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SUPERSEDING
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MILITARY SPECIFICATION

DETERGENT, EXTERNAL REMOVABLE FUEL TANKS

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

1. SCOPE

1.1 Scope. This specification covers a water soluble, oil dispersing nonionic detergent used for cleaning aircraft removable fuel tanks.

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

QQ-A-200/16	-Aluminum Alloy Structural Shapes, Extruded 6061
PPP-P-704	-Pails, Metal (Shipping, Steel 1 Through 12 Gallon)

MILITARY

MIL-T-5624	-Turbine Fuel, Aviation, Grades JP-4 and JP-5

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Specifications and Standards Department (Code 9321), Naval Air Engineering Center, Lakehurst, New Jersey 08733 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

MILITARY (Continued)

MIL-D-16791	-Detergent, General Purpose (Liquid, Nonionic)

STANDARDS

FEDERAL

FED-STD-313	-Material Safety Data Sheets, Preparation and Submission of
FED-STD-791	-Lubricants, Liquid Fuels, and Related Products; Methods of Testing

MILITARY

MIL-STD-105	-Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-290	-Packaging, Packing, and Marking of Petroleum and Related Products

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions, should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Qualification. The detergents furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.4).

3.2 Material.

3.2.1 Biodegradability. The detergent shall be a biodegradable liquid nonionic surface active agent. (See 4.7.1.)

3.2.2 Active ingredient concentration. The detergent shall contain a minimum of 99 percent active ingredient. (See 4.7.2.)

3.2.3 Structure of active ingredient. The detergent active ingredient shall be a fatty alkylolamide with a short to intermediate alcohol chain. (See 4.7.3.)

3.3 Effectiveness. When the detergent is tested as specified in 4.7.4 it shall remove all traces of fuel when the tank is cleaned.

3.4 Corrosion. When the detergent is tested as specified in 4.7.5 it shall cause no visible corrosion to the aluminum alloy, and any weight change shall not be greater than ±0.2 milligrams per square inch of panel surface.

3.5 Effects on seal and gasket material. When the detergent is tested as specified in 4.7.6 it shall not produce a change in volume of seal and gasket material that is greater than +5 percent.

3.6 Storage stability. After storage for one year, the detergent shall meet the requirements of 3.3, 3.4 and 3.5. (See 4.7.7.)

3.7 Toxicity. The detergent shall have no adverse effect on the health of personnel when used for its intended purpose. The fluid shall contain no components which produce noxious vapors in such concentrations as to be an annoyance to personnel during formulation or use under conditions of adequate ventilation while exercising caution to avoid prolonged contact with the skin and while observing Occupational Safety and Health Administration (OSHA) guidelines. Questions pertaining to the toxic effects shall be referred by the procuring activity to the appropriate departmental-medical service who will act as an advisor to the procuring activity (see 4.4).

3.8 Workmanship. The detergent shall be a clear homogeneous liquid at 25°C (77°F). (See 4.7.8.)

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

1. Qualification inspection. (4.4)

2. Quality conformance inspection. (4.6)

4.3 Sampling.

4.3.1 Qualification inspection sample. The qualification inspection sample shall consist of at least two 1 gallon containers of detergent. The manufacturer shall supply the qualifying laboratory with certified statements of prior tests showing that the sample being submitted conforms with all the requirements of this specification, except for storage stabil-

ity test (3.6). Qualification samples shall be accompanied by a certified statement giving the complete formula for the detergent submitted and the chemical composition and source of materials used therein. All information furnished will be held as commercial confidential. Approval granted on a detergent shall not apply if any of the components have been changed in type, grade, quantity, or source of supplier. The samples and reports shall be forwarded to the Aircraft and Crew Systems Technology Directorate, Naval Air Development Center, (Code 60622), Warminster, Pennsylvania, 18974 (qualifying laboratory). The samples shall be plainly identified by securely attached dur-able tags or labels marked with the following information:

Sample for qualification inspection
Detergent, External Removable Fuel Tanks
MIL-D-81956A
Name of manufacturer
Product code number
Date of manufacture
Submitted by (name) (date) for qualification inspection in accordance with the requirements of MIL-D-81956A under authorization of (reference) authorizing letter (see 6.4)

4.3.1.1 Formulation sheet. An example of a satisfactory form for the formulation sheet, indicating the percentage and nature of each ingredient, is as follows:

Component A	percent
Component B	percent
Component C	percent

4.3.2 Quality conformance inspection samples. The quality conformance inspection samples shall consist of a sample for tests (4.3.2.3) and samples for examination of filled containers (4.3.2.4). Samples shall be labeled completely with information identifying the purposes of the sample, name of product, specification number, lot and batch number, date of sampling, and contract number.

4.3.2.1 Bulk lot. A bulk lot (batch) is an indefinite quantity of a homogeneous mixture of material offered for acceptance in a single isolated container; or manufactured in a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

4.3.2.2 Packaged lot. A packaged lot is an indefinite number of unit containers of identical size and type, offered for acceptance, and filled with homogeneous mixture of material from one isolated container; or filled with a homogeneous mixture of material manufactured in a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

4.3.2.3 Sample for tests. A 1 gallon sample for tests shall be taken at random from each lot of detergent to be offered for delivery under a contract or order. The sample shall be subjected to all the applicable quality conformance inspections. If the sample for tests fail any of the quality conformance inspections, the inspection lot shall be rejected.

4.3.2.4 Samples for examination of filled containers. Random samples of filled unit containers and a sample of shipping containers fully prepar-ed for delivery shall be selected from each lot of lubricant in accordance with MIL-STD-105 at inspection level I and acceptable quality level (AQL) = 2.5 percent defective.

4.4 Qualification inspection. Qualification inspection shall consist of a review for approval of the submitted manufacturer's report and subjecting the qualification samples (4.3.1) to examination and testing in accordance with Table I. Material and Safety Data Sheets (3.7) shall be prepared and submitted to the Qualifying Laboratory (4.3.1) in accordance with FED-STD-313.

TABLE I. Qualification inspection.

Inspection	Requirement paragraph	Test method paragraph
Biodegradability	3.2.1	4.7.1
Active Ingredient Concentration	3.2.2	4.7.2
Structure of Active Ingredient	3.2.3	4.7.3
Effectiveness	3.3	4.7.4
Corrosion	3.4	4.7.5
Effects of Seal and Gasket Materials	3.5	4.7.6
Storage Stability	3.6	4.7.7
Toxicity	3.7	4.4
Workmanship	3.8	4.7.8

4.5 Retention of qualification. In order to retain qualification of a product approved for listing on the Qualified Products List (QPL), the manufacturer shall verify by certification to the qualifying activity that the manufacturer's product complies with the requirements of this specification. The time of periodic verification by certification shall be in two-year intervals from the date of original qualification. The Government reserves the right to re-examine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specifica-tion requirements.

4.6 Quality conformance inspection. Quality conformance inspection shall consist of testing the sample for test (4.3.2.3) for all the requirements specified in Section 3 except biodegradability (3.2.1) and storage stability (3.6), and examination of the samples of filled containers (4.3.2.4) for conformance with 5.1.

4.7 Inspection methods. Inspection shall be in accordance with Method 9601 of FED-STD-791.

4.7.1 Biodegradability. The supplier shall submit a certificate of compliance to the requirements for biodegradability. The certificate shall be accompanied by actual test data (field or laboratory) including the test procedure utilized in making the biodegradability determination.

4.7.2 Active ingredient concentration. Certification of the concentration of the active ingredient, including the percentage by weight and the method of determination, shall be made available by the supplier.

4.7.3 Structure of active ingredient. The structure of the detergent shall be confirmed by utilizing a suitable infra-red spectrophotometer.

4.7.4 Effectiveness.

4.7.4.1 Safety check equipment. For checking the flammable vapors inside the tank, a "Supersensitive Combustible Gas Indicator" Model SS-P, No. 503-001, Johnson Williams Meter, manufactured by Bacharach Instrument Co. Division of Ambac Industries or equivalent shall be used.

4.7.4.2 Simulated fuel tank. A five gallon storage drum conforming to PPP-P-704 shall be used. A 1-1/2 to 2 inch drain hole shall be placed in the bottom of the tank and a rubber stopper inserted into the opening.

4.7.4.3 Calibration of the gas indicator. The gas indicator shall be calibrated in a combustible-vapor free atmosphere. The reading shall be set at zero parts per million of combustible vapors. The interior of the simulated fuel tank shall be tested for combustible vapors. If the reading is other than zero, the can shall be washed with a 1 percent solution of detergent conforming to MIL-D-16791, Type I, thoroughly rinsed with fresh water, and dried with oil-free air until the reading is zero.

4.7.4.4 Soiling. One pint of JP-5 fuel conforming to MIL-T-5624 shall be placed in the drum. The cap shall be closed and the drum rotated so that the fuel contacts all surfaces and crevices. The cap shall be opened and the drain plug removed. All liquid fuel shall be drained from the drum. The interior of the drum shall be tested for combustible vapors. There must be a positive indication of the presence of combustible vapors, or else the drum must be resoiled or moved to a warmer area.

4.7.4.5 Cleaning. The drain plug shall be inserted. Five hundred and twenty five ml. of cleaning solution (25 ml. of cleaner and 500 ml. of water) shall be poured into the drum and the cap shall be closed. The can shall be shaken and rotated so that all surfaces are coated with solution. The solution shall be allowed to remain in contact for a minimum of two minutes, then the drum shall be opened by removing the drain plug. After all cleaner has drained thoroughly the interior of the drum shall be rinsed with clear warm water. The tank shall be allowed to drain thoroughly and a check shall be made for the presence of combustible vapors. If the meter reads above zero, it constitutes a failure in this test.

4.7.5 Corrosion. Three specimens shall be used for this test. The panels shall conform to QQ-A-200/16, shall be 0.050 inch nominal thickness, and measure one by six inches. The panels shall be cleaned by dipping in hot methyl alcohol, cool distilled water, acetone, and dried for one hour at 100° ±3°C (212° ±5°F). The specimens shall then be weighed to the nearest milligram. The three specimens shall be separately immersed in 1:5, 1:10, and 1:20 detergent in water mixtures for four hours at 25° ±1°C (77° ±2°F). The panels shall be removed, rinsed with deionized or distilled water, then with methyl alcohol, dried for 1 hour at 100° ±3°C (212° ±5°F) cooled and reweighed.

4.7.6 Effects on seal and gasket material. This test shall be conducted in accordance with Method 3603 of FED-STD-791 except immersion shall be 4 hours at 24° ±3°C (75° ±5°F). The test specimen shall be standard "L" type rubber (see 6.3).

4.7.7 Storage stability. One filled unit container shall be stored for one year then tested for effectiveness (3.3), corrosion (3.4) and effect on seal and gasket materials (3.5) in accordance with 4.7.4, 4.7.5 and 4.7.6 respectively.

4.7.8 Workmanship. A 100 ml sample of the detergent shall be visually examined for conformance with 3.8.

5. PACKAGING

5.1 Packaging, packing and marking. Packaging, packing and marking shall be in accordance with MIL-STD-290, Level A, B, C or commercial as specified (see 6.2).

6. NOTES

6.1 Intended use. The detergent covered by this specification is intended to be used to remove traces of flammable solvents from aircraft external removable fuel tanks.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number and date of this specification

b. Type and size of container (see 5.1)

c. Quantity (See 5.1.)

d. Applicable levels of packaging and packing (see 5.1)

e. Certification of concentration of active ingredient (4.7.2)

f. Toxicological data requirements (see 3.7 & 4.4)

6.3 Standard "L" type rubber samples. Information on a source for standard "L" type rubber samples may be obtained from the Aircraft and Crew Systems Technology Directorate, Naval Air Development Center, (Code 60622), Warminster, Pennsylvania 18974.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the qualified products list is the Naval Air Systems Command, Department of the Navy; however, information pertaining to qualification of products may be obtained from the Aircraft and Crew Systems Technology Directorate, Naval Air Development Center, (Code 60622) Warminster, Pennsylvania 18974 (qualifying laboratory).

6.5 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:
Army - AV
Navy - AS

Preparing Activity:
Navy - AS
(Project No. 7930-0360)

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DOCUMENT IDENTIFIER *(Number)* AND TITLE

MIL-D-81956A DETERGENT, EXTERNAL REMOVABLE FUEL TANKS

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

☐ VENDOR ☐ USER ☐ MANUFACTURER

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