Criteria for NATO Forces
Materiel.

(Copies of North Atlantic Treaty Organization (NATO) are available from NATO Blvd,
Leopold III, 1110 Brussels, Belgium.)

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U.S. ARMY TANK-AUTOMOTIVE AND ARMAMENTS COMMAND (TACOM)

- Control No. 94-02 - TACOM Ground Precautionary Message (Maintenance Advisory).
- STA Form 4895 - Equipment Preservation Data Sheet Preparation for Shipment and Storage.
- STA Form 4895-1 - Equipment Preservation Data Sheet for Shipment and Storage (continuation).

(Copies are available from Commander, U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/IE, Warren, MI 48397-5000.)

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

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC. (AIA)

- AIA/NAS 840 - Plug, Pipe Thread, Protective, Dust and Moisture Seals (DoD Adopted).
- AIA/NAS 847 - Caps and Plugs, Protective, Dust and Moisture Seals (DoD Adopted).

(Copies of AIA are available from the Aerospace Industries Association of America, Inc. (AIA), 1250 Eye Street N W, Suite 1100, Washington DC 20005.)

AMERICAN PETROLEUM INSTITUTE (API)

- Petroleum Measurement Tables, Publication 2013 - Cleaning Mobile Tanks in Flammable or Combustible Liquid Service.

(Copies are available from the American Petroleum Institute, 1220 "L" Street, N.W., Washington, DC 20005.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM D287 - Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products, (Hydrometer Method) (DoD Adopted).
- ASTM D928 - Standard Specification for Sodium Bicarbonate.
- ASTM D3950 - Standard Specification for Strapping Nonmetallic, (and Joining Methods).

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- | | |
|------------|---|
| ASTM D3953 | - Standard Specification for Flat Strapping, Steel and Seals (DoD Adopted). |
| ASTM D4675 | - Standard Guide for Selection and Use of Flat Strapping Materials (DoD Adopted). |
| ASTM D4727 | - Standard Specification for Corrugated and Solid Fiberboard, Sheet Stock (Container Grade) and Cut Shapes (DoD Adopted). |
| ASTM D5330 | - Standard Specification for Pressure-Sensitive Tapes, for Packaging Filament Reinforced (DoD Adopted). |

(Copies are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

- | | |
|-----------------|---|
| SAE-AMS-T-22085 | - Tape, Pressure-Sensitive, Adhesive, Preservation and Sealing (DoD Adopted). |
| SAE AS33671 | - Strap, Tie-down, Electrical Components, Adjustable, Self-Clinching, Plastic, Type I, Class 1 (DoD Adopted). |

(Copies are available from the Society of Automotive Engineers, Inc, 400 Commonwealth Drive, Warrendale, PA 15096.)

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. DEFINITIONS

3.1 General. For the purposes of this standard, the following definitions will apply.

3.1.1 Levels of protection. A means of specifying the level of military processing that a given vehicle requires to minimize the risk that the equipment will degrade during shipment and storage.

Level A - Processing for outside storage for a period of 2 years in any worldwide environment without any exercising or maintenance. Vehicles processed to Level A are not authorized for deck loading on ships without additional protection not covered herein. Vehicles processed to Level A are not driveable and may require disassembly and tarping.

Level B - Processing for controlled humidity storage for a period of 48 months and processing for shipment, drive-on drive-off, and temporary outside storage not to exceed 90 days without any exercising or maintenance. Vehicles processed to Level B are not authorized for deck loading on ships and may require additional care of supplies in storage to maintain equipment (see 5.2).

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3.1.2 Recovered materials. “Recovered materials” means materials that have been collected or recovered from solid waste.

3.1.3 Solid waste. “Solid waste” means (a) any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility; and (b) other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities. It does not include solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation returns flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, (33 U.S.C. 1342 et seq.), or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.). (Source: Federal Acquisition Regulations, section 23.402).

3.1.4 Military preservation. Application of protective measures to minimize deterioration including cleaning, drying, preservative materials, barrier materials, cushioning, and containers. Designed to protect tactical equipment during shipment, handling, indeterminate storage, and distribution to consignees worldwide.

4. GENERAL REQUIREMENTS

4.1 Classification-levels of protection. Processing for shipment and storage shall be IAW the applicable level of protection (level A or B) specified in the procurement document. The requirements of the applicable paragraphs referenced in the specific vehicle EPDS, and all the unique requirements for the applicable vehicle are detailed on the STA Forms 4895 (see figure 1 and 6.2.1).

4.2 Environmental. Unless otherwise specified, vehicle processing shall be conducted under the following conditions:

- a. Air temperature: 73 ± 18 degrees Fahrenheit ($^{\circ}\text{F}$)
(23 ± 9.8 degrees Celsius ($^{\circ}\text{C}$)).
- b. Barometric pressure: 28.5 (+2, -3) inches (in.) of mercury (Hg).
(96.5 (+ 6.8, -10.2) kilopascals (kPa)).
- c. Relative humidity: 50 ± 30 percent (%).

4.3 Documents, records and forms. The DA Form 2258 or any equivalent document that contains the preservation/depreservation guide for that specific vehicle being shipped, shall reflect all the preservation accomplished and the complete depreservation instructions. All technical manuals (TMs) and lube orders (LOs) shall be heat sealed inside a bag conforming to MIL-B-117, type I, class B, style 2. The log book, DD form 1348 or DD Form 250 and one copy of DA Form 2258 shall be heat sealed inside a separate bag, as specified above. The document location standards shall apply as specified in table I.

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TABLE I. Document location standards.

Document	Vehicle type	Location
TMs, and LOs.	All vehicles.	Packed in BII box.
Log Book, DD Form 1348 or DD Form 250, and DA Form 2258, one copy.	All self-propelled wheeled vehicles.	Drivers compartment within map compartment or; secured under passenger or driver seat.
	Trailers, van type.	In storage compartment or inside van door, right side, secured.
	Trailers, flat bed.	In storage compartment or secured to under carriage.
	Trailers, small.	Secured to drawbar assembly at left side.

4.4 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials shall 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. The use of new or commercially available materials or products is encouraged and recommended provided they are equal to or better than similar approved materials or products without increasing the cost to the Government. In instances where the material or product is not covered by a specific specification or standard, the manufacturer or fabricator of the material or product shall make available documented evidence by an approved testing laboratory, that the material or product meets or exceeds all requirements of the performance specification for a similar material or product.

4.5 Hazardous materials. Hazardous materials shipped in, on, or with the vehicle shall be packaged, packed, and marked, IAW the applicable requirements of the CFR Title 29, Title 40, and Title 49, the International Maritime Dangerous Goods Code, or the International Civil Aviation Organization Technical Instructions for the applicable mode of transport. Special precautions may be necessary for hazardous materials stored with a vehicle for periods of long term storage. All military air shipments containing hazardous materials shall comply with the Joint Service Manual, AFJMAN24-204/TM-38-250/NAVSUP PUB 505/MCO P4030.19F /DLAM 4145.3. As a general rule, Hazardous Materials should not be stored nor shipped with the vehicle. When hazardous materials are shipped on the vehicle, increased transportation costs should be anticipated.

4.5.1 Hazardous material packaging. All hazardous material shall be shipped in packaging which meets the performance requirements specified in the applicable packaging specification and the mode of transportation regulations cited in 4.5.

4.5.2 Hazardous material shipment documentation. All hazardous material shipments shall be supported by documentation certifying that the packaging meets the performance requirements specified in the applicable packaging specifications and the mode of transportation

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regulations cited in 4.5. The shipper, if not a self-certifier, shall be responsible for assuring that third party providers of hazardous material packaging services are, in fact, registered with the Department of Transportation (DOT). The shipper's signed certification that the packaged configuration meets applicable requirements shall be incorporated on the DD Form 250, Material Inspection and Receiving Report, or other related acceptance document if the DD Form 250 is not used. All certificates and reports shall be available for inspection by authorized Government representatives for a period of three years.

4.5.3 Safety and health. Processing for shipment and storage and subsequent deprocessing of equipment may involve the use of substances requiring personal protection or exposure precautions. Appropriate safety and health information shall be available to all personnel involved and any data for processing the equipment for shipment and storage for deprocessing shall include all necessary warnings, MSDSs, cautionary markings, etc. Documentation shall accompany the vehicle and insure communication of safety and health issues (see 4.4, 4.5, 4.11, 4.12, 4.13 and 6.8).

4.6 Government Furnished Equipment (GFE). Unless previously accomplished, GFE (other than installed) shall be packaged, packed and marked IAW the individual document for the specific item. GFE shall be stowed with the BII.

4.7 Preservation. Preservatives used in processing of vehicles shall be applied directly after cleaning and drying of the vehicle. Unless otherwise specified the required preservatives shall be uniformly applied by any applicable procedure that permits the preservative to coat all necessary surfaces.

4.7.1 Volatile Corrosion Inhibitor (VCI). The use of VCI is recommended in many applications in this specification. These inhibitors act by an evaporation and condensation process and offer complete protection to many surfaces that are not easily reached. However, the use of this preservative with non-ferrous metals, plastics, and painted surfaces, shall be done with care. Certain formulations on certain materials can cause corrosion and other deleterious effects on the vehicle components. Additionally, any heating of the oil can cause the volatile vapors to be removed thus eliminating the preservative qualities of the oil. These VCI oils (MIL-PRF-46002) are not operational oils and shall be drained and new operational oil and filters added prior to any vehicle operation.

4.7.2 Preservative oil. The MIL-PRF-21260 preservative oil is an acceptable operational oil and does not require changing unless indicated by analysis or as specified in the TM for regular operational usage. It will retain its preservation qualities for up to 50 hours of engine operation.

4.7.3 Commercial Off-The-Shelf (COTS) preservatives. COTS preservatives may be used with prior Government's approval in place of Military Preservatives and shall be specified on the EPDS for a specific model vehicle. Some TMs also contain COTS preservatives (see 6.4).

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4.7.4 Atomize spray equipment. When atomized spraying of preservatives is appropriate, equipment such as that shown in figures 2 and 3 may be used.

4.8 Air supply lines. All air supply lines used in the processing of vehicles shall be equipped with moisture separators to prevent moisture contamination.

4.9 Disassembly. A reduction in cube shall be made when cost effective to facilitate loading the maximum number of vehicles on the carrier (e.g., trailer side racks, where trailers can be nested for transport), to minimize transportation costs on overseas shipment (e.g., soft-top cab), and to prevent damage to vehicle components (e.g., mirrors). Vehicles shall have windshield wiper blades removed and packed with OVE, and electronic gear such as radios, telephones, etc. shall be removed by qualified personnel and stored in a general purpose warehouse when vehicles are stored open storage. Components separated from the major end item by removal or disassembly shall be tagged or marked with the identification of the component(s) and the identification and storage location of the major end item. Acceptable containers for Level A or Level B shall be selected from MIL-STD-2073-1, Table C.II. Selection criteria shall reflect the most economical container(s) that shall provide the required protection for the specific vehicle application and provide the necessary protection for the parts and the vehicle. All containers shall be securely strapped in or on the vehicle with steel strapping IAW ASTM D3953, 0.75 x 0.035 in. (19 x .9 millimeters (mm)), minimum, Type I, Finish B.

4.10 Removed vehicle parts. Parts removed from the vehicle shall be matchmarked when necessary to facilitate reassembly. The matchmarking information shall be put on shipping tags, and attached to mating parts. The marked shipping tags shall be waterproofed. Removed bolts, nuts, screws, pins, etc. shall be placed in one of the mating parts and secured to prevent loss.

4.11 Marking. Unless otherwise specified, identification and contract data markings are not required on drive-on, drive-off vehicles that are shipped within the Continental United States. The address marking of vehicles for unit movement overseas shall be IAW the applicable regulations of the military department involved. Address markings, identification, and contract data shall be stenciled on a marking board/panel or applied by attaching a preprinted, pressure-sensitive adhesive label, or securing an other than pressure-sensitive adhesive label with tape, to the vehicle's surface. When specified, the address label can be attached directly to the surface of the vehicle, the label shall be placed either on the rear of the vehicle or on the right side near the rear of the vehicle. When marking boards/panels are used, they shall be secured on the front of the vehicle. Unless otherwise specified, the markings shall be positioned on the vehicle at a height of not more than 6 feet (ft) or less than 4 ft.

4.11.1 Hazardous materials markings. Motor vehicles or mechanical equipment powered by internal combustion engines are a hazard for transport and shall comply with the CFR Title 49, and as applicable the International Air Transport Association Dangerous Goods Regulations, International Maritime Dangerous Goods Code, or the Joint Service Regulation AFJMAN24-204

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(for military air shipments). These regulations also apply to any hazardous material shipped with the vehicle.

4.11.2 Markings, marking materials, and any special markings. MIL-STD-129 provides the minimum requirements for uniform military marking and procedures for their application with MIL-HDBK-129 (see 6.6) furnishing guidelines. BII/COEI/OVE and removed items shall be considered assortment of related items, which cannot be identified under a single stock number but which support a specific weapon system or end item. These items shall be packed in shipping containers and shall be marked with a brief description of the contents in lieu of the entire identification data required by MIL-STD-129. Containers shall be marked "ASSORTED BII(COEI/OVE or REMOVED ITEMS) FOR (NSN), (U.S.ARMY REGISTRATION NUMBER), (GROSS WEIGHT (LBS))". Use the NSN and registration number of the vehicle. Packing lists shall be prepared for each shipping container IAW requirements of MIL-STD-129 and guidelines of MIL-HDBK-129.

4.11.3 Labels. Labels applied to a vehicle processed to Level A, shall adhere to the vehicle without fading, for a period of 2 years exposure to an outdoor environment. Labels applied to a Level B processed vehicle shall adhere to the vehicle, without fading for a period of 48 months in a controlled humidity environment, and for a period of 90 days in an outdoor environment. Labels shall comply with MIL-STD-129. Any tape used to secure labels shall be transparent waterproof, weather resistant pressure-sensitive adhesive type. The labels used and any tape used shall not cause damage to the painted surface.

4.12 Transportability. Transportability engineering shall be properly applied when shipment by special mode(s) transport is required in deployment of military equipment. The processing requirements specified for all vehicles shall not adversely impact transportability and shall be accomplished prior to any transportability testing on new vehicle development programs. Cube reduction, disassembly, packing and/or stowing of BII and COEI can be critical factors in the transportability approval process. All motor vehicles or mechanical equipment powered by internal combustion engines shall meet the hazardous material requirements in CFR Title 49.

4.13 Marine transport. All military tactical vehicles shall be capable of water transport because most equipment in a strategic deployment will be transported by ship. Preservation procedures shall address unique vehicle processing to insure vehicles are capable of transport on barges and tactical watercraft. This is essential to insure equipment can be deployed in logistics-over-the-shore operations.

4.14 Lubrication and fluids. The vehicle shall be fully lubricated and have all fluids filled to full operational level IAW the appropriate LO unless otherwise specified herein or on the EPDS. Vehicles going into long term storage shall be relubricated using materials conforming to drawings, specifications or LO's applicable to the vehicle, after the vehicle has been driven more than 50 miles (80.5 kilometers (km)), has over 50 hours of operation time, or has been exposed to

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contaminating environments, since initial lubrication. If not otherwise specified in TMs, LOs, or dictated by Army Oil Analysis Program (AOAP), change fluids every 90 months while in storage.

4.15 Tires. All vehicle tires shall be inflated to normal operating pressure with dry air. Dry nitrogen may be considered for long term outside storage. Air pressure and/or if nitrogen was used, shall be annotated on DA Form 2258.

4.16 Basic Issue Items (BII). BII shall be military preserved and packed to Level A or Level B (see 3.1.1) in an acceptable shipping container listed in Table C. II of MIL-STD-2073-1, and as further detailed on the EPDS for the specific model vehicle. Selection criteria shall reflect the most economical container that shall provide the required protection. Any containers stowed on the exterior of a vehicle shall be arranged in a manner to provide clearance for sling cables, lifting eyes, and vehicle protective covers, and shall not cause any transportability problems. Unless otherwise specified, BII items shall be stowed aboard the vehicle for shipment and all component and support items shall be stowed aboard the vehicle for shipment. Stowage and securement methods shall be sufficient and safe for the intended purpose. Stowage, securement, including blocking and bracing shall meet weight and clearance requirements of the shipment medium. Blocking and securement by banding shall prevent movement within the vehicle. All containers shipped with the vehicle OCONUS, shall be completely immobilized and able to withstand the extremes of the transportation environment, including sea state 7 conditions on small to medium size ships. This translates to 0.81 G's side to side and 0.42 G's fore and aft. All containers shall be securely strapped in or on the vehicle with steel strapping IAW ASTM D3953, 0.75 x 0.035 in. (19 x 0.9 mm), minimum, Type I, Finish B. When BII containers are stowed in exposed locations on the vehicle, and the vehicle is going to be stored outside unsheltered areas, the BII shall be removed and placed inside sheds, warehouses, or other structures. These containers shall be identified to the vehicle it was removed from so the containers can be returned to that vehicle. BII shall be packed separate from any OVE or any COEI. BII shall be secured to minimize pilferage and stowed on the vehicle as specified on the EPDS.

4.17 Cleaning and drying. Exterior and interior surfaces of the cab and the body shall be free of dirt, dust, and any other contaminants that are injurious to the vehicle or its components. Cleaning items or surfaces to be preserved with an oil or grease-type preservative shall be accomplished by use of MIL-PRF-680 petroleum solvent (see 6.3). CAUTION: Do not direct stream of water or steam under pressure against exterior mounted air cleaner, communications equipment, and surfaces protected with rust proofing or corrosion preventative materials. Immediately after cleaning, surfaces shall be thoroughly dried. Drying shall be accomplished by any process that will not harm the vehicle or its components.

4.17.1 Electronic and other similar devices. Devices which might be damaged by cleaning solvents shall be cleaned or dusted IAW the TM instructions or by using a clean rag, using a soft brush, or blowing with low pressure compressed dry air.

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4.17.2 Cleaning of battery cables and battery box. Remove batteries from equipment and clean batteries, clamps, supports, retainers, and battery box using an acid swabbing brush and a solution of 1/2 pound (lb) (0.23 kilograms (kg)) of ASTM D928, sodium bicarbonate, to 1 gallon (gal) (3.8 liters (L)) of water. Flush with clean water and dry (see TM 9-6140-200-14).

4.18 Miscellaneous preservation. All exterior, unpainted surfaces and any semi-permanent surface treatment that provides only minimal corrosion protection shall be preserved with a contact preservative to protect the item from chemical deterioration, (see MIL-STD-2073-1, Table J III), for military contact preservatives. Preservatives selected shall be those where application, use, or removal shall not damage the item or impair item function.

4.18.1 Minor rework. Prior to spot painting, Stage I, II, and III corrosion (see 6.9) shall be removed by approved mechanical or chemical means. Chemical agent resistance coating (CARC) spot painting shall be performed IAW provisions of MIL-C-53072. When spot painting camouflaged equipment, the colors of the original pattern shall be used.

4.18.2 Lubrications. All exposed oil can points such as, but not limited to, levers, locking bars, strikers, hinges, hinge pins, locking pins, pintle pins, locking levers, wing nuts, linkages, and threaded ends of yokes and related clevis pins shall be lubricated with preservative oil conforming to MIL-PRF-21260, PE 15-40, or MIL-PRF-32033. Working mechanism of padlocks, latches, door locks, and hand operated locking knobs shall also be lubricated with specified preservative oil.

4.18.3 Hydraulic Systems and cylinders. Where practical, store hydraulic cylinders in the fully retracted position which is the normal locked/stored position for the equipment. Hydraulic systems shall be filled to operating level with the operational fluid as specified in the vehicle LO. Exposed surfaces of the hydraulic ram shall be coated with MIL-PRF-10924 grease. Wrap a grease proof wrap, MIL-B-121, around the grease surfaces and secure the wrap with tape, SAE-AMS-T-22085, Type II. Place a tag on the ram requiring the grease to be cleaned off the exposed surface prior to use. This is necessary to prevent the ram seal from being damaged by contaminated grease.

4.19 Engine cooling systems. Vehicles basically have two types of cooling systems; Liquid and Air. Air cooled engines require no special preservation procedure. Liquid cooled engines shall be protected IAW technical bulletin (TB), TB 750-651. Cooling systems shall be filled up to the operating level with a solution consisting of antifreeze A-A-52624. Antifreeze inhibited solution A-A-52624, may be retained in engine cooling systems for an extended period of time from the fill date, provided the coolant meets the freeze point requirements of -50°F (-35°C) and the reserve alkalinity requirements (blue dip stick), which indicates when the coolant is safe to use.

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4.20 Engine crankcase. The engine crankcase shall be filled to the operating level with new preservative oil conforming to MIL-PRF-21260, grade as specified in the vehicle TMs and/or LOs. DA Form 2258 shall be annotated with the type and grade of oil used. A tag shall be prepared for each engine and attached to or near to lube oil fills: "THIS CRANKCASE IS FILLED TO OPERATING LEVEL WITH PRESERVATIVE LUBRICATING OIL GOOD FOR OPERATION UNTIL THE FIRST REQUIRED OIL CHANGE - DO NOT DRAIN - CHECK OIL LEVEL - IF LOW, FILL TO OPERATING LEVEL WITH OPERATIONAL OIL". To insure continuous preservation qualities of the oil, oil shall be changed after 50 hours of operation. Vehicles put into operation will not require oil change until indicated by AOAP. The preservative oil MIL-PRF-21260, is the operational oil, (MIL-PRF-2104 with preservative additives).

4.21 Transmission. Transmissions that operate on MIL-PRF-2104 type lubricating oil shall be filled to operating level with preservative oil conforming to MIL-PRF-21260, grade PE 10 or PE 15-40. Transmissions that do not normally operate on MIL-PRF-2104 type oil shall be filled to operating level with operational oil, as specified in the applicable LO. Operate through all ranges for a minimum of 1 minute at a sufficient speed to assure lubricant coverage of all interior parts and surfaces. Transmissions shall be stored in neutral position. DA Form 2258 shall be annotated to indicate the grade and type of oil used.

4.22 Differentials, transfer assemblies, and power takeoff assemblies. Differentials, transfer assemblies, power takeoff assemblies, and other gear-driven units, that operate on MIL-PRF-2104 type lubricating oil, shall be filled to operating level with preservative oil conforming to MIL-PRF-21260 grade as specified in LO. Those units that do not normally operate on MIL-PRF-2104 type oil shall be filled to operating level with operational oil (e.g., MIL-PRF-2105, grade FO 80-90), as specified in the applicable LO. Operate as specified in the TMs to assure lubricant coverage of all interior parts and surfaces. DA Form 2258 shall be annotated to indicate grade and type of oil used.

4.23 Intervehicular jumper cable, air lines, and safety chains. The intervehicular jumper cable shall be secured to the vehicle with an adjustable, self-clinching, plastic tiedown strap IAW SAE AS33671 or secured with a tape conforming to ASTM D5330, 0.50 in. (12.7 mm) wide, type IV. Connectors at end of air lines shall be secured in provided dummy couplings. Loose portions of air lines and safety chains shall be secured to the vehicle as specified for the intervehicular jumper cable. Cables and air lines shall have a bend of not less than a 2 in. (304.8 mm) radius when secured to the vehicle. All cable connectors that are not connected will be preserved with MIL-C-81309, Type III, Class 2 (see 6.5).

4.24 Soft top cabs with top removed. Tops shall be removed. Normally this is done for shipment to ports or overseas, and when the removal will facilitate loading to the full capacity of the transportation conveyance. When the top is removed, the windshield shall be secured in folded-down position. The top shall be thoroughly dried, folded, or rolled in a manner to avoid creasing of plastic windows, and military packaged IAW MIL-STD-2073-1. The preserved cab

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top shall be military packed in an exterior Level A or Level B shipping container listed in table C.II of MIL-STD 2073-1. Selection criteria shall reflect the most economical container that shall provide the required protection. The box shall be identified and stowed with BII or within the vehicle. The rubber molding that is not directly exposed to the elements, wherein metal to molding or molding to molding contact is involved, for example, around windows and vents shall be dusted with a talc conforming to A-A-59303. The door glass shall be rolled down to the maximum extent and the door glass slit sealed with tape conforming to SAE-AMS-T-22085, type IV. Dash panel instruments shall be covered with one piece of 6 mil commercial grade black polyethylene and secured in place with tape conforming to SAE-AMS-T-22085, type IV. Defroster vents shall be sealed with the same class tape. The horn button shall be covered as specified for dash panel instruments or with plastic caps conforming to NAS 847. Openings in top of shift towers shall be sealed with tape conforming to SAE-AMS-T-22085, type IV. All cab drains shall be open, permanent seat backs and cushions shall be covered with 6 mil black polyethylene. The polyethylene shall be secured in place with tape conforming to SAE-AMS-T-22085, Type II, allowing bottom side to be open for drainage.

4.24.1 Windshield cover. For the shipment to ports or overseas, moveable/lowerable windshields shall be secured in a folded down position and provided with a cover fabricated from plywood paneling 32/16 minimum span rating, grade CD, bonded with exterior glue conforming to A-A-55057. The cover shall be dimensioned so that it extends to the outside perimeter of the windshield assembly and shall be designed and positioned to prevent damage to the glass and/or the vehicle. Battens, cleats and supporting wood members shall be utilized, as necessary, to support the cover adequately in a plane horizontal to the common plane of the windshield assembly. The cover shall be notched and cut out, to circumvent protrusions above the common plane such as windshield wiper motors and brackets. The cover shall be secured to the windshield assembly with minimum 0.75 by 0.035 in. strapping conforming to ASTM D4675, type I, finish B and ASTM D3953, type I, finish B. Edge protectors suitable to prevent damage to vehicle protective finish shall be placed between the strapping and the bearing area of the components. The strapping shall be located on the windshield in such a manner that it does not damage rubber seals along the hinged edge. Windshield covers shall be fabricated IAW the detailed requirements in the vehicle EPDS.

4.25 Vehicle bodies.

4.25.1 Cargo bodies, covers removed. Covers shall be removed. Normally, to reduce the cube for shipment to ports or overseas and when removal increases the loading capacity of the transportation medium. Leather straps of the cover shall be coated with a commercially acceptable grade neat's-foot oil. The cover, including end curtains, shall be Military preserved IAW MIL-STD-2073-1 and secured to prevent movement in or on the vehicle. The preserved covers shall be packed in an exterior Level A or B shipping container listed in Table C.II of MIL-STD-2073-1. Selection criteria shall reflect the most economical container that shall provide the required protection. The box shall be identified and stowed with BII. Top bows shall be removed. Unpainted, unplated metal surfaces of bows, racks, stake pockets, and removed

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hardware shall be preserved IAW MIL-PRF-16173, grade 4. Bows shall be banded together with strapping, 0.75 by 0.035 in., conforming to ASTM D4675, type I, finish B and ASTM D3953, type I, finish B. The strapping, 0.75 in. wide conforming to ASTM D4675 and type II or III of ASTM D3950, may be used as an alternate. Bows shall then be stowed and secured in the cargo compartment or packed in the box with the cover. Edge protectors suitable to prevent damage to vehicle protective finish shall be placed between the strapping and the bearing area of the components. Openings resulting from the removal of bows, racks, and stakes, that are not provided with drain holes to permit draining, shall be sealed with tape conforming to SAE-AMS-T-22085, type IV. Troop seats and side racks shall be removed, banded together and stowed in the cargo compartment in the same manner as the bows. Body drains shall be secured in the open position.

4.25.2 Cargo bodies, covers in place. Troop seats shall be in a folded position and secured with furnished locking devices. Body drains shall be secured in the open position.

4.25.3 Dump bodies, covers removed. When troop seats, bows, and covers are furnished with the dump body, the items shall be processed as prescribed in 4.25.1. When furnished, the cab protector (except when welded) shall be removed and secured within the body. When vehicles are placed in storage outside, the front end of the dump body shall be higher than the rear to allow drainage.

4.25.4 Van, ambulance, panel utility, and maintenance truck. Body drains and ventilators, except those which would allow the entry of free water, shall be placed in the open position to provide all the possible ventilation. The ladder shall be removed from the rear of the van and stowed and secured inside of the van. Vehicles with composition or metal floors shall have the strapping secured through footman loops or other equally positive means of anchoring the strapping. All strapping as a minimum shall be 0.75 by 0.020 in., conforming to ASTM D4675 and type I, finish A of ASTM D3953. For overseas shipment, tiedown hooks, mounted on each side of the van, shall be removed and placed in a bag. The bag shall be stowed in the map compartment. Doors shall be closed and secured to prevent pilferage or damage.

4.25.5 Water tank, ferrous and non-ferrous. The most common method of cleaning a water tank body is by subjecting the tank to steam cleaning with an added compound conforming to A-A-59133 followed by steam alone and then dried typically using a blast of prepared clean, dry compressed air. After cleaning, drains and lower outlets shall be left in the open position and openings covered with fine mesh aluminum or plastic screen, secured in place with tape conforming to MIL-T-22085, type II. Drain plugs shall be removed, metallic drain plugs shall be coated with preservative IAW MIL-C-10382 and packaged IAW MIL-STD-2073-1, Method 33. Non-metallic drain plugs shall be packaged and inspected IAW Method 33 of MIL-STD-2073-1C. The bag containing drain plug shall be identified and securely attached to one of the faucets or in a conspicuous location within the equipment compartment. Rubber seals of hatches and top openings shall be coated with a talc conforming to A-A-59303 and forward outlet, hatches and top openings closed and secured. Equipment compartment drains shall be

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secured in the open position and compartment doors closed and secured to prevent pilferage or damage. For steel tanks, other than stainless or precoated, all interior surfaces shall be coated with preservative IAW MIL-C-10382. The interior of piping shall also be coated with the same type preservative, MIL-C-10382.

4.25.6 Fiberglass tanks. Fiberglass tanks shall be cleaned, using a mild nontoxic detergent and warm water, followed by a clear water rinse. The drain plug shall be removed and the interior of the tank drained and completely dried by subjecting the item to a blast of prepared dry and clean compressed air. The interior of piping shall be coated with preservative IAW MIL-C-10382. The drain plug shall be reinstalled. The rubber seal manhole and filler cover shall be coated with a talc conforming to A-A-59303. The filler and manhole cover shall be closed and secured. Lower outlets shall be left in the open position and openings covered with fine mesh aluminum or plastic screen, secured in place with a tape conforming to MIL-T-22085, type II.

4.25.7 Water pumping system. The drain plug on the bottom of the water pump shall be removed and the pump completely drained. The drain plug shall be reinstalled. As an example, the plug shall be removed from the tee on the top of the pump and the pump filled with preservative oil conforming to MIL-C-10382. The pump shall be operated allowing the preservative to drain through outlet nozzle and introduce a sufficient amount of preservative MIL-C-10382 to assure complete coverage of areas within the pumping system from intake to outlet. After completion of application of preservative, the drain plug shall be removed and the system completely drained. The drain and top plug shall be reinstalled. A red warning tag bearing the following information: "BEFORE PLACING IN USE, FLUSH SYSTEM WITH HOT WATER, MINIMUM 160°F (71°C), AND DRAIN TO MAXIMUM EXTENT" shall be attached to the preserved water tank in a conspicuous location, and DA Form 2258 (see figure 5) annotated.

4.26 Fuel tank trucks and semitrailers.

4.26.1 Tank purging. The preferred method for purging is to use a solvent wash, and then a hot water rinse. Immediately after the hot water rinse, the tanker shall be drained of all water and dried with hot air. Prior to any tank maintenance a vapor reading of 0.0 is required. The American Petroleum Institute Publication 2013, Field Manuals (FM) FM 10-20, and FM 10-71, and TB 43-0212 all contain guidance on how to safely vapor-free and clean mobile tanks used in the transportation of flammable liquids. TACOM Ground Precautionary Message, Control Number 94-02, Maintenance Advisory, provides proper guidance for purging fuel tankers using a purging solution (see 6.10).

4.26.2 Tank cleaning and preservation. Many different fuel tanker cleaning methods exist. Commonly used methods are water displacement, pressure washing, steaming, ventilation, and chemical. Within these broad categories there are many variations. The type of cleaning required may vary depending on the product carried by the tanker, the type of tank (e.g., stainless, teflon-coated steel), and the purpose for cleaning. For long term storage the following methods

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are recommended. For stainless steel tankers, the use of a steam cleaning process is recommended. Use the procedures in FM 10-20, Organizational Maintenance of Military Petroleum Pipelines, Tanks, and Related Equipment for removing contaminants. The abbreviated procedures include:

- a. Dry steam tank for at least 1 hour.
- b. Allow tank to cool.
- c. If necessary, enter tank and remove heavy sludge.
- d. Wet steam with a solvent.
- e. Wet steam with water to rinse.
- f. Dry tank with rags.

TM 9-2330-356-14 also has a steam method for purging tankers. If steaming cannot be used (e.g., some M131 tankers have Teflon-coated steel tanks that shall not be subjected to steam temperatures over 140°F) a pressure washing method is recommended. This uses a high-pressure solution of water and solvent and for maximum effectiveness the solution shall be heated. These are the only methods authorized for aircraft tankers. As an alternate, the chemical method of TB 43-0212 is recommended. Do not use the procedures in FM 10-71 because these procedures are only for removing contaminants or to prepare a tank for a change in product, and do not cover purging of tankers. Other processes are available and used by commercial cleaning companies, but shall only be used after careful consideration of its advantages and disadvantages. The use of water washes with detergent or other cleaning compounds have been used, but shall be used with care because of potential adverse effects on the filter elements, tank linings, segregators etc. Care is also needed to insure that cleaning products are not left in the valves, outlet pipes, and other parts of the interior of the tanker. Once the tanker is cleaned, a preservative oil conforming to MIL-PRF-21260, grade PE 10-1, MIL-PRF-32033, or MIL-PRF-46002 shall be used to prevent corrosion. This oil shall be used on bare metallic surfaces that are susceptible to corrosion. Aircraft fuel tankers shall not be preserved internally because the preservative is considered a contaminant. Fuel tankers shall have a high priority for controlled-humidity storage due to potential contamination problems caused by daily "breathing" of air into and out of the tank.

4.27 Fire extinguishers/compressed gas cylinders:

- a. Fixed cylinders integral to a weapon system. The DOT regulations identify how long these cylinders can go between hydrostatic retests. However, these test intervals only apply to cylinders that are being recharged. They do not apply to fully charged cylinders. Therefore, no fully charged and installed cylinder need be removed from a vehicle for hydrostatic retest, even if the retest interval has expired, unless it does not pass the visual inspection requirements detailed in the respective weapon system TM. If the retest interval has expired, and the cylinder has been completely or partially discharged, then the cylinder shall be hydrostatic tested before the cylinder is recharged.
- b. Portable cylinders (e.g. hand helds). The standard hydrostatic retest interval for compressed gas cylinders is every five (5) years. This applies to fully charged

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- extinguishers, as well as those being prepared for recharge. This is applicable to DOT 3A, 3AA, or 3AL cylinders containing carbon dioxide (CO₂) used in weapon systems. However, if the extinguishers contain dry powder, Halon, or a hydrofluorocarbon (HFC) agent, the hydrostatic test interval for these cylinders is only every twelve (12) years. Likewise, the hydrostatic retest interval for DOT A, 3AA, and 3AL cylinders containing chlorofluorocarbon (CFC) used in weapon system air conditioning or refrigeration systems is every five (5) years. Portable fire extinguishers, shall undergo hydrostatic retest when the retest interval expires.
- c. Disposable, portable fire extinguishers (such as the Halon 1301 handhelds in weapons systems) are not subject to evacuation or recharge. The hydrostatic test interval is therefore equivalent to the service life of the extinguisher. These extinguishers shall be replaced at the intervals prescribed in the applicable technical manuals. All Halon 1301 handheld fire extinguishers removed from weapons systems due to visible damage or expiration of service life shall be turned in to the Army Ozone-Depleting Substance (ODS) Reserve at the Defense Supply Center Richmond following the Army's turn-in procedures found at the Army Acquisition Pollution Prevention Support Office web site (www.aappso.com).
 - d. Hydrostatic retest shall be performed by a DOT-certified retest facility. The CONUS facilities are certified through one of the DOT Independent Inspection Agencies. The OCONUS facilities are certified through the Defense Logistics Agency (see 6.11).

4.28 Refrigeration systems. Check all refrigeration systems to insure systems are fully charged with no leaks IAW the applicable TMs.

5. DETAILED REQUIREMENTS

5.1 Level A.

5.1.1 Performance conditions. Equipment processed Level A is intended to provide protection for the equipment stored for up to 48 months in an unheated warehouse environment or 24 months in an outdoor environment for climatic conditions defined by STANAG 2895, Cycle A3 (see 6.14).

5.1.2 Tires. Tires shall be coated with A-A-52408 preservative.

5.1.3 Batteries. Dry charged batteries shall be installed and secured in vehicle battery carrier with steel strapping, 1.25 by 0.031 in. (32 by 0.79 mm) conforming to ASTM D4675 and ASTM D3953, finish B.

5.1.3.1 Battery cables. Battery cables shall be secured to the battery carrier with an adjustable, self-clinching, plastic tiedown strap, IAW SAE AS33671, or secured with tape conforming to ASTM D5330, type IV, 0.50 in. wide.

5.1.3.2 Filler caps. Filler cap openings, when applicable, shall be sealed by placing a 2 in. (51 mm) wide by 3 mil thick sheet of film, conforming to MIL-PRF-22191 type II, over all filler

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cap openings with the caps removed. The sheet shall be of sufficient length to be depressed into the filler cap opening to the same depths as the filler plug. Filler caps shall be screwed or inserted into the filler openings to form a complete seal without damaging the sheet.

5.1.3.3 Electrolyte. The electrolyte shall be packaged and packed IAW O-S-801, as applicable, except that exterior containers shall conform to PPP-B-621, class 2 overseas type. The marking shall be as specified in O-S-801. The packed electrolyte shall be stowed in the same location as the BII, and secured independently to permit separate removal.

5.1.4 BII. BII shall be Military preserved and Level A packed as specified in 3.1.1 and 4.16. When BII is stowed in exposed locations on the vehicle and the vehicle is going to be stored outside, the BII shall be removed from the vehicle and placed inside sheds, warehouses, or other structures to protect the BII from the elements. These containers shall be identified to the vehicle from which it was removed and shall have special marking as follows: "DO NOT STORE OUTSIDE FOR EXTENDED PERIODS" (see 4.11).

5.1.5 Disassembly. Components separated from the major end item by removal or disassembly shall be tagged or marked with the identification of the component(s) and the identification and storage location of the major end item. Acceptable containers for Level A shall be selected from MIL-STD-2073-1C, Table C.II. Selection criteria shall reflect the most economical container(s) that shall provide the required protection for the specific vehicle application and provide the necessary protection for the parts and the vehicle.

5.1.5.1 Belt pulleys. The belt tension shall be released on all belts after completing the engine preservation. Unpainted surfaces of pulley grooves shall be coated with a primer conforming to A-A-52465. A tag shall be prepared indicating, "BELT TENSIONS RELIEVED, ADJUST PRIOR TO STARTING ENGINE," and DA Form 2258 annotated.

5.1.5.2 Storage. Vehicles shall have windshield wiper blades removed and packed with OVE. Electronic gear such as radios, telephones, etc., shall be removed by qualified personnel and stored in a general purpose warehouse when vehicles are stored in open storage.

5.1.6 Vehicle fuel tanks.

5.1.6.1 Metallic, ferrous fuel tanks. Fuel tanks in vehicles shall be completely drained of all fuel by removing the fuel tank drain plug or, if not equipped with a drain plug, by siphoning or any other means available. After draining, the fuel tank drain plug, if so equipped, shall be reinstalled and the fuel tank filled or fogged with lubricating oil conforming to MIL-PRF-21260, type 1, grade PE 10-1 or equivalent, and again drained, siphoned or otherwise emptied. If drained, allow to drain until the oil flow drips. The metallic plug, if so equipped, and tank filler cap, if metallic, shall be coated with the same oil and reinstalled. The examination of the first processed tank shall be made to determine if all interior surfaces are coated with preservative. If the top of the tank is not coated with preservative because of an airlock, the sending unit shall be loosened or some other means devised to permit the preservative to reach all interior surfaces.

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Emptied preservative oil may be reused for processing other fuel tanks, provided not more than 10 percent (%) of the fluid is fuel. One validation method is to test IAW ASTM D287.

5.1.6.2 Non-metallic and non-ferrous fuel tanks. Fuel tanks in vehicles shall be completely drained of all fuel by removing the fuel tank drain plug or, if not equipped with a drain plug, by siphoning or any other means available. No preservation of fuel tanks is necessary. The metallic drain plug, if so equipped, and tank filler cap, if metallic, shall be coated with a lubricating oil conforming to MIL-PRF-21260, type I, grade PE 10-1 and reinstalled.

5.1.7 Engines.

5.1.7.1 Gasoline.

5.1.7.1.1 Fuel system. A portable container with two compartments shall be positioned to provide gravity feed to the engine. One compartment shall be filled with gasoline specified for engine operation, the other with oil conforming to MIL-PRF-21260, type I, grade PE 10-1. The container shown in figure 4 has proven to be satisfactory for engine preservation. The engine fuel supply line shall be disconnected at the most convenient point nearest the fuel tank, and a flexible line from the portable container connected to the disconnected fuel supply line leading to the engine. The container selector valve shall be turned to the fuel position, the engine started and operated at fast idle speed, without load, until running smoothly, but not for more than 4 minutes. The engine shall then be accelerated to 2/3 maximum revolutions per minute (rpm) and, with the engine still operating, the selector valve on portable container shall be switched to the oil position. The instant the oil reaches the combustion chambers, this will be noted by loss of engine rpm or excessive smoke emitting from the exhaust pipe, the ignition shall be turned off. The line from portable container shall be disconnected and the engine fuel line reconnected.

5.1.7.1.2 Combustion chamber. After processing the fuel system (see 5.1.7.1.1), the engine shall be cooled to assure that the cylinder head temperature, measured at spark plug gasket surfaces of all cylinders, is not more than 100°F (37.8°C). The cooling shall be accomplished by induced air currents, circulation of engine coolant, for liquid-cooled engines, or by waiting the period of time required to arrive at the above specified temperature. When the ambient temperature exceeds 100°F, the engine shall be cooled to a temperature equivalent to the ambient. After the engine has been cooled to the required temperature, processing through the combustion chamber shall be started and completed with minimum delay. The overall elapsed time for complete engine processing shall not exceed 24 hours. Spark plugs shall be removed. As the engine is cranked with the starting motor, preservative oil conforming to MIL-PRF-21260 type I, grade PE 10-1 shall be atomized sprayed through each spark plug opening into the combustion chamber with a low air pressure, less than 25 pounds per square inch (psi) (172.4 kPa). The amount of oil sprayed into the combustion chamber shall be IAW table II. After completion of the above and without cranking the engine, the amount of oil specified in table II shall be atomized sprayed into each combustion chamber. The spark plugs shall be cleaned or replaced to ensure electrode tip is carbon or corrosion free, gapped, and installed. The equipment shown in

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figures 2 and 3 have proven satisfactory for engine preservation. Fuel filters and sediment bowls shall be drained.

CAUTION: Special precautions shall be taken to assure that the amount of oil specified above will not result in a hydrostatic lock. Prior to processing additional engines, the first engine shall be processed as specified above and allowed to stand for 12 hours. The engine shall then be manually rotated or rotated by the starter if manual turning is not possible to assure that the amount of oil sprayed into combustion chambers allows free rotation of the engine.

TABLE II. Combustion chamber preservation.

Oil spray oz (mL) <u>1/</u>	Cylinder volume in ³ (cm ³) <u>2/</u>
0.5 (14.8)	Up to 25 (409.7)
1 (29.6)	Up to 50 (819.4)
1.5 (44.4)	Up to 75 (1229)
2 (59.2)	Over 75 (1639)

1/ oz (mL) = ounce (milliliter)

2/ in³ (cm³) = cubic inch (cubic centimeter)

5.1.7.2 Gasoline auxiliary. The fuel tank filler cap and drain plug shall be removed and the fuel tank completely drained. The fuel tank shall be preserved as specified in 5.1.6. The filler cap shall be reinstalled, and after completion of the engine processing, the filler cap breather vent shall be sealed with a tape conforming to SAE-AMS-T-22085, type II. The gasoline auxiliary engine shall be processed as specified in 5.1.7.1.1, 5.1.7.1.2 and 5.1.7.3.5.

5.1.7.3 Diesel and multifuel (2 and 4 cycle).

5.1.7.3.1 Fuel system. Prior to processing the engine, the engine shall be cooled to ensure that cylinder head temperature measured at injector nozzle flange surface of all cylinders is not more than 100°F. Cooling shall be accomplished by induced air currents, circulation of engine coolant, or by waiting the period of time required to arrive at the above specified temperature. When ambient temperature exceeds 100°F, the engine shall be cooled to a temperature equivalent to the ambient. The fuel supply system from the fuel tank shall be shut off. A portable container/line/device shall be positioned to provide preservative oil feed to the engine. Disconnect the fuel line and drain as much fuel as possible from all fuel lines, filters, heater, etc in the system. Fuel tank shall be drained and flushed with preservative oil prior to processing engine (see 5.1.6). Disconnect the fuel line at a quick disconnect before the fuel filters. If this is not practical disconnect between the primary fuel filter and fuel pump at the primary fuel filter outlet. Drain the fuel from the secondary fuel filter and the primary fuel filter. If vehicle is not equipped with a secondary fuel filter, disregard all requirements concerning the secondary fuel filter. Remove filter can and remove filter element. Fill filter can with preservative oil and reinstall with filters. Disconnect residual vehicle fuel return line at quick disconnect coupling. Connect a transparent plastic fuel line to the engine end of the disconnected fuel return line. Insert the other end of the plastic fuel line into a recovery container to collect the residual returned fuel/oil

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mixture. Start engine and run until preservative oil is flowing out the fuel return line (see 5.1.7.3.3), or the time established in the EPDS for specific model vehicle. The throttle shall be placed in half-open position and the engine shut-off or choked by placing fabricated air restriction plate over the air intake until the engine stops. Fabricate air restrictor plate from a piece of plywood or similar material. Cement a piece of rubber (5/16 in. (7.9 mm) thick has been used successfully) or other material that shall not damage engine to the plywood with adhesive.

5.1.7.3.2 Combustion chamber. Engine shall be cooled to ensure that cylinder head temperature measured at injector nozzle flange surface of all cylinders is not more than 100°F. Cooling shall be accomplished by induced air currents, circulation of engine coolant, or by waiting the period of time required to arrive at the above specified temperature. When ambient temperature exceeds 100°F, the engine shall be cooled to a temperature equivalent to the ambient. CAUTION: For the next procedure, specific cranking times should be specified on the EPDS; if a time period is not specified, each cranking period shall not be less than 10 seconds nor more than 30 seconds. Special precautions shall be taken to assure that these time limits are kept, otherwise the engine starter or starter solenoid may be damaged. Processing instructions should be detailed on the EPDS, if not, a general guide is as follows: The throttle shall be placed at maximum open position and the engine cranked with the starter. Engine may fire, but the air restrictor shall prevent engine from starting. Allow starter to cool and repeat at least two times. After completing the engine processing, reconnect all fuel lines, drain preservative oil from filter cans and install new filters. Seal all engine air intakes. The following deprocessing instructions shall be annotated on DA Form 2258: "MAIN ENGINE PRESERVED WITH PRESERVATIVE OIL. DO NOT CRANK" AND "BEFORE CRANKING, REMOVE CAPS, TAPE, OR PLUGS FROM INTAKE, EXHAUST, BREATHER OPENINGS, OIL LEVEL DIPSTICK TUBE, ETC."

5.1.7.3.3 Preservative dye. An oil soluble red dye conforming to MIL-D-81298 shall be added to the preservative oil to establish time periods and insure coverage for the engine preservation. The concentration of dye shall be sufficient to impart a marked coloring to the oil. Prior to vehicle shipment/storage, the dye shall be flushed out with preservative oil without the dye.

5.1.7.3.4 Alternate processing. Alternate processing requirements shall be detailed in the EPDS. Some manufacturers recommend use of VCI to prevent internal engine corrosion damage. These special processing procedures shall be specified in the EPDS. VCI oils should not be used full strength on non-ferrous metals where it will have direct prolonged contact. Follow instructions as specified in the EPDS. MIL-PRF-21260, grade PE-10 is the normal preservative oil used in engine processing. Use of other oils, especially VCI oils, shall only be used based on manufacturers recommendations detailed in the EPDS. CAUTION: Some VCI products have been known to promote corrosion of certain metals (e.g., brass, cadmium, copper, lead, magnesium, zinc, solder) and may also attack certain organic materials (e.g., natural rubber). It is always a good idea to check with the commercial vendor to insure compatibility.

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5.1.7.3.5 Preservation through dipstick shroud opening and oil filler tube. Six ounces of preservative oil (e.g., MIL-PRF-21260, MIL-PRF-46002 or MIL-PRF-32033) shall be atomizer sprayed into the crankcase through the oil filler cap opening. On smaller type engines like Auxiliary Power Units, the amount of oil shall be reduced to 3 ounces or as specified on the EPDS. Use an extension of sufficient length to permit the spray nozzle to be within the crankcase without being submerged in the crankcase oil. After atomizer spraying has been accomplished, the dipstick shall be reinstalled, the oil filler cap closed, and all openings to the engine interior, including dipstick shroud opening and oil filler cap shall be sealed with tape conforming to SAE-AMS-T-22085, type IV.

5.1.7.3.6 Preservation through main engine exhaust systems. Two ounces of preservative oil (e.g., MIL-PRF-21260, MIL-PRF-46002 or MIL-PRF-32033) shall be atomizer sprayed into the exterior exhaust openings toward the engine. One ounce of specified preservative oil shall be atomized into turbocharger exhaust. Seal the openings with tape conforming to SAE-AMS-T-22085, type IV. Then seal the engine crankcase breathers with plastic plugs conforming to NAS 847 or with tape conforming to SAE-AMS-T-22085, type IV. Opening of tailpipes, vertical and horizontal, shall be sealed with tape conforming to SAE-AMS-T-22085, type IV.

5.1.7.4 Air intake system.

5.1.7.4.1 Without turbocharger. The air intake shall be disconnected and one ounce of preservative oil (MIL-PRF-46002, MIL-PRF-21260, or MIL-PRF-32033) atomized sprayed into the intake directed toward the engine. Reconnect and seal openings with tape SAE-AMS-T-22085, type IV.

5.1.7.4.2 With turbocharger. Disconnect air tubes into turbocharger and between turbocharger and engine. Atomize spray preservative oil (MIL-PRF-21260, MIL-PRF-46002, or MIL-PRF-32033) one oz into air intake of turbocharger, one oz into outlet of turbocharger, and two oz into air tube going to engine. Reconnect all air tubes and seal openings with tape SAE-AMS-T-22085, type IV.

5.1.7.5 Air cleaner (oil bath and dry type). The air cleaner, oil bath type, shall be filled to the operating level with the operational oil as specified in the applicable drawing, specification or LO. The interior of the air cleaner, above the oil level, shall be sprayed with a preservative oil conforming to MIL-PRF-46002, grade 1 and the element reinstalled. The dry type air cleaner shall be clean and dry with the new filter element. Oil bath and dry type air cleaner openings shall be sealed with a tape conforming to SAE-AMS-T-22085, type IV, or covered with 6 mil of commercial grade polyethylene, secured with a tape conforming to SAE-AMS-T-22085, type IV.

5.1.7.6 Heaters, fuel operated.

5.1.7.6.1 Heaters installed in vehicles. Disconnect the heater fuel line at the most convenient point between the heater fuel tank and the heater. Drain the fuel from the system to

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the maximum extent possible. Attach a hose from a tank containing preservative oil conforming to MIL-PRF-21260, grade PE 10-1, to provide the feed of oil to the heater through the heater fuel pump. Process the heater until all fuel has been purged out of the heater and lines and the preservative oil has run through the system. Remove the preservative oil line, drain oil lines, and reconnect the heater fuel supply line. Seal all openings to the heater with plastic plugs and caps conforming to NAS 847, or with a tape conforming to SAE-AMS-T-22085, type IV, including the breather, valves, external exhaust stacks, etc. A red warning tag shall be prepared and attached to the heater operating switch bearing the information, "HEATER PRESERVED AND SEALED - REMOVE SEALS - DEPROCESS PRIOR TO STARTING HEATERS". DA Form 2258 shall be annotated and shall specify the depreservation requirements.

5.1.7.6.2 Heaters, not installed. Heaters shall be military preserved and packed as specified on the EPDS and stowed with the COEI or BII as appropriate.

5.1.8 Propeller shafts. Exposed, machined surfaces of propeller shafts, including splines, slip joints, constant velocity joints, and universal joints, shall be preserved IAW MIL-PRF-16173, grade 4.

5.1.9 Disc type clutch. The clutch pedal with gear shift in "NEUTRAL" shall be depressed the required distance to eliminate the free play, then depressed an additional 1 to 1.5 in. (25.4 to 38.1 mm). The pedal shall be secured in the depressed position, by wiring the pedal to floorboard plates, or by wiring a block between the pedal shaft and the floorboard, or by wiring a block between the pedal stop and the pedal bumper.

5.1.10 Brake systems. Exterior, unpainted, or threaded surfaces such as cables, clevises, and linkages of service and parking brakes shall be preserved IAW MIL-PRF-16173, grade 4.

5.1.10.1 Airbrakes. The air compressor shall be processed as specified in 5.1.12. Air reservoirs shall be drained of all condensate and interior surfaces atomized sprayed with preservative oil conforming to MIL-PRF-21260, type I, grade PE 10-1. Drain plugs and threaded areas shall be coated with the same grade of preservative oil and plugs reinstalled. Drain valves shall be closed. Exposed ends of service air lines and dummy couplings shall be covered with tape conforming to SAE-AMS-T-22085, type IV. Air line filters shall be drained and closed. Exhaust ports of relay emergency quick release, and relay valves not equipped with exhaust check valves shall be closed by inserting plastic plugs (e.g., NAS 840-pipe plugs), or sealed with tape conforming to SAE-AMS-T-22085, type IV. Warning tags shall be prepared indicating any area sealed and shall be securely attached in the driver's compartment in a conspicuous location. Additionally, DA Form 2258 shall indicate all areas sealed. When applicable, brakes shall be caged to prevent galvanic corrosion from contact.

5.1.10.2 Hydraulic brakes. The brake system shall be filled with an operational hydraulic fluid as specified in the applicable drawing, specification, or LO.

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5.1.10.3 Diaphragm-type chambers, pull-type cylinders, and hydrovacs. Exterior, metallic unpainted surfaces of diaphragm chambers, cylinders, valves, vacuum tank piping and compensator rods shall be preserved IAW MIL-PRF-16173, grade 4.

5.1.10.4 Air-hydraulic brakes. Air-hydraulic, vacuum, and vacuum hydraulic brakes shall be processed IAW the applicable requirements of 5.1.10.1 and 5.1.10.2.

5.1.10.5 Electric brakes. Electric brakes shall be preserved IAW 5.1.10.

5.1.11 Windshield washers. Windshield washer container and lines shall be drained of all fluid and lines reinstalled.

5.1.12 Air compressor. Where the lubricating system is separate from the associated power unit, the air compressor crankcase shall contain a preservative oil conforming to MIL-PRF-21260, type I, grade PE 10-1 or PE 30-1, as specified on the drawing, specification or LO, filled to the operating level. The compressor air outlet shall be disconnected. Compressors equipped with air cleaners shall have the cleaners removed and processed as specified in 5.1.7.5. Compressors equipped with air strainers shall have the strainers removed and coated with a preservative oil. While the compressor is being operated during engine preservation (see 5.1.7.1 or 5.1.7.3 as applicable), 0.5 oz (148 mL) of the same grade of preservation oil shall be atomized sprayed into the compressor air intake until the oil appears at the outlet. The air outlet shall be reconnected and the air cleaner or air strainer reinstalled.

5.1.13 Water tank, ferrous and non-ferrous. The most common method of cleaning a water tank body is by subjecting the tank to steam cleaning with an added compound conforming to A-A-59133, followed by steam alone and then dried typically using a blast of prepared clean, dry compressed air. After cleaning, drains and lower outlets shall be left in the open position and openings covered with fine mesh aluminum or plastic screen, secured in place with tape conforming to SAE-AMS-T-22085, type II. Drain plugs shall be removed, metallic drain plugs shall be coated with preservative IAW MIL-C-10382 and packaged IAW MIL-STD-2073-1, Method 33. Non-metallic drain plugs shall be packaged and inspected IAW MIL-STD-2073-1, Method 33. The bag containing drain plugs shall be identified and securely attached to one of the faucets or in a conspicuous location within the equipment compartment. Rubber seals of hatches and top openings shall be coated with talc conforming to A-A-59303 and forward outlet, hatches and top openings closed and secured. Equipment compartment drains shall be secured in the open position and compartment doors closed and secured to prevent pilferage or damage. For steel tanks, other than stainless or precoated, all interior surfaces shall be coated with preservative IAW MIL-C-10382. The interior of piping shall also be coated with the same type preservative, MIL-C-10382.

5.1.14 Fiberglass tanks. Fiberglass tanks shall be cleaned, using a mild nontoxic detergent and warm water, followed by a clear water rinse. The drain plug shall be removed and the interior of the tank drained and completely dried by subjecting the item to a blast of prepared dry and clean compressed air. The interior of piping shall be coated with preservative IAW

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MIL-C-10382. The drain plug shall be reinstalled. The rubber seal manhole and filler cover shall be coated with talc conforming to A-A-59303. The filler and manhole cover shall be closed and secured. Lower outlets shall be left in the open position and openings covered with fine mesh aluminum or plastic screen, secured in place with tape conforming to SAE-AMS-T-22085, type II.

5.1.15 Water pumping system. The drain plug on the bottom of the water pump shall be removed and the pump completely drained. The drain plug shall be reinstalled. As an example, the plug shall be removed from the tee on the top of the pump and the pump filled with preservative oil conforming to MIL-C-10382. The pump shall be operated allowing the preservative to drain through outlet nozzle and introduce a sufficient amount of preservative MIL-C-10382 to assure complete coverage of areas within the pumping system from intake to outlet. After completion of application of preservative, the drain plug shall be removed and the system completely drained. The drain and top plug shall be reinstalled. A red warning tag bearing the following information: "BEFORE PLACING IN USE, FLUSH SYSTEM WITH HOT WATER, MINIMUM 160°F (71°C), AND DRAIN TO MAXIMUM EXTENT", shall be attached to the preserved water tank in a conspicuous location, and DA Form 2258 annotated.

5.1.16 Fuel servicing system. All drains and drain plugs shall be opened or removed to permit maximum drainage. The gravity discharge and all compartment manifold valves shall be opened. Drain plugs shall be reinstalled and valves placed in normal operating positions. On tankers with multiple tank compartments, the first fuel compartment shall be filled with preservative oil MIL-PRF-21260, type I, grade PE-10-1. The preservative oil shall be pumped alternately into all fuel compartments of the vehicle and all valves operated to their maximum positions to provide the preservative contact with all surfaces. The preservative shall be drained from the system as specified above. The drained oil shall be recovered and may be reused for processing of other vehicles provided not more than 10% of the fluid is fuel when tested IAW ASTM D287, as appropriate. The manifold and emergency trip valve shall be secured in the open position. The remaining valves shall be closed and drain plugs reinstalled. Tankers with a single tank compartment shall be processed as specified above, except that the preservative oil shall be pumped through the servicing system and into a recovery container. As an alternate, it is preferred that the EPDS detail a fogging procedure that will accomplish this preservation because of the environmental impact of using large quantities of preservative oil and the amount of industrial waste that this generates.

5.1.16.1 Fuel tanker body and equipment. All interior surfaces of fuel compartments, including unpainted surfaces of underside of hatches, except stainless steel, aluminum, and tanks coated with epoxy-based enamel or fuel resistant lacquer, shall be coated with preservative oil of MIL-PRF-21260, type I, grade PE 10-1. All openings of the tank shall be closed, including the emergency relief valves. A red warning tag bearing the following information "BEFORE PLACING IN USE, FLUSH COMPARTMENT AND FUEL SERVICING SYSTEM WITH SAME FUEL WITH WHICH VEHICLE IS TO BE FUELED, AND DRAIN TO MAXIMUM EXTENT" shall be secured to the gravity gate valve. Rubber seals of hatches shall be coated with

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talc conforming to A-A-59303, and hatches shall be closed and secured. Exterior unpainted metal surfaces of hose couplings, valves and pump shall be coated with preservative IAW MIL-PRF-16173, grade 4. Equipment compartment drains shall be secured in the open position. Keys to vehicle stowage cabinet shall be identified and secured in a conspicuous location adjacent to engine instruments inside the stowage cabinet.

5.1.16.2 Fuel tanker and semitrailer with segregator. Tank trucks and semitrailers equipped with a segregator tank shall have the segregator tank removed and drained. A bypass line constructed of fuel resistant rubber hose shall be installed connecting the disconnected intake and the outlet piping vacated by the removal of the segregator. The bypass line shall be secured to the piping with appropriate size hose clamps. The fuel servicing system shall be processed as specified in 5.1.16. The bypass line shall be removed and stowed in the vehicle storage cabinet. The intake and outlet piping and the opening of the segregator tank shall be sealed with tape conforming to SAE-AMS-T-22085, type II. The segregator tank shall be reinstalled to support hangers. A red warning tag, bearing the following information, "BEFORE PLACING INTO USE, REMOVE SEGREGATOR, INSTALL BYPASS LINE, FLUSH COMPARTMENTS AND FUEL SERVICING SYSTEM WITH THE SAME FUEL THE VEHICLE IS TO BE FILLED WITH AND DRAIN TO MAXIMUM EXTENT - REMOVE BYPASS LINE AND REINSTALL SEGREGATORS", shall be secured to the gravity gate valve.

5.1.17 Vehicle cabs.

5.1.17.1 Hardtop cab. Inspection access plates shall be removed and all interior surfaces of doors, including inner surfaces of access plates, if unpainted, not galvanized or otherwise corrosion protected (e.g., rustproofed), shall be coated IAW MIL-PRF-16173, grade 4 (see 4.7) and access plates reinstalled. The rubber molding not directly exposed to the elements, wherein metal to molding or molding to molding contact is involved, (e.g., around doors, windows, and vents) shall be dusted with talc conforming to A-A-59303. Windows shall be open 0.50 in. for ventilation and cab air vents shall be left in the open position. Removed items shall be preserved, packaged, packed and stowed, separate from the BII, IAW the individual document specified for the vehicle (see 4.11.2). All cab drains shall be open, screens installed where necessary, and DA Form 2258 annotated.

5.1.17.2 Soft-top cabs with top in place. The processing of the soft-top cabs shall be as specified in 5.1.17.1.

5.1.17.3 Soft-top with top removed. Process IAW 4.24. Removable seat backs and cushions shall be removed, placed in a bag conforming to type I, class B, style 2 of MIL-B-117, and boxed with other on-vehicle equipment (OVE) items.

5.1.18 Trailers. Racks, bows, and lattice type side extensions, as applicable, shall be removed and banded together with strapping 0.75 by 0.020 in., conforming to ASTM D4675 and type I, finish C of ASTM D3953. Nonmetallic strapping 0.75 in. wide conforming to

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ASTM D4675 and type II or III of ASTM D3950 may be used as an alternate. Edge protectors suitable to prevent damage to vehicle protective finish shall be placed between the strapping and the bearing area of the components. Covers shall be clean, dry, folded to the smallest practical cube, secured (e.g., tied) and heat sealed inside a waterproof bag conforming to MIL-B-117, type I, class B, style 2. Covers shall be packed in containers conforming to PPP-B-621, class 2, style 4, modified to require a one-piece plywood top. The racks, bows, sides, and cover shall be stowed and secured on the bed of the trailer body or packed in the box with the cover. During the storage, trailers shall be stored in such a manner as to afford drainage.

5.1.19 Winch and derrick assemblies. The winch gear and other gear driven units shall contain the applicable lubricant as specified on the drawing, specification or LO, filled to the operational level. The steel cable shall be unreel and all surfaces coated with preservative MIL-PRF-16173, grade 1. Nonmetallic cables shall not be preserved. If preservative is disturbed during rewind, additional preservative shall be applied. Exposed unpainted metal surfaces of cable drums, sheaves, snatch blocks, boom block, A-frame, crane, derrick boom controls and linkages shall be coated with the same type preservative. Exposed surfaces of hydraulic piston rod shall be coated with preservative MIL-PRF-10924, MIL-PRF-23827 or MIL-PRF-81322 and wrapped with a barrier material conforming to MIL-B-121, type II, grade A, class 2 and secured with tape conforming to SAE-AMS-T-22085, type II. The cover from the winch automatic brake assembly shall be removed. Exterior surfaces of brake disc and brake band shall be coated with a primer conforming to A-A-52465. The adjusting pin, spring and related hardware shall be coated with preservative MIL-PRF-16173, grade 4. All disassembled items shall be reassembled.

5.1.20 Gears, chains, and drives. Exposed gears, non-precision drive chains, sprockets, and adjusting mechanisms shall be coated with preservative MIL-PRF-16173, grade 4. The exposed precision drive chains shall be coated with preservative oil MIL-PRF-32033 to assure penetration to inner surfaces of rollers, pins, and bushings. The excess of MIL-PRF-32033 preservative specified shall be allowed to drain, then the entire area shall be coated with preservative MIL-PRF-16173, grade 4.

5.2 Level B.

5.2.1 Performance conditions. Equipment processed Level B is intended to provide protection for:

- a. Up to 48 months storage under controlled humidity conditions.
- b. Outside storage for 90 days maximum without any exercising or maintenance.
- c. All equipment shall be operational, drive-on, drive-off, with minimal processing.

5.2.2 Fuel tanks. Unless another volume of fuel is specified, each vehicle shall be shipped with minimum one-fourth tank of fuel, grade F-34 (JP-8), of MIL-DTL-83133 in the fuel tank. For storage, a minimum of one-half full tank of fuel and a maximum of three-quarters full tank is recommended. Vehicle shipment data shall include the quantity, proper shipping name and identification of hazardous materials aboard the vehicle.

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5.2.3 Batteries, cables and retainers. Batteries, cables and retainers shall be installed and fully operational. Batteries shall be filled with electrolyte and fully charged. Unless otherwise specified, the batteries shall be disconnected for storage exceeding 30 days and the cable ends shall be secured from contact to the terminals using cable ties or tape conforming to ASTM D5330. A tag stating, "BATTERIES ARE DISCONNECTED", shall be placed in the driver's compartment. Wet batteries shall be maintained IAW TM 9-6140-200-14. Vehicle shipment data shall include the quantity, proper shipping name and identification of hazardous materials aboard the vehicle.

5.2.4 BII. Unless otherwise specified, BII shall be Military preserved and packed Level B as specified in paragraph 4.16 and stowed aboard the vehicle for shipment. Stowage and securement methods shall be sufficient and safe for the intended purpose. Stowage and securement, including blocking and bracing, shall provide clearance for sling cables and lifting eyes, and shall meet weight and clearance requirements of the shipment mode. Blocking and securement by banding shall prevent movement within the vehicle. The containers in or on the vehicle and equipment which are placed in sheltered (not exposed to the elements) areas shall remain in place with the vehicle and equipment. BII containers stowed in exposed locations on the vehicle and equipment, which are exposed to the elements, shall be removed and placed inside warehouses. These shall be identified to the vehicle to which it was removed and shall be marked to indicate that outside storage is not permitted.

5.2.5 Windshield wiper bottle. The windshield wiper water bottle shall be filled with a water mixture that will prevent freezing appropriate to the area being assigned.

5.2.6 Soft-tops with top removed. Seat backs and cushions installed by snap fasteners or envelope slip covers shall be processed as specified in 4.24 and secured individually to the seat frame with 0.075 by 0.20 in. (19.1 x 0.5 mm) steel strapping conforming to ASTM D4675 and type I, finish C of ASTM D3953. Two straps shall be secured around each seat back and cushion, one in each direction, crossing at right angles at the approximate center. The fiberboard conforming to ASTM D4727, class weather-resistant, shall be placed between strapping and edges of seat backs and cushions to prevent damage to the fabric and barrier material.

5.3 Loading.

5.3.1 Securement. Each vehicle shall be properly loaded and secured for transport. Loading and securement methods shall be sufficient and safe for the intended purpose. Loading and securement shall conform to carrier requirements and applicable transportation regulations. Guidance for all modes of military shipments is provided by the Military Traffic Management Command Transportation Engineering Agency (see 6.7).

5.3.2 Level A. Level A processed vehicles cannot be driven and shall be towed or lifted when movement is necessary. **WARNING:** Deck loading of Level A processed vehicles requires additional preparation. Contact Engineering Design Activity for supplemental requirements. For

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example, all openings in closed cabs, vans, and other closed type bodies shall be sealed with tape, SAE-AMS-T-22085, Type II. Radiator grilles shall be covered with plywood cover, and doors shall be secured to prevent accidental opening. Tarping of the vehicle is also highly desirable.

5.3.2.1 Export shipment. Export shipment of motor vehicles shall have cube reduced where practical to minimize transportation cost and to facilitate loading the maximum number of vehicles on the carrier. For example, the vertical section of the tailpipe which exceeds the highest, fixed, nonreducible, point of the vehicle, shall be removed, stowed, and secured on the vehicle.

5.3.2.2 Deck loading. Deck loading of vehicles is not authorized without prior approval to insure additional protective measures have been taken and the risk properly assessed.

5.3.2.3 Inverted trailers, chassis and trailer dollies. Select trailers, chassis, flatbeds and cargo types, and trailer dollies can be inverted for shipment provided that the specifics on how it is to be accomplished, has Military Traffic Management Command, reference AR 70-44 (DOD Engineering for Transportability) approval that this is a valid method (see 6.7). Transport configuration for wheeled vehicles requires two sets of data: one for the fully operational configuration (includes fuel, lubricants, water, and so forth), and one for the shipping (reduced or sectionalized) configuration. For the reduced configuration things like covers, racks, bows, and sides shall be removed. Also wheels may be removed and secured. Special requirements may also apply to these types of removals, for example, a trailer with hydraulic master brake cylinders may have the filler plug and vent assembly removed from the inverted trailer and a solid plug installed. Warning tags shall also have to be applied. Detachable lunettes shall be removed to reduce cube on overseas shipments to minimize transportation costs. MIL-STD-1366 covers Transportability Criteria for all modes of transportation. The EPDS shall not specify any transportation criteria that has not been covered as an element of the Transportability Approval process.

5.3.3 Level B. Level B processed vehicles (drive-on, drive-off) are not acceptable for deck loading on ocean transport.

5.4 Quality assurance provisions. Unless otherwise specified in the contract or purchase order, the contractor shall be responsible for establishing a quality system that satisfies program objectives and meets all the standard's requirements and gives full consideration to the specific requirements on the EPDS for the vehicle to be procured (see figure 1 and 6.12).

6. NOTES

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

6.1 Intended use. This military standard practice description is intended to be used in conjunction with the implementing documents for the processing, marking, and inspection of wheeled vehicles. The proper maintenance of equipment during storage is a part of the care of supplies in storage (COSIS) program, AR 740-3. The preferred storage environment for vehicles

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is in controlled humidity warehouses. Under COSIS, the condition of equipment is determined by cyclic inspection procedures and the condition of equipment is maintained IAW appropriate maintenance procedures, including preventative maintenance. Storage serviceability standard, SB740-98-1, tracked vehicles, wheeled vehicles and component parts is the document to use in assuring the true condition of stored USA TACOM materiel is known; recorded; and maintained in a condition to meet supply demands.

6.2 Associated Data Item Descriptions (DIDs). This Standard is cited in DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), as the source document for the DID. When it is necessary to obtain the data, the applicable DID must be listed on the Contract Data Requirements List (DD Form 1423), except where the DoD Federal Acquisition Regulation supplement exempts the requirement for a DD Form 1423.

6.2.1 DI-PACK-81581, 14 March 2000 (EPDS). The DID is current as of the date of this standard. The current issue of the AMSDL must be researched to ensure that only the current and approved DID is cited on the DD Form 1423 (see 4.1).

6.3 Substitute cleaning solvents. The following Environmentally Compliant Solvents (ECS) are replacements for MIL-PRF-680 in Ground Mobility Equipment (see 4.17 and 6.3.1).

- a. Type I and II of MIL-PRF-680:
 - (1) 6850-01-378-0679 - 5 gal (18.9 L), 0666 - 55 gal drum
 - (2) 6850-01-375-5553 - 5 gal, 5555 - 55 gal drum
 - (3) 6850-01-381-4420 - 5 gal, 4404 - 55 gal drum
 - (4) 7930-01-328-2030 - 5 gal, 4058 - 55 gal drum.
- b. Type III of MIL-PRF-680 solvent, the following ECS can be used in addition to the current MIL-PRF-680:
 - (1) 6850-01-277-0595 - 5 gal
 - (2) 6850-01-244-3207 - 55 gal drum.

6.3.1 Procurement sources. The following procurement sources may be utilized as required.

- a. NSN 6850-01-378-0679, Inland Technology Inc., 401 E 27th Street, Tacoma, WA 98421-1203
- b. NSN 6850-01-375-5553, Sentry Chemical Co. Inc., 1481 Rock Mountain Rd., Stone Mountain, GA 30083-1505
- c. NSN 6850-01-381-4420, Inland Technology Inc., 401 E 27th Street, Tacoma, WA 98421-1203
- d. NSN 7930-01-328-2030, P-T Technologies Inc., 108 4th Ave S, Safety Harbor, FL 34695
- e. NSN 6850-01-277-0596, Bio-Tec Inc., 2533 N Carson Street, Suite 2012, Carson City, NV 89706

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- f. NSN 6850-01-244-3207, Bio-Tec Inc., 2533 N Carson Street, Suite 2012, Carson City, NV 89706
- g. NSN 6630-00-105-1418, Eveready Battery Co Inc., Checkerboard Square, Saint Louis, MO 63164 or Leica Inc. Surveying and IV, 111 Deer Lake Rd. Deerfield, IL 60015

6.4 Commercial Off-The-Shelf (COTS) preservatives. CARWELL CP90 has been tested and is approved for use in lieu of MIL-PRF-32033 and MIL-PRF-16173 for select applications under specific detailed guidelines. For example, the product cannot be applied to any parts that are glued together as the product may break down the glue. The product must be applied without interruption to prevent missing parts of the vehicle since it is a clear liquid. The product must be reapplied and the interval of application is dependent on the storage environment. The product cannot be applied to the engine housing or to any exhaust system because of the extreme heat. It also has never been tested on tarps, covers, or other soft-tops, so the effects of the product on these parts is unknown. CARWELL CP90 is available under the following National Stock Numbers: 8030-01-414-7423 (16 ounce bottle), 8947 (5 gallon container), and 7430 (55 gallon drum) (see 4.7.3).

6.5 MIL-C-81309. MIL-C-81309 has an NSN of NSN 8030-00-546-8637 (see 4.23).

6.6 Supplemental publications. MIL-HDBK-129 provides general information on military marking and should be used to provide guidance for the utilization of MIL-STD-129 and requirements for marking of vehicles for shipment and storage (see 4.11.2).

6.7 Military Traffic Management Command. Copies of the document are available from Military Traffic Management Command, Transportation Engineering Agency, Attn: MTTE-DPE, 720 Thimble Shoals Blvd., Suite 130, Newport News, VA 23606-2574 (see 5.3.1 and 5.3.2.3).

6.8 Material Safety Data Sheets (MSDS). Contracting officers will 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 of data are listed in FED-STD-313; and 29 CFR 1910.1200 requires that the Material Safety Data Sheet 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 Material Safety Data Sheet (see 4.5.3).

6.9 Minor rework (corrosion stage definitions). Stage 1: Discoloration staining; no direct visual evidence of pitting, or other surface damage. Stage 2: Loose rust, black or white corrosion accompanied by minor etching, and pitting of surface. No scale or tight rust. Stage 3: Rust, black or white corrosion accompanied singularly or in combination with etching, pitting, or more extensive surface damage. Loose or granular condition (see 4.18.1).

6.10 Biodegradable purging solution. Use NSN 7930-01-7034 or NSN 7930-01-7035 (see 4.26.1).

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6.11 Guidance and packaging for fire extinguishers/ compressed gas cylinders. The ODS Reserve staff at the Defense Supply Center Richmond continues to provide training concerning the safe storage and handling of compressed gas cylinders and Halon system cylinders to personnel in DLA, the Military Services and other Federal agencies. A safety guide for the decommissioning of Halon fire extinguishing systems was initiated by the ODS Reserve and was prepared in coordination with the Environmental Protection Agency, Halon Recycling Corporation, Halon Alternatives Research Corporation, Fire Suppression Systems Association, and Halon system manufacturers. This guide provides personnel involved in the decommissioning of Halon cylinders with identification and safe handling procedures for the commonly used cylinders. It is planned for this document to be periodically updated. Because proper procedures are essential to the safe decommissioning of Halon systems and cylinders, the goals of this document are to address the potential risks associated with decommissioning, to describe the Halon system configurations that might be encountered in the field or reclamation facilities, and to provide safe decommissioning guidelines. General guidelines for safe Halon decommissioning are provided as well as specific procedures for properly handling and operating the major Halon system valve configurations. Recommendations for consideration by governments, Halon system owners, Halon bank operators, Halon recyclers, and Halon service professionals are also provided. The guide is available electronically to the public on the World Wide Web by accessing the Defense Environmental Network and Information Exchange (DENIX) at <http://www.denix.osd.mil> and retrieving the document, "Moving Towards a World Without Halon, Volume 2: Safety Guide for Decommissioning Halon Systems". Or, use the following web address: <http://www.denix.osd.mil/denix/Public/News/DLA/Halon/hal1.html>. ODS turn-in and requisitioning guidance is provided as Appendices B and C to this retrospective. For special concerns involving ODS turn-in and requisition guidance contact the Reserve Policy Office at 804-279-5203/4525 or DSN 695-5203/4525 (see 4.27).

6.12 Preservation examinations/inspections. Due to the unique environment that vehicles are exposed to in the military distribution system, it is desirable that the examinations/inspections be jointly developed by the responsible parties involved to insure the quality system developed meets the needs for those conditions the equipment is expected to encounter (see 5.4).

6.13 Subject term (key word) listing.

- Packaging
- Packing
- Preservation procedure
- Preservation process
- Preservation protection
- Protection, military equipment

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6.14 International standardization agreements. Certain provisions of this standard (see 5.1.1) are the subject of international standardization agreement STANAG 2895. When amendment, revision, or cancellation of this standard 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.

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EQUIPMENT PRESERVATION DATA SHEET PREPARATION FOR SHIPMENT AND STORAGE		1. NATIONAL STOCK NUMBER	2. APPROVAL
3. PART NUMBER	4. CAGE		5. MODEL NO.
6. NOMENCLATURE		7. DATE	8. REVISION
9. <u>NOTES:</u>			

STA Form 4895, SEP 99

Previous editions are obsolete.

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FIGURE 1. Equipment preservation data sheet - (continued).

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**INSTRUCTIONS FOR DEVELOPING & REVISING
STA Form 4895 – EQUIPMENT PRESERVATION DATA SHEET-PREPARATION
FOR SHIPMENT AND STORAGE**

Complete STA Form 4895 as follows to develop or revise an Equipment Preservation Data Sheet (EPDS). The numbers to the left of the text correspond to the block number on the form. All blocks are mandatory to be filled except as otherwise identified in the instructions below.

Block Number	Instructions
1	Enter the National Stock Number (NSN) of the vehicle to which the EPDS applies. If there is no NSN for the vehicle, leave blank, and be sure to fill data into blocks 3, 4 and 5.
2	Enter the name of the approving official.
3	Part Number or Drawing Number that controls the physical configuration of the vehicle.
4	Enter the 5 digit Commercial and Government Entity (CAGE) Code of the activity associated with the data in block 4. The CAGE is assigned IAW Cataloging Handbook H4/H8, Commercial and Government Entity, Name to Code.
5	Enter Vehicle Model Number.
6	Enter the Vehicle Description including Name and Line Item Number (LIN).
7	Enter the date when the EPDS was first issued. For the initial and subsequent revision of the EPDS, enter the date of the revision. Date format will be CCYYMMDD where CC = Century, YY = Year, MMM = Month, and DD = Day, (i.e. September 14, 2001 will be shown as 2001SEP14).
8	Enter the alphabetic character(s) to identify the current revision of the EPDS. For the initial submittal, leave this block blank. After the "Z" revision, show successive revisions as AA, AB, and so forth.
9	Enter the Non-Reduced (a) Length, (b) Width, (c) Height of the vehicle in inches and the vehicle (d) cube in cubic feet.
10	Enter the Reduced for export shipment (a) Length, (b) Width, (c) Height of the vehicle in inches and the reduced vehicle (d) cube in cubic feet.

FIGURE 1. Equipment preservation data sheet - (continued).

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- 11 Weight
- a. Enter the weight of the vehicle without the Basic Issue Items (BII) or any additional authorized equipment in pounds. This is often referred to as the curb weight of the vehicle.
 - b. Enter the packed weight of all the BII and any additional authorized equipment being fielded with the vehicle.
 - c. Enter the total weight of the vehicle as offered for shipment at time of fielding. This is often referred to as the empty shipping weight.
- 12 Enter the total vehicle ship tons. This is also called a freight ton or measurement ton and is determined by dividing the reduced cubic feet of the vehicle by 40 cu.ft..
- 13 Enter the applicable paragraph reference to MIL-STD-3003 that applies to the specific vehicle.
- 14 Enter a note reference number when additional information is required to detail the preservation requirement or take exceptions to the specified paragraph.
- 15 Enter "X" for Required and leave blank for Not Applicable. Levels of protection are defined in paragraph 3.1.1 of MIL-STD-3003.
- 16 List any additional remarks or notes needed to explain how to preserve, package, pack, mark, exercise, and prepare the vehicle for shipment and storage. Also identify any unique preventive maintenance care and services required during the storage cycle. The EPDS must reference and support all Transportability and Deployability requirements to insure Strategic Mobility.

FIGURE 1. Equipment preservation data sheet - (continued).

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**INSTRUCTIONS FOR DEVELOPING & REVISING
STA FORM 4895-1, EQUIPMENT PRESERVATION DATA SHEET PREPARATION
FOR SHIPMENT AND STORAGE (CONTINUATION SHEET)**

Complete STA Form 4895-1 as follows to develop or revise an Equipment Preservation Data Sheet. The numbers to the left of the text correspond to the block number on the form. All blocks are mandatory to be filled except as otherwise identified in the instructions below.

Block Number	Instructions
1	Enter the National Stock Number (NSN) of the vehicle to which the EPDS applies. If there is no NSN for the vehicle, leave blank, and be sure to fill data into blocks 3, 4, and 5.
2	Enter the name of the approving official.
3	Enter the Part Number or Drawing Number that controls the physical configuration of the vehicle.
4	Enter the 5 digit Commercial and Government Entity (CAGE) Code of the activity associated with the data in block 4. The CAGE is assigned IAW Cataloging Handbook H4/H8, Commercial and Government Entity, Name to Code.
5	Enter the Vehicle Model Number.
6	Enter the Vehicle Description including Name and LIN.
7	Enter the date when the EPDS was first issued. For the initial and subsequent revisions of the EPDS, enter the date of the revision. Date format will be CCYYMMMDD where CC=Century, YY=Year, MMM=Month, and DD=Day, (i.e. September 14, 2001 will be shown as 2001SEP14).
8	Enter the alphabetic character(s) to identify the current revision of the EPDS. For the initial submittal, leave this block blank. After the "Z" revision, show successive revisions as AA, AB, and so forth.
9	List any additional remarks or notes needed to explain how to preserve, package, pack, mark, exercise, and prepare the vehicle for shipment and storage. Also identify any unique preventive maintenance care and services required during the storage cycle. The EPDS must reference and support all Transportability and Deployability requirements to insure Strategic Mobility.

FIGURE 1. Equipment preservation data sheet - (continued).

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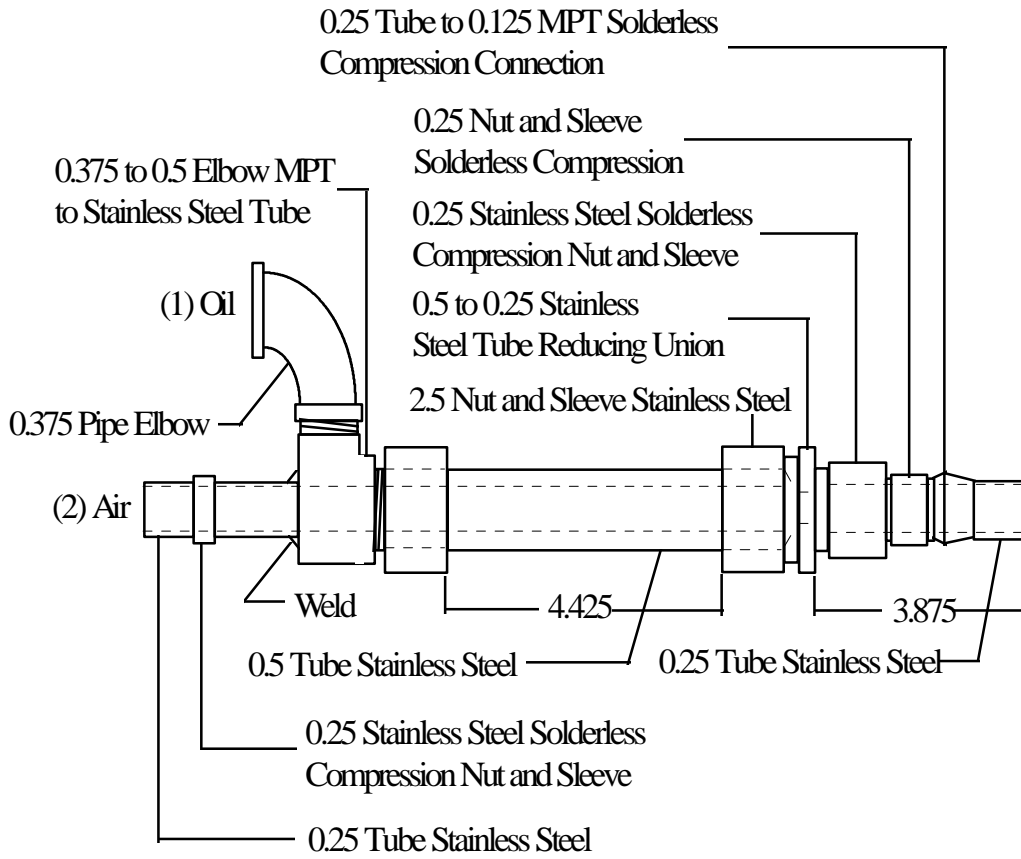
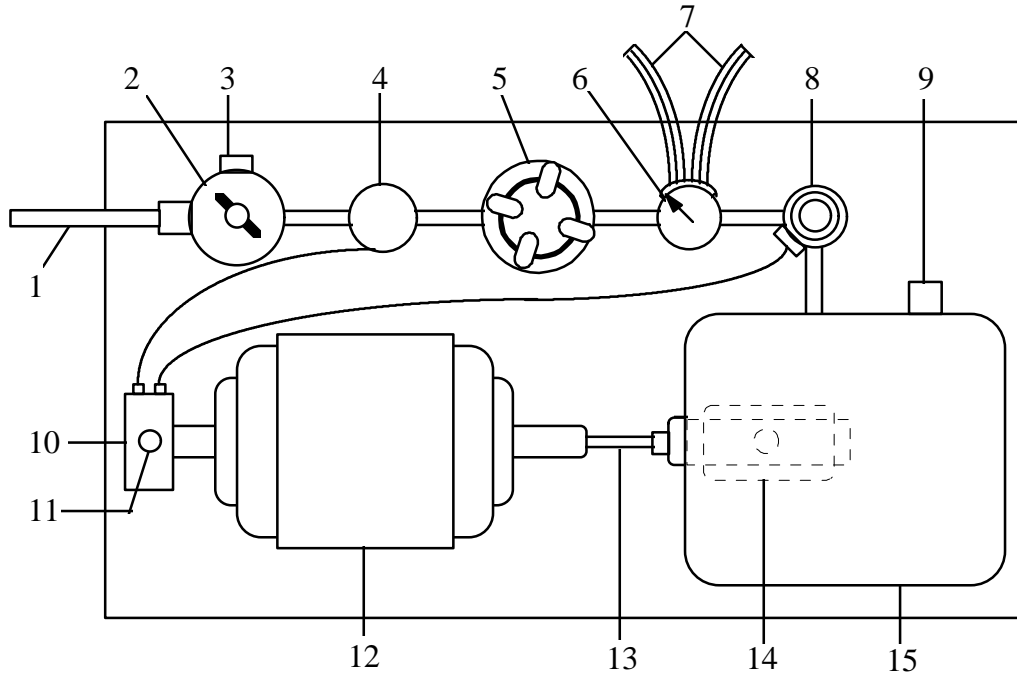


FIGURE 2. Fabrication details for oil spray atomizing nozzle.

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- | | |
|--------------------------------|------------------------------------|
| 1. Air line | 9. Oil tank level gage |
| 2. Air pressure regulator | 10. Electric junction box |
| 3. Air pressure gage | 11. Electric line |
| 4. Solenoid valve | 12. Motor, 1/4 Hp |
| 5. Moisture separator | 13. Shaft |
| 6. Oil pressure gage | 14. Positive displacement oil pump |
| 7. Two double taped lines pump | 15. Oil tank |
| 8. Solenoid valve | |

NOTE: This equipment has proven satisfactory for processing engine through spark plug openings in conjunction with figure 2.

FIGURE 3. Pressure pump.

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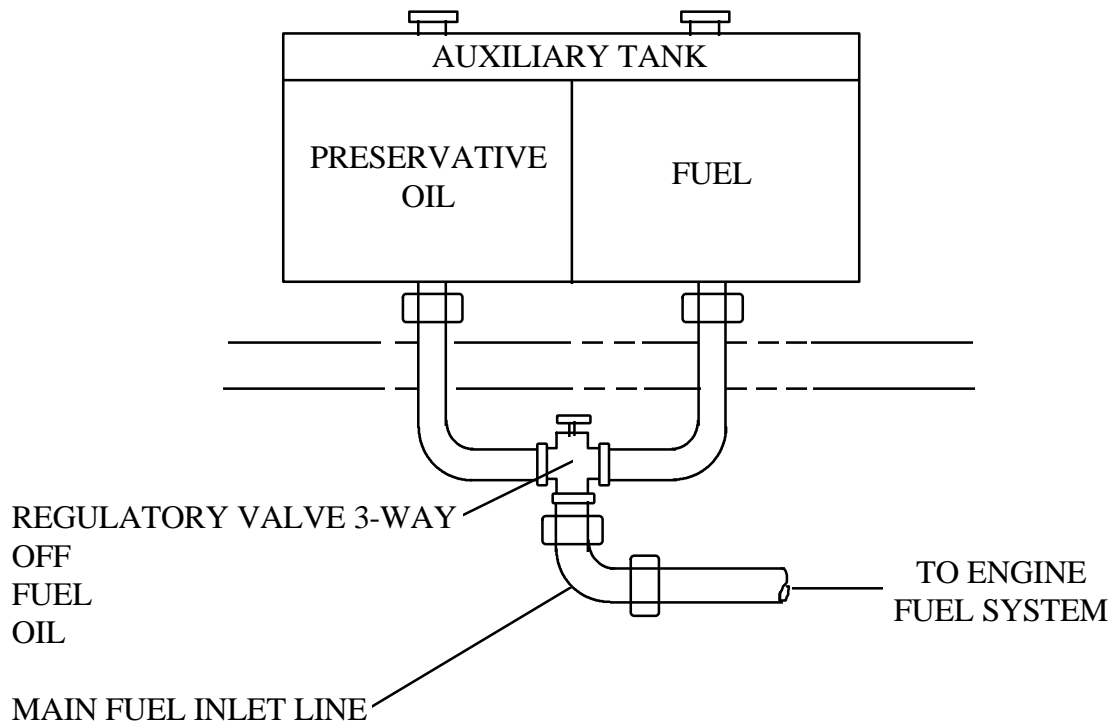


FIGURE 4. Auxiliary fuel container.

Custodian:
Army - AT

Preparing Activity:
Army - AT

(Project PACK-1092)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-STD-3003(AT)

2. DOCUMENT DATE (YYYYMMDD)
20010709

3. DOCUMENT TITLE **Vehicles, Wheeled: Preparation for Shipment and Storage of**

4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (*Last, First, Middle Initial*)

b. ORGANIZATION

c. ADDRESS (*Include Zip Code*)

d. TELEPHONE (*Include Area Code*)
(1) Commercial
(2) DSN
(*If applicable*)

7. DATE SUBMITTED
(YYYYMMDD)

8. PREPARING ACTIVITY

a. NAME

b. TELEPHONE (*Include Area Code*)
(1) Commercial (810) 574-8745
(2) DSN 786-8745

c. ADDRESS (*Include Zip Code*)
Commander
U.S. Army Tank-automotive and Armaments Command
ATTN: AMSTA-TR-E/IE
Warren, MI 48397-5000

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Standardization Program Office (DLSC-LM)
8725 John J. Kingman Road, Suite 2533
Fort Belvoir, Virginia 22060-6221
Telephone (703) 767-6888 DSN 427-6888