

NOT MEASUREMENT SENSITIVE

MIL-PRF-11090K
16 November 2016
SUPERSEDING
MIL-PRF-11090J
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PERFORMANCE SPECIFICATION

CLEANING COMPOUND, DEGREASING AND DEPRESERVING SOLVENT

This specification is approved for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one class of biodegradable degreasing and depreserving cleaning compound, suitable for use in removing oils, greases, asphalt, tars, and rust preventive compounds, other than a wax type, from metallic and painted surfaces.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to DLA Aviation VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616, or e-mailed to STDZNMGT@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at <https://assist.dla.mil/>.

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2.2 Government documents.

2.2.1 Specifications. The following specifications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

- | | |
|---------------|--|
| MIL-DTL-11195 | - Enamel, Lusterless, Fast Dry, VOC Compliant,
(for Use on Ammunition and Other Metals) |
| MIL-DTL-11414 | - Primer Alkyd, Fast Dry, Corrosion Inhibiting, Lead
and Chromate Free |
| MIL-PRF-10924 | - Grease, Automotive and Artillery |

(Copies of these documents are available at <https://assist.dla.mil>.)

2.2.2 Other government documents. The following other government documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

CODE OF FEDERAL REGULATIONS (CFR)

- | | |
|----------------|--|
| 49 CFR 100-185 | - Pipeline and Hazardous Material Safety
Administration, Department of Transportation |
|----------------|--|

(Copies of this document are available online at <http://www.ecfr.gov>)

ENVIRONMENTAL PROTECTION AGENCY (EPA)

- | | |
|---------------------|---|
| SW-846 Method 8021B | - Aromatic and Halogenated Volatiles by Gas
Chromatography Using Photoionization and/or
Electrolytic Conductivity Detectors |
|---------------------|---|

(Copies of this document are available online at <http://www.epa.gov/>)

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2.3 Non-government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

ASTM B209	- Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM D93	- Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester
ASTM D490	- Standard Specification for Road Tar
ASTM D512	- Standard Test Methods for Chloride Ion in Water
ASTM D808	- Standard Test Method for Chlorine in New and Used Petroleum Products (Bomb Method)
ASTM D1783	- Standard Test Methods for Phenolic Compounds in Water
ASTM D3699	- Standard Specification for Kerosine

(Copies of these documents are available online at <http://www.astm.org/>)

SAE INTERNATIONAL

SAE AMS4376	- Plate, Magnesium Alloy 3.0Al - 1.0Zn - 0.20Mn (AZ31B-H26) Cold Rolled and Partially Annealed
SAE AMS4377	- Magnesium Alloy, Sheet and Plate 3.0Al - 1.0Zn - 0.20Mn (AZ31B-H24) Cold Rolled, Partially Annealed

(Copies of these documents are available online at <http://www.sae.org/>)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 Toxic chemicals, hazardous substances, and ozone depleting substances (ODSs). The use of toxic chemicals, hazardous substances, or ODSs shall be avoided whenever feasible.

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

3.3 Materials and chemical composition.

3.3.1 Biodegradability. The synthetic detergents used in the cleaning compound shall be biodegradable when tested as specified in 4.3.7.

3.3.2 Prohibited material. The cleaning compound shall contain no detectable concentrations of the materials listed in table I.

TABLE I. Prohibited materials.

Material	Test paragraph
Phenolic or cresylic acids or their salts ¹	4.3.4
Halogenated hydrocarbons	4.3.5
Benzene or toluene	4.3.6

¹ Compounds in which a hydroxyl group is directly attached to an aromatic nucleus or in which the hydrogen of such a hydroxyl group has been replaced to form a metal derivative.

3.4 Physical properties.

3.4.1 Flash point. The cleaning compound shall have a minimum flash point (Pensky-Martens closed cup tester method) of 60 °C (140 °F) when tested in accordance with 4.3.8.

3.5 Performance properties.

3.5.1 Soil removal properties. When tested in accordance with 4.3.10, the cleaning compound shall remove the soils listed in table II. The soils shall be prepared as a blend prior to testing as described in 4.3.10.2. No test panel shall show any residual soil or stain greater than that obtained with the comparison formula of 4.3.9.2 when tested in accordance with 4.3.10. The acceptability criterion for the cleaning performance of the compound being tested shall be as specified in 4.3.10.5. The bottom 3 millimeters (mm) (0.125 inch) of the panels shall be disregarded when making the comparison.

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TABLE II. Soils.

Soil	Specification
Grease	MIL-PRF-10924
Tar (grade RT-11)	ASTM D490

3.5.2 Corrosion. No test panel treated with the cleaning compound shall show any corrosion or discoloration greater than that obtained with the comparison formula of 4.3.9.2 when tested in accordance with paragraph 4.3.11.

3.5.3 Attack on paint. The cleaning compound shall show no evidence of loosening paint when tested in accordance with 4.3.12.

3.5.4 Phase separation and stability. The cleaning compound shall not require agitation prior to use and shall show no separation, precipitation into separate phases, or gelation after six months storage greater than that obtained from the comparison formula similarly stored. In addition, the cleaning compound shall be equal or better in performance properties to the comparison formula of 4.3.9.2 when tested by the methods designated herein, at the end of the storage period, as specified in 4.3.13.

3.6 Instruction labels. A suitable label with the following instructions printed thereon shall be attached to each container:

Instructions for use: The cleaning compound may be used by soak, brush, or spray application. Do not dilute. Allow the cleaning compound to remain on work for 3 to 5 minutes before rinsing. Two recommended procedures for spray application are as follows:

Method 1: Apply the compound by spray gun at a pressure of 27.5 kPa (4 psi). Hold the spray nozzle or the gun about 15 cm (6 inches) away from the work. Use a heavy stream of liquid rather than dispersion. Examine the soil 3 to 5 minutes after application. If the soil has not softened, spray a second application of the compound. Allow 3 to 5 minutes, then rinse by means of a "Steam Jenny" or equivalent device at a pressure of 275 to 350 kPa (40 to 50 psi), or if not available, then with hot water, preferably at a pressure of 175 to 350 kPa (25 to 50 psi). If water must be avoided, rinse with Stoddard solvent.

Method 2: Apply compound by spray gun at a pressure of 140 kPa (20 psi). Hold the spray nozzle or the gun about 15 cm (6 inches) away from the work. Do not rinse. In this method, the compound may be repeatedly recycled and reused.

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WARNING - COMBUSTIBLE

Keep away from heat or flame.
Use with adequate ventilation.
Avoid breathing of vapor.
May be irritating to skin, eyes, and respiratory tract.
Protect hands by wearing gloves when using this material.
If skin or eye contact occurs, flush with large amounts of water.
Do not take internally.

CAUTION: DO NOT USE ON ACRYLIC PLASTICS. Care should be exercised when using this solvent on other plastics, rubber, etc., including pretesting on the specific material to insure no deleterious effects.

3.6.1 Container label. Information on the container label shall include the flash point as determined by the Pensky-Martens closed cup tester method using ASTM D93. Labeling for this product must be in compliance with 49 CFR 100 - 185.

3.7 Toxicity. The cleaning compound shall have no adverse effect on the health of the personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency.

3.8 Workmanship. The ingredients shall be carefully formulated to produce a cleaning compound that is stable. The product shall be homogeneous and be free from abrasive materials.

4. VERIFICATION

4.1 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be performed on each lot. A lot shall consist of the cleaning compound produced by one manufacturer in no more than 24 hours, at one plant, from the same materials, and under essentially the same manufacturing conditions, provided the operation is continuous. In the event the process is a batch process, each batch shall constitute a lot.

4.2 Conformance inspection. The conformance inspection shall be performed on representative samples. Sampling shall be conducted in accordance with table III. This inspection shall include the requirements of 3.3 through 3.8 and the tests of 4.3. Failure of any verification or test by any sample shall be cause for rejection of the lot represented.

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TABLE III. Sampling for cleaning compound.

Number of containers in a batch or lot	Number of sample containers
2 to 25	2
26 to 150	3
151 to 1,200	5
1,201 to 7,000	8
7,001 to 20,000	10
20,001 to 35,000	15
over 35,000	20

4.3 Test methods and procedures.

4.3.1 Test specimen preparation. A representative specimen of approximately 2 liters (L) (2 quarts) shall be removed from each sample container and placed in a suitable, clean, dry container labeled to identify the lot or batch and the container from which it was taken.

4.3.2 Validation for high-flash point naphtha characteristics or change of supplier. When a contractor wishes to change the cleaning compound formulation by substituting a high-flash point naphtha not already used in an approved formulation, or one from a new supplier, a half-liter (one pint) sample of the new high-flash point naphtha, together with a request for a waiver for its use, must be forwarded to DLA Aviation - FAJA, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616.

4.3.3 Reagents. All chemical materials employed as reagents in chemical composition testing shall be of reagent grade in accordance with the appropriate material specification.

4.3.4 Phenolic or cresylic acids or their salts.

4.3.4.1 Sample preparation. Measure 50 milliliters (mL) of the cleaning compound into a clean 250-mL separatory funnel. Add 100 mL of 0.05 mol/L calcium hydroxide solution. Shake vigorously for 2 minutes, venting frequently. Allow layers to separate, and then transfer the aqueous layer to a 500-mL volumetric flask. Repeat the extraction two more times, combining the aqueous layers. Dilute the combined extracts to volume with distilled water.

4.3.4.2 Analysis. Analyze the sample according to method B of ASTM D1783. The preliminary distillation step described in the method is required. The pH of the sample shall be checked prior to distillation and again prior to analysis and adjusted as necessary to meet the limits required by the method. Using the above extraction technique, the detection limit of the test method is 0.5 milligram/liter (mg/L).

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4.3.5 Halogenated hydrocarbons and other chlorine or halogen compounds. Either method described in 4.3.5.1 or 4.3.5.2 may be used for determining halogen content. The second method, bomb combustion/mercurimetric nitrate titration, is simpler and will normally be the method of choice. While both methods are intended for determination of chlorine, the other halogens are positive interferences. Therefore, results should be reported as "total halogens as chlorine" rather than "total chlorine".

4.3.5.1 Bomb combustion/gravimetric method. Prepare and analyze the sample as directed in ASTM D808. The detection limit for this test method is 0.1 percent chlorine.

4.3.5.2 Bomb combustion/mercurimetric nitrate titration method. Combust the sample as directed in ASTM D808. Rinse the bomb interior, sample cup, cup supports, and terminal bases using distilled water and a rubber policeman. Collect the washings in a 600-mL glass Griffin beaker. Continue until the total volume of the bomb washings is about 350 mL. Do not test washings with methyl red. Analyze the washing in accordance with method A of ASTM D512 (mercurimetric nitrate titration).

4.3.6 Benzene and toluene.

4.3.6.1 Required material. In this method, which covers the determination of benzene and toluene in the commodity, the following apparatus and materials are required:

- a. Standard laboratory glassware.
- b. Gas chromatograph as specified in EPA SW-846 method 8021B for the analysis of aromatic compounds.
- c. Stock standard solutions: prepared solutions of benzene and toluene in hexane at a minimum of three concentrations. The lowest concentration should be equivalent to the detection limit of interest for the method (approximately 50 micrograms per gram).

4.3.6.2 Test procedure.

4.3.6.2.1 Sample preparation. Add 1 gram of each sample to a glass container containing 50 mL of hexane.

4.3.6.2.2 Calibration standard preparation. Add 1 mL of each stock standard solution to a glass container containing 50 mL of hexane.

4.3.6.2.3 Reagent blank preparation. Add 1 mL of hexane to a glass container containing 50 mL of hexane. This is the reagent blank.

4.3.6.2.4 Injection sample preparation. Shake each container briefly to completely disperse the cleaning compound in the hexane. Allow any solids to settle. Remove 1 to 2 mL to an injection vial.

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4.3.6.2.5 Chromatograph calibration. Inject 2 microliters (μL) of each calibration standard into the gas chromatograph. Prepare a standard curve of the area or height versus concentration for both benzene and toluene. The correlation coefficient of the standard curve should be greater than 0.995.

4.3.6.2.6 Residual benzene and toluene. Inject 2 μL of the reagent blank into the gas chromatograph. Use the standard curve to calculate the benzene and toluene concentration in the reagent blank.

4.3.6.2.7 Concentration of benzene and toluene. Inject 2 μL of each sample extract into the gas chromatograph. Use the standard curve to calculate the benzene and toluene concentration in the sample.

4.3.6.2.8 Calibration verification. Re-inject one of the calibration standards every 10 injections to verify that the analytical system has remained in calibration. If the response of the standard has changed by more than 15 percent, the system must be recalibrated.

4.3.7 Biodegradability of the synthetic detergents. The supplier shall submit a certificate of compliance with the requirements for biodegradability. Testing for biodegradability shall be performed in accordance with a method currently being used by the detergent industry. The certificate shall be accompanied by the actual test data (field and laboratory), including the test procedure utilized in making the biodegradability determination (see 6.2).

4.3.8 Flash point. Determine the flash point by the Pensky-Martens closed cup tester method in accordance with ASTM D93.

4.3.9 Soil removal properties. The comparison formula (4.3.9.2) and the cleaning compound being evaluated shall each be tested for removal of a blend of grease tar soils. All cleaning compounds shall be tested as described in 4.3.10.4.

4.3.9.1 Soils used. The grease and tar soils described in this section shall be prepared as a blend prior to testing as described in 4.3.10.2.

4.3.9.1.1 Grease. The grease shall conform to MIL-PRF-10924.

4.3.9.1.2 Tar. The tar shall conform to grade RT-11 of ASTM D490.

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4.3.9.2 Comparison formula. The comparison formula shall consist of 70 percent by volume of solvent and 30 percent by volume kerosine.

4.3.9.2.1 Solvent. The solvent used in preparation of the comparison formula shall be an aromatic petroleum fraction containing less than one part per million (ppm) by weight of benzene and toluene and have a flash point (Pensky-Martens closed cup tester method) of 60 °C (140 °F) minimum when tested in accordance with ASTM D93.

4.3.9.2.2 Kerosine. The kerosine used in preparation of the comparison formula shall be a refined petroleum distillate consisting of a homogeneous mixture of hydrocarbons essentially free of water, inorganic acidic or basic compounds, and excessive amounts of particulate contaminants, in accordance with grade 1-K of ASTM D3699.

4.3.10 Soil test.

4.3.10.1 Preparation of test panels. All soil tests shall be made on panels as prepared in this section. Panels shall be made of U.S. standard 19-gage 1010 cold-rolled steel (CRS) and shall measure 1.25 centimeter (cm) × 5 cm (0.5 inch × 2 inches). A 3-mm (0.125-inch) diameter hole shall be placed near one end. The face of the panel shall be polished in a rotating manner against coarse emery cloth until clean. It shall then be immersed in heptane, removed, dried with paper toweling, and placed in a desiccator over activated silica gel. Care shall be taken not to touch the panels with anything except forceps during the operation. Panels shall be kept in desiccated condition for not less than 16 hours nor more than 48 hours prior to soil application.

4.3.10.2 Preparation of soil blend. A mixture of grease conforming to MIL-PRF-10924 and tar conforming to grade RT-11 of ASTM D490 is prepared by mixing three parts by weight of tar with one part by weight of grease in a beaker, with heat provided by immersing the bottom of the beaker in hot water (about 60 °C (140 °F)).

4.3.10.3 Application of soil blend to steel test panels. Apply 20 mg of soil blend to one side of each steel test panel after it has been prepared in accordance with 4.3.10.1. About 2.5 to 3.8 cm (1 inch to 1.5 inches) of the surface of the steel test panel shall be covered with the soil blend. Place the covered steel test panels in a horizontal position in an oven at 150 ±2 °C (302 ±4 °F) with all air vents open for 1 hour. Covered steel test panels shall not be allowed to touch each other. At the end of 1 hour, remove the panels from the oven and allow to cool to room temperature.

4.3.10.4 Test procedure.

4.3.10.4.1 Cleaning compound test. Four test panels shall be used for each cleaning compound tested. Four test tubes, each large enough to hold a steel test panel and containing about 15 mL of the cleaning compound, shall be set up in a test tube rack for each compound tested. Immerse the test panels in the cleaning compound at room temperature for 10 minutes.

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4.3.10.4.2 Cleaning without water bath. Immediately upon removal from the cleaning compound, wipe two of the four steel test panels with a fresh paper towel and lay out for later inspection. Mark with an identification of the cleaning compound and a notation that the test strips were not dipped in boiling water. Note discoloration of the cleaning compound in the test tubes. Perform all wiping with one stroke of paper toweling, using moderate, uniform pressure from one steel test panel to the next within a series of tests.

4.3.10.4.3 Cleaning with water bath. Immediately upon removal from the cleaning compound, immerse the other two of the four steel test panels in a beaker containing boiling water for 1 minute. Remove and wipe each while still hot with a fresh paper towel and lay out for later inspection. Mark the panels with an identification of the cleaning compound and a note that the test strips were dipped in boiling water. Note discoloration of the cleaning compound in the test tubes and any scum floating on the boiling water in the beakers. Perform all wiping with one stroke of paper toweling using moderate, uniform pressure from one steel test panel to the next within a series of tests.

4.3.10.5 Evaluation. In any series of tests, cleaning compounds shall be compared with the comparison formula. Accordingly, the sequence of steps in 4.3.10.4 shall be carried out with each cleaning compound being tested, as well as the comparison formula. Any cleaning compound that cleans as well or better than the comparison formula in both the immersion and non-immersion test is acceptable. Any cleaning compound that does not clean as well as the comparison formula in either the immersion or the non-immersion tests is unacceptable. The bottom 3 mm (0.125 inch) of each steel test panel shall be disregarded in making the comparison.

4.3.11 Corrosion. Aluminum test panels conforming to ASTM B209 and steel test panels of 1010 CRS shall be 7.5 cm × 0.6 cm (3 inches × 0.25 inch) in size. Test panels of magnesium shall be cut 7.5 cm × 1.2 cm (3 inches × 0.5 inch) in size from approximately 0.9-mm (0.034 inch) thick sheet magnesium conforming to SAE AMS4376 or SAE AMS4377. Drill a hole approximately 3 mm (0.125 inch) from each end of each panel so that the panels can be tied together. Polish the panels with No. 50 aluminum oxide cloth followed by No. 320 carborundum paper. Wash the panels with 95 percent ethyl alcohol and dry with paper toweling. Tie the three panels together at the top and bottom with cotton string, the magnesium being sandwiched between the aluminum and steel panels, place in a test tube, and cover with cleaning compound. Use four sets for the comparison formula (see 4.3.9.2) and four sets for the cleaning compound under test. After 24 hours, remove the panels from the cleaning compound and the comparison formula, separate, wash with water, then alcohol, and dry. Examine each panel for pitting, other types of corrosion, and discoloration.

4.3.12 Attack on paint.

4.3.12.1 Preparation of panels. Panels shall be made of U.S. standard 20-gage 1010 CRS, 7.5 cm × 10 cm (3 inches × 4 inches). They shall be degreased in a trichloroethylene degreaser and wiped with a lint-free cloth to remove any soil. Repeat the degreasing. One coat of primer conforming to MIL-DTL-11414 shall be applied by spraying to give a coat thickness of 0.018 mm to 0.020 mm (0.7 mil to 0.8 mil). After the panel has been air dried for 1 hour, one topcoat of enamel conforming to MIL-DTL-11195, type II, shall be applied by spray to give a coat thickness of 0.018 mm to 0.020 mm (0.7 mil to 0.8 mil). After the panel has again been air dried for 1 hour,

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it shall be kept at 49 °C (120 °F) for 24 more hours, then at room temperature for not less than 24 hours nor more than 30 days.

4.3.12.2 Evaluation. Four panels, prepared as above, shall be used for each cleaning compound evaluated. Each panel shall be placed horizontally (resting at a slight angle) in a 2-liter beaker and covered with cleaning compound. After 30 minutes, the panels shall be removed and rinsed with water at 26 to 30 °C (80 to 85 °F). The panels shall then be air dried for 1 hour. Then the panels shall be rubbed with paper toweling to determine whether or not paint has been loosened. If any of the four panels show evidence of loosening, the cleaning compound shall be considered to loosen paint.

4.3.13 Phase separation and stability. The cleaning compound, when received, shall be thoroughly mixed, and a representative sample poured into a liter glass-stoppered bottle until full. It shall be kept together with a liter of the comparison formula of 4.3.9.2 (in a like container) in a place relatively free from vibration at 37.8 °C (100 °F) for six months, and shall be compared at the end of that time to the comparison formula for evidence of precipitation, separation into separate phases, or gelation, and for performance in all tests of 4.3.10.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the inventory control point's packaging activity within the military department or defense agency, or within the military department's system command. Packaging data retrieval is available from the managing military department's or defense agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. The degreasing and depreserving solvent cleaning compound is military unique. It is used in combat areas and must function in adverse terrain conditions found on the battlefield. Typical applications include the M-109 and M-110 Howitzers, the MK-19 machine gun, the Nimitz class carrier, and other ships and armament. No commercial alternative exists.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Inspection conditions, if different (see 4.1).
- c. Requirement for certificate of compliance with the requirements for biodegradability accompanied by the actual test data (field and laboratory), including the test procedure utilized in making the biodegradability determination (see 4.3.7).
- d. Packaging requirements (see 5.1).

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6.3 Safety data sheets (SDS). Contracting officers will identify those activities requiring copies of completed SDS 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 SDS for each hazardous chemical used in an operation must be readily available to personnel using the material.

6.4 Safety procedures. All personnel performing laboratory tests should follow standard safety procedures including the use of recommended personal protective equipment, appropriate ventilation, and should receive training as specified by Occupational Safety and Health Administration in 29 CFR 1910.1450.

6.5 Subject term (key word) listing.

Ammunition
 Artillery
 Asphalt
 Automotive
 Biodegradable
 Grease
 Metal
 Oil
 Rust
 Tar

6.6 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the previous issue.

Custodians:
 Army - MR
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Preparing Activity:
 DLA - GS3

(Project 6850-2017-001)

Review Activity:
 Army - EA

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