MIL-C-5543A
9 MAY 1962
SUPERSEDING
MIL-C-5543
9 JANUARY 1950

MILITARY SPECIFICATION

CLEANING COMPOUND, WASHING MACHINE, AIRCRAFT METAL PARTS

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 This specification covers one type of cleaning compound for use in industrial spray washing machines.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL

QQ-A-355 — Aluminum Alloy, Plate and Sheet 2024

QQ-A-362 — Aluminum Alloy, Plate and Sheet, Alclad 2024

PPP-D-723 — Drums, Fiber

STANDARDS

FEDERAL

FED. TEST METHOD STD. NO. 536 — Soap and Soap-Products (Including Synthetic Detergents); Sampling and Testing

MILITARY

MIL-STD-129 — Marking for Shipment and Storage

(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)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply:

FSC 7930

CONSOLIDATED CLASSIFICATION COMMITTEE

Uniform Freight Classification Rules

(Application for copies of the above publication should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 6, Ill.)

3. REQUIREMENTS

3.1 Qualification. The compound furnished under this specification shall be a product which has been tested and has passed the qualification tests specified herein, and has been listed on or approved for listing on the applicable Qualified Products List.

3.2 Material. Material shall be as specified herein. When materials are used which are not specifically designated, they shall be entirely suitable for the purpose intended.

3.3 Detail requirements.

3.3.1 The basic constituents shall be thoroughly mixed and processed to produce a uniformly powdered or granulated compound readily soluble in water.

3.3.2 The compound shall be free from fillers, fatty acid rosin soap, and objectionable odors.

3.3.3 *Corrosion.* When tested in accordance with 4.6.2, the compound shall not cause a gas evolution in excess of 1 milliliter per hour from aluminum alloys nor shall there be any etching, pitting, or darkening.

3.3.4 *Hydrogen ion content.* The pH of a 1-percent solution of the cleaning compound shall be not less than 11 and not more than 12 when tested at 25° C (see 4.6.3).

3.3.5 *Total alkalinity.* The total alkalinity shall be not less than 22.0 percent when calculated to percent Na_2O (see 4.6.4).

3.3.6 *Solubility.* A 5-percent solution of the material dissolved in distilled water shall be completely free from undissolved or suspended particles (see 4.6.5).

3.3.7 *Stability.* There shall be no evidence of precipitation in a hard water solution made up and tested in accordance with 4.6.5.1.

3.3.8 *Interfacial tension.* The interfacial tension between a 1-percent solution of the material in distilled water and a heavy white mineral oil, U.S.P. XII shall not exceed 11 dynes, going from the interface into the oil, at a temperature of 25° C (see 4.6.6).

3.3.9 *Caking.* A sample of the cleaning compound subjected for 72 hours to an atmosphere of 50 ±5 percent relative humidity and at a temperature of 25° ±4° C shall show no caking (see 4.6.7).

3.3.10 *Lather persistency.* After a solution of the cleaning compound in distilled water has been shaken vigorously and allowed to stand for 1 minute, a trace of lather which is not continuous is permissible (see 4.6.8).

3.3.11 *Cleaning.* The compound shall, when mixed in conformance with the directions supplied by the manufacturer and placed in a standard industrial washing machine, show satisfactory cleaning ability on surfaces of aircraft parts (see 4.6.9).

3.4 Use of MIL designations. MIL designations shall not be applied to a product, except for qualification test samples, nor referred to in correspondence until notice of approval has been received from the activity responsible for qualification (see 6.3).

3.5 Workmanship. Workmanship shall be in accordance with commercial practice covering this class of material.

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection responsibility: The supplier is responsible for the performance of all in-

spection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. 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 tests. The inspection and testing of the cleaning compound shall be classified as follows:

(a) Qualification tests (4.3)

(b) Acceptance tests (4.5)

4.3 Qualification tests. Qualification tests shall consist of all the tests specified in 4.6.

4.3.1 *Sampling instructions.* The manufacturer shall submit one 100-pound drum of the compound and 1 pound of each ingredient. Samples shall be appropriately identified with the manufacturers identifying nomenclature and code number and any additional identification required by the letter of authorization (see 6.3). Containers for the ingredient materials shall bear the chemical name and commercial source of the ingredient. Samples shall be accompanied with test reports specified in 4.4.

4.4 Test reports. The contractor shall furnish test reports in duplicate, showing quantitative results for all tests and analyses required by this specification. and signed by the director, or his authorized assistant, of the laboratory in which the tests were conducted. When inspection is conducted at the contractor's plant, these reports shall be furnished to the Inspector.

The following analyses and tests shall be reported:

(a) Formulation including percent composition by weight.

(b) All tests of this specification.

(c) The following data on each ingredient, as applicable:

Chemical composition
Titer
Acid number
Iodine number
Saponification number
Assay (percent active ingredient)
Commercial source of each ingredient

4.5 Acceptance tests. Acceptance tests shall consist of all the tests of this specification except the test for cleaning (4.6.9).

4.5.1 *Sampling.* Unless otherwise specified, acceptance test samples shall be in accordance with Federal Test Method Standard No. 536.

4.5.2 *Rejection.* Failure of any sample of the compound to conform to any one of the requirements of this specification shall be cause for the rejection of the lot represented.

4.6 Test methods.

4.6.1 *Examination of product.* All material submitted for acceptance under contract shall be carefully examined to determine conformance with this specification with respect to materials, marking, and workmanship.

4.6.2 *Corrosion.*

4.6.2.1 Tests shall be conducted on aluminum-alloy sheets, in the tempered condition, conforming to Specification QQ–A–355 and QQ–A–362. Four specimens, two for each test, 4 inches by ¾ inch and approximately 0.032 inch, shall be cut from a sheet of each material, and cleaned with a grease solvent. Ink markings shall be removed with alcohol or acetone. Specimens shall then be dipped

for 20 to 30 seconds in a mixture of 3 parts concentrated (70 percent) nitric acid, and 1 part concentrated (50 percent) hydrofluoric acid. (The wax container in which hydrofluoric acid is sold makes a suitable container for the hydrofluoric-nitric acid mixture.) [1] Specimens shall be washed well with distilled water, dried with clean air and allowed to age for not less than 24 hours in an atmosphere free from chemical fumes.

[1](CAUTION: Care must be taken not to get this acid mixture in contact with the skin. In case of accidental contact, wash well with water and place a wet borax poultice over the affected area for at least 1 hour, then treat as a burn. For the eyes, wash well with water, then with a saturated boric acid solution. See a doctor in either case.)

4.6.2.2 Solutions of 0.3 and 1.2 percent of the cleaning compound in boiled distilled water shall be prepared. The tests shall be conducted on each alloy in each solution using an apparatus similar to that shown in figure 1. Approximately 200 milliliters of the solution shall be poured in the flask and heated to 70° ± 5° C. The specimen shall be introduced in the test tube which then shall be filled completely by means of suction. The rubber tubing shall be clamped and the solution kept at 70° ± 5° C for 1 hour. The volume of liberated gas shall be determined and corrected to standard conditions of temperature and pressure (0° C, 760 millimeters of mercury), allowing a correction for the vapor pressure of water. The specimen shall be removed, rinsed with distilled water, dried and examined visually.

4.6.3 *Hydrogen ion content.* The pH of a 1-percent solution of the material in boiled distilled water shall be determined at 25° C with a suitable glass electrode and corrected for sodium ion error.

4.6.4 *Total alkalinity.* A prepared aqueous solution of the material shall be titrated with standard acid to the methyl orange end point and the total alkalinity calculated as percent Na_2O.

4.6.5 *Solubility and stability.* A 5-percent stock solution of the cleaning compound shall be prepared by dissolving 50 grams in a liter of distilled water at 77° ±2° F. The solution shall then be examined for undissolved or suspended particles.

4.6.5.1 A 50-grain hard water stock solution shall be prepared by dissolving 1.003 grams of analytical reagent calcium acetate, $Ca(C_2H_3O_2)_2 \cdot H_2O$ and 0.704 gram of analytical reagent magnesium sulfate, $MgSO_4 \cdot 7H_2O$ in 1 liter of boiled distilled water. The following solution shall be mixed, adding the ingredients in the order listed:

Boiled distilled water	160 milliliters
50-grain hard water stock solution	75 milliliters
5-percent solution of the cleaning compound	15 milliliters

This solution shall be mixed well and heated to and maintained at 70° ±5° C for 1 hour and then shall be examined for precipitate.

4.6.6 *Interfacial tension.* A 1-percent solution of the material shall be prepared in boiled distilled water for the determination of the interfacial tension between this solution and heavy white mineral oil, U. S. P. XII. The test shall be conducted at a temperature of 25° C, using a duNouy tensiometer or any other suitable means, going from the interface into the oil.

4.6.7 *Caking.* A 400-milliliter low form beaker shall be filled with the cleaning compound and covered with a piece of cardboard. The beaker and cardboard shall be inverted, and the beaker removed. After submitting the compound to an atmosphere of 45 to 55 percent relative humidity at 21° to 29° C for 72 hours, there shall be no evidence of caking.

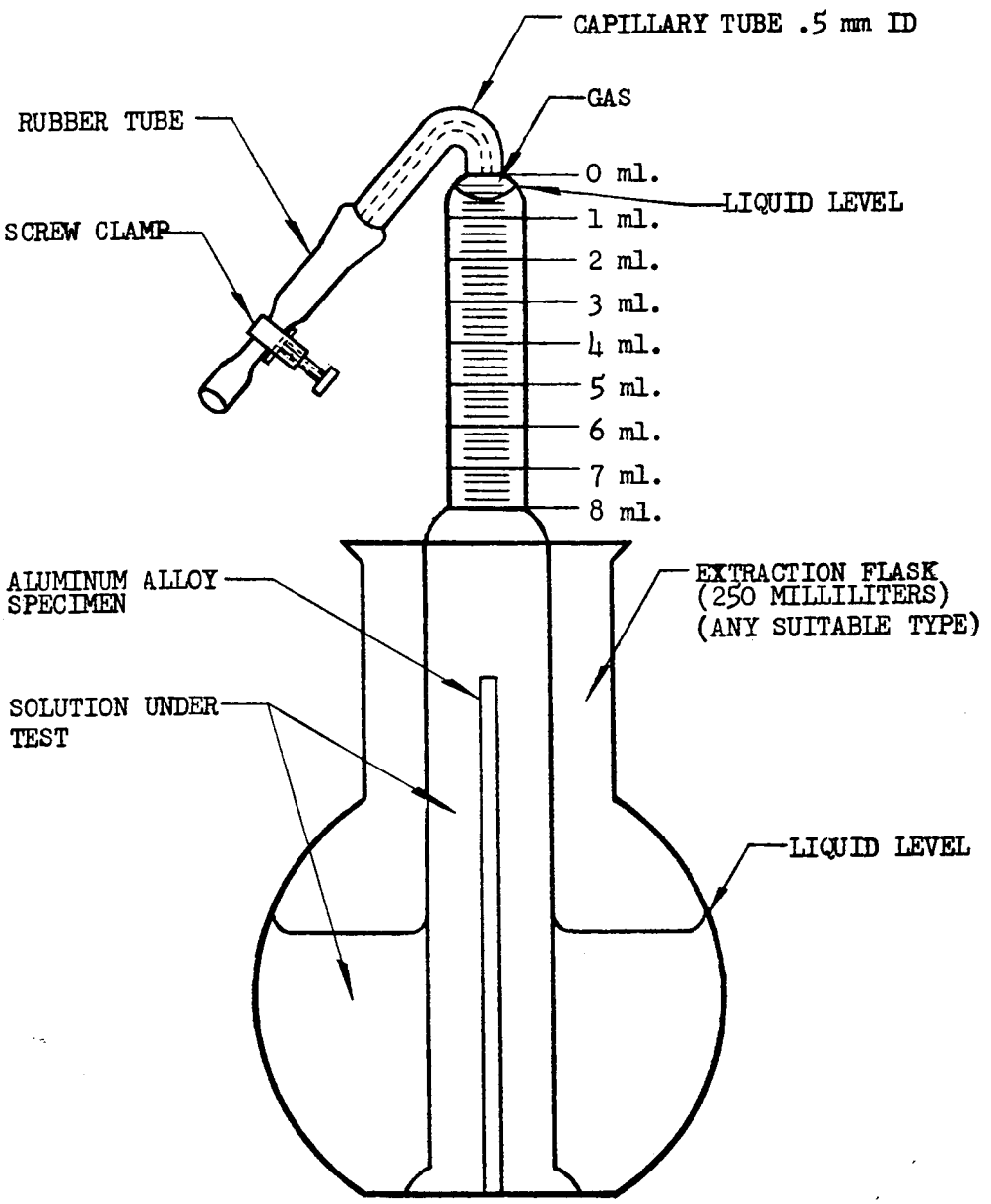

FIGURE 1. *Corrosion test apparatus*

4.6.8 *Lather persistency.* One gram of the material shall be dissolved in 300 milliliters of distilled water at 25° ± 5° C in a 500-milliliter cylindrical bottle. The solution shall be shaken vigorously and allowed to stand for 1 minute. The solution shall be examined for evidence of foam.

4.6.9 *Cleaning test.* The compound shall be mixed in conformance with the manufacturer's instructions in a sufficient quantity for operation of an industrial washing machine. After mixing, the cleaning solution shall satisfactorily clean surfaces on representative aircraft parts which have been soiled in routine operational service.

4.7 **Packaging, packing, and marking.** Preparation for delivery shall be examined for conformance with section 5.

5. PREPARATION FOR DELIVERY

5.1 Levels of preservation, packaging and packing.

5.1.1 *Level A and level B.* Unless otherwise specified, 150 pounds of the cleaning compound shall be packaged in fiber drums conforming to type I, grade A of Specification PPP–D–723. Top and bottom shall not be fastened to drum sidewall by any method that requires puncture of sidewall. Each drum shall be lined with a polyethylene liner of 3–mil thickness. After filling of drum, liner shall be completely sealed so as to form a moisture-resistant barrier around material contained.

5.1.2 *Level C.* Unless otherwise specified, the cleaning compound shall be prepared for delivery in accordance with Uniform Freight Classification Rules or other regulations for safe delivery to destination at the lowest applicable rate.

5.2 Marking. In addition to any special marking required by the contract or order, each drum shall be marked in accordance with Standard MIL–STD–129, including lot, batch, or control number. The nomenclature shall be as follows: CLEANING COMPOUND, WASHING MACHINE, AIRCRAFT METAL PARTS.

6. NOTES

6.1 Intended use. The cleaning compound covered by this specification is intended for use in industrial washing machines and other types of washing machines where foaming is objectionable for cleaning aircraft metal parts.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.

(b) Quantity of compound desired and capacity of containers (see 5.1.1).

(c) Levels of packaging and packing (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved 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 suppliers is called to this requirement, 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 Bureau of Naval Weapons, Navy Department, Washington 25, D. C., and information pertaining to qualification of products may be obtained from that activity.

Notice: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-713-154/5509