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January 24, 1986
SUPERSEDING
P-C-436D
10 May 1985

FEDERAL SPECIFICATION

CLEANING COMPOUND, ALKALI, BOILING VAT (SOAK) OR HYDROSTEAM

This specification is approved by the Commissioner, Federal Supply Services, General Services Administration, for the use of all federal agencies.

1. SCOPE

1.1 Scope. This specification covers one grade of alkaline cleaning compound for use in the hot soak tank cleaning of ferrous and nonferrous alloy parts. It is also for use in hydrosteam units operating on existing steam supply for steam cleaning (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government publications. The issues of the following documents, in effect on date of invitation for bids or solicitation for offers, form a part of this specification to the extent specified herein.

Federal Specifications:

- QQ-A-250 - Aluminum and Aluminum Alloy Plate and Sheet, General Specification for
- QQ-A-250/4 - Aluminum Alloy, 2024, Plate and Sheet.
- QQ-M-44 - Magnesium Alloy Plate and Sheet (AZ31B).
- PPP-D-729 - Drums: Metal, 55-Gallon (For Shipment of Noncorrosive Material).
- PPP-P-704 - Pails; Metal: (Shipping, Steel 1 Through 12 Gallon).

Federal Standards:

- Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).

AMSC: N/A

/FSC 6850/

DISTRIBUTION STATEMENT A Approved for public release; distribution unlimited.

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(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial descriptions as outlined under General Information in the Index of Federal Specifications and Standards, and Commercial Item Descriptions. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification other Federal Specifications and Commercial Item Descriptions required by activities outside the Federal Government for bidding purposes are available without charge from the General Services Administration Business Centers in Boston, MA, New York, NY, Philadelphia, PA, Washington, DC, Atlanta, GA, Chicago, IL, Kansas City, MO, Fort Worth, TX, Denver, CO, San Francisco, CA, Los Angeles, CA, and Seattle, WA.)

(Federal Government activities may obtain copies of Federal Standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specification:

MIL-L-6082 - Lubricating Oil, Aircraft Reciprocating Engine (Piston).

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-129 - Marking for Shipment and Storage.

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

Laws and Regulations

Regulations of Federal Hazardous Substances Labeling Act.
(Public Law 86-613, 86th Congress, S. 1283, approved July 12, 1960)
Code of Federal Regulations (CFR) 49, Transportation, Parts 100-199

(The code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or requests for proposal shall apply.

American Society for Testing and Materials (ASTM):

- D217 - Test Method for Cone Penetration of Lubricating Grease
- D800 - Method for Chemical Analysis of Industrial Metal Cleaning Compositions
- D946 - Specification for Penetration - Graded Asphalt Cement for use in Pavement Construction
- D1339 - Test Method for Surface and Interfacial Tension of Solutions of Surface-Active Agents
- D3951 - Practice for Commercial packaging
- E29 - Recommended Practice for Indicating Which Places of Figures are to be Considered Significant in Specified Limiting Values
- E70 - Test method for pH of Aqueous Solutions with the Glass Electrode

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

3. REQUIREMENTS

3.1 Material. The raw materials used in manufacture of these compounds shall be intimately assembled and processed so as to produce a granular, free flowing product which will remain uniform in composition and show no evidence of segregation or caking during handling or storage.

3.2 Composition. The cleaning compound shall consist of sodium metasilicate, monobasic sodium phosphate, trisodium phosphate, nonionic surfactant, and anionic surfactant in the proportions necessary to meet the requirements of this specification (see 6.4).

3.2.1 Silicate. Silicate, calculated as SiO_2 , shall be not less than 15.1 percent by weight of the cleaning compound when tested as specified in 4.4.8.1.

3.2.2 Total phosphate. Total phosphates, calculated as P_2O_5 , shall be between 17.7 and 22.0 percent by weight of the cleaning compound when tested as specified in 4.4.8.2.

3.2.3 Total alkalinity. The total alkalinity, calculated as Na_2O , shall not exceed 28.0 percent by weight of the cleaning compound when tested as specified in 4.4.8.3.

3.2.4 Alcohol soluble matter. The total alcohol soluble matter shall be between 17.3 and 18.4 percent by weight of the cleaning compound when tested as specified in 4.4.8.4.

3.2.5 Synthetic detergents. All anionic and nonionic detergents used in the manufacture of this cleaning compound shall be at least 80 percent biodegradable. A certificate of compliance to this effect shall be furnished by the contractor with each lot of cleaning compound (see 4.5 and 6.2.2).

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3.2.6 Condition in Container. The compound should be free flowing and should show no evidence of lumps or caking.

3.3 Performance requirements.

3.3.1 Cleaning efficiency. When tested as specified in 4.4.1.1, a 4.75 percent (4.75 grams of compound in 100 mL solution) distilled water solution of the cleaning compound shall completely remove mineral oil and asphalt soils from steel test panels, the removal of the mineral oil being indicated by freedom from water-break and "residue-pattern" stains.

3.3.2 Stability. A 4.75 percent (4.75 grams of compound in 100 mL solution) distilled water solution of the cleaning compound, after boiling for 40 hours and testing as specified in 4.4.1.2, shall completely remove mineral oil and asphalt soils from steel test panels, as in the cleaning efficiency requirement of 3.3.1.

3.4 Corrosiveness. The cleaning compound shall not attack aluminum. When tested in accordance with 4.4.2.2.1, there shall be no loss in weight of aluminum test panels and a maximum of 0.5 mg increase in weight. When tested galvanically coupled to magnesium test panels as described in 4.4.2.2.2, aluminum test panels shall lose no weight but gain from 0.4 to 1.0 mg while the magnesium test panels shall gain between 1.0 and 2.0 mg in weight. In both tests, aluminum shall remain bright, unstained, and unetched.

3.5 pH value. the pH value of a distilled water solution of the compound at a concentration of 4.75 percent (4.75 grams of compound in 100 mL of solution) shall be not more than 12.2 when tested at 25°C., as specified in 4.4.3.

3.6 Dust forming properties. When tested as specified in 4.4.4, the dust forming properties shall be such that the dust shall settle within a period of 5 seconds.

3.7 Surface tension. The surface tension of a 0.0317 percent solution (0.0317 grams of compound in 100 mL of solution) of the compound in distilled water at 25°C (80°F). shall be not more than 36 dynes per centimeter when determined as specified in 4.4.5.

3.8 Penetration. When tested as specified in 4.4.6, the average penetration shall be not less than 30.0.

3.9 Segregation. When tested as specified in 4.4.7, the difference of the percentages of an ingredient of the compound (such as silicate) taken from different portions of a container shall not exceed 2 percent of the average percentage of that ingredient in the compound. (The compound shall be subjected to the test specified in 4.4.7 at the discretion of the inspection laboratory when segregation of the ingredients appears to have occurred.)

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3.10 Workmanship. The compound shall be manufactured in accordance with the best commercial practice to produce a high quality material which is stable and not subject to change during storage in a sealed container.

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 Sampling and inspection.

4.2.1 Sampling for inspection. Sampling for inspection and tests shall be performed in accordance with MIL-STD-105.

4.2.2 Examination of the end item. Visual examination of the end item shall be made for defects in appearance with respect to form uniformity, as applicable. The sample unit shall be one primary container. The inspection level shall be S-2 with at least three sample units randomly selected from the lot. The acceptable quality level (AQL) shall be 4.0 defects per 100 units.

4.2.3 Examination of filled containers for defects in net contents. The sample unit shall be one primary container. The inspection level shall be S-2 with a minimum of three sample units randomly selected from the lot. The unit quantity per container shall not be less than 99.5 percent nor more than 101 percent of the quantity specified. The AQL for the examination of net contents shall be 4.0 defects per 100 units.

4.2.4 Examination of preparation for delivery. An examination shall be made of each lot to determine that the packaging, packing, and marking comply with the requirements of section 5. The sample unit shall be one shipping container and the lot size shall be the number of containers offered for delivery at one time. The inspection level shall be level S-2 with an acceptable quality level of 4.0 defects per hundred units.

4.2.5 Significant places. For the purpose of determining conformance with this specification, an observed or calculated value shall be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value in accordance with the rounding-off method of ASTM E29.

4.3 Quality conformance testing of the end item. The end item shall be tested for the characteristics as indicated in section 3. The lot size shall be expressed in units of filled containers. The sample unit shall be one gallon from each sample container selected and placed in a clean dry

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container, labeled to identify the lot and container from which it was taken. The sample for testing shall be a two-gallon composite of equal quantities from each sample unit. The inspection level shall be S-1 with no less than three sample units selected at random from the lot. There shall be no evidence of failure to meet the specified requirements.

4.4 Test methods.

4.4.1 Performance tests. Performance tests shall consist of:

- a. Cleaning efficiency.
- b. Stability.

4.4.1.1 Cleaning efficiency test.

4.4.1.1.1 Preparation of test panels. Test panels of SAE 1020, 18-20 gage, cold-worked steel, 2 1/2 by 2 1/2 inches in size, with a 1/4-inch diameter hole placed 1/8 inch from one corner, shall be prepared. Sharp edges shall be smoothed with No. 1 coarse emery cloth. The panels shall then be degreased in c.p. grade acetone. Polish both faces with No. 1 emery cloth stroking in one direction only. Clean in a hot alkaline solution until free from water break. Rinse in water, then dip in absolute ethyl alcohol, and air dry.

4.4.1.1.2 Application of soils. The following soils shall be applied to separate panels:

4.4.1.1.2.1 Mineral oil. The soiling material shall be mineral oil conforming to MIL-L-6082 grade 1065. The cleaned panels shall be suspended on an "S" hook and dipped into a 400-mL beaker of the oil at a temperature of $26^{\circ} + 1^{\circ}\text{C}$ ($79 + 2^{\circ}\text{F}$). They then shall be removed and allowed to drain at a temperature of $26^{\circ} + 1^{\circ}\text{C}$ ($79 + 2^{\circ}\text{F}$) for 30 minutes. The remaining drop of oil in the lower corner of each panel is then removed with absorbent cotton. The amount of mineral oil adhering per panel shall be approximately 0.15 gram.

4.4.1.1.2.2 Asphalt. The soiling material shall be petroleum asphalt conforming to ASTM D946, grade 85-100. The soil, heated to approximately 50°C (122°F) (see 6.3) shall be spread evenly over one face of the cleaned test panels using the edge of a steel spatula, leaving unsoiled the triangular area at the corner which includes the 1/4 inch hole. The amount of asphalt on each panel shall be 0.32-0.34 g determined by trial and error. Allow each panel to stand for 15 minutes before stripping.

4.4.1.1.3 Preparation of cleaning solution. In a 2-liter beaker, prepare 1600 mL of a 4.75 percent (4.75 grams of compound in 100 mL of solution), distilled water solution of the test compound. Bring solution to a boil and keep at this temperature throughout the test. Maintain solution level throughout the test by addition of distilled water.

4.4.1.1.4 Cleaning procedure. Three test panels with each type of soil, prepared as specified in 4.4.1.1.2, shall be cleaned successively in the following order; mineral oil, then asphalt. The soiled test panels shall be immersed in the cleaning solution specified in 4.4.1.1.3 by means of an iron hook, one end of which passes through the 1/4 inch hole and the other end over a glass rod placed across the top of the 2-liter beaker. At the end of 3-minute intervals the test panel shall be moved forward and backward, six times in each direction, and then up and down three times in each direction. This agitation of the panels is applied in the cleaning of the asphalt test panels but not in the cleaning of the mineral oil panels. The panel shall then be removed from the solution for visual inspection of the extent of soil removal and quickly replaced. The entire operation of agitation of the test panel and visual examination shall require not more than 6 seconds. Mineral oil test panels shall be cleaned for 3 minutes, and asphalt soiled panels for 21 minutes respectively. At the end of the specified cleaning period, or before, if visual examination indicates completeness of soil removal, the panel shall be removed from the cleaning solution and given two 6-second rinses in distilled water (no agitation); there shall be a 4-second drain between rinses. The rinsing solutions shall consist of 2 one-liter beakers, each containing 800 mL of distilled water at $23^{\circ} + 3^{\circ}\text{C}$ ($73^{\circ} + 5^{\circ}\text{F}$).

4.4.1.1.5 Measurement of residual soil.

4.4.1.1.5.1 Asphalt. Rinsed asphalt test panels, after treatment specified in 4.4.1.1.4, shall be dried for 15 minutes in an oven at a temperature of $75^{\circ} + 1^{\circ}\text{C}$ ($167^{\circ} + 2^{\circ}\text{F}$) followed by cooling at room temperature for 30 minutes. They shall then be examined for residual soil. Tests shall be run in triplicate.

4.4.1.1.5.2 Mineral oil. Rinsed mineral oil test panels, after treatment as specified in 4.4.1.1.4, shall be examined for presence or absence of water-break. They shall then be dried for 15 minutes at a temperature of $50^{\circ} + 1^{\circ}\text{C}$ ($122^{\circ} + 2^{\circ}\text{F}$) followed by cooling at room temperature for 30 minutes. They shall then be examined for presence or absence of residual stains ("residue-pattern" stains), the number and approximate size of which are recorded. Tests shall be run in triplicate.

4.4.1.2 Stability test.

4.4.1.2.1 Preparation of solution. In a 3-liter beaker, prepare 1600 mL of a 4.75 percent (4.75 grams of compound in 100 mL of solution) distilled water solution of the test compound. Boil the solution for 40 hours, replacing the water lost by evaporation as necessary. Transfer the solution to a 2-liter beaker, bring to a boil, and keep the solution at a boil throughout the test, maintaining the solution level by addition of distilled water.

4.4.1.2.2 Stability test procedure. Using the solution prepared in 4.4.1.2.1, three test panels for each type of soil prepared and soiled in accordance with 4.4.1.1.1 and 4.4.1.1.2, shall be cleaned successively as specified in 4.4.1.1.4 (a total of six test panels). The residual soil on each panel shall be determined in accordance with 4.4.1.1.5.

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4.4.2 Corrosion tests.

4.4.2.1 Preparation of test panels. Test panels shall be cut 3 inches by 3/4 inch in size from approximately 0.034 inch thick sheet aluminum conforming to QQ-A-250/4 T3 or T4 temper. Sharp edges shall be smoothed with No. 150 alundum polishing paper. Polish both faces with the same abrasive, stroking in one direction only.

4.4.2.2 Cleaning of panels. Panels shall be cleaned with c.p. acetone, using a swab of absorbent cotton. They shall then be wiped with paper toweling, dipped in absolute ethyl alcohol, and again wiped with paper toweling.

4.4.2.2.1 Corrosion test procedure. The clean test panel shall be weighed to the nearest 0.0001 gram and immersed completely in 200 mL of a boiling 4.75 percent (4.75 grams of compound in 100 mL of solution) distilled water solution of the compound contained in a 500-mL tall-form beaker. The solution shall be kept at a boil throughout the test, the level being maintained by additions of distilled water as required. After 60 minutes, the test panel shall be removed from the boiling solution, rinsed under flowing tap water (cold), rinsed in distilled water 20° -26° C (68-79°F) dipped in absolute ethyl alcohol, wiped dry with paper toweling, and reweighed. The presence of corrosion products shall be noted. Tests shall be run in duplicate.

4.4.2.2.2 Galvanic corrosion test procedure. The aluminum test panels shall be cut 1 1/2 inches by 3/4 inches in size from approximately 0.034 inch thick sheet conforming to QQ-A-250/4 T3 or T4 temper. Sharp edges shall be smoothed with No. 150 alundum polishing paper. Both faces shall be polished with the same abrasive, stroking in one direction only. The magnesium test panels shall be cut 3 inches by 3/4 inch in size from approximately 0.034 inch thick sheet conforming to QQ-M-44. The magnesium panels shall be polished as the aluminum. Two 1/16 inch holes are made in each panel, close to the narrow ends of the aluminum panels, and at one end and the center of the magnesium panels, so that they may be fastened together, as shown in figure 1.

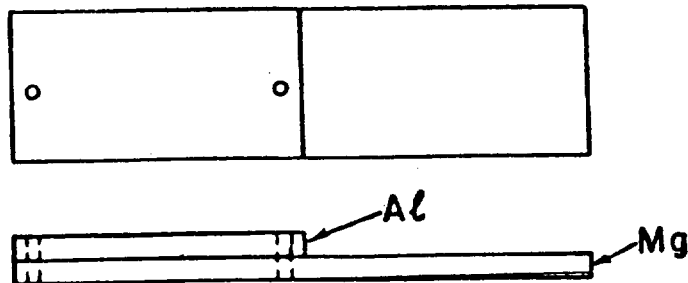


Figure 1. Galvanic corrosion test panels.

The panels shall then be cleaned as specified in 4.4.2.2, and weighed to the nearest 0.0001 gram. A magnesium and an aluminum panel are then fastened together by means of cotton string (figure 1), and immersed completely in 200 mL of a boiling 4.75 percent (4.75 grams of compound per 100 mL solution) distilled water solution of the compound contained in a 500 mL tall-form beaker. The solution is kept at a boil for 2 hours, maintaining the solution level by additions of distilled water as required. The couple is then removed from the boiling solution, rinsed under flowing tap water (cold), unfastened, rinsed in distilled water, dipped in absolute ethyl alcohol, wiped dry with paper toweling, and the members of the couple reweighed. Tests shall be run in duplicate.

4.4.3 pH value. Prepare 100 mL of a 4.75 percent (4.75 g of compound in 100 mL of solution) distilled water solution of the compound. Determine the pH at 25°C (77°F) in accordance with ASTM E70.

4.4.4 Dust forming. The inside walls of a 250-mL glass-stoppered graduate shall be rendered completely free of any grease and moisture. A 25 gram sample of the cleaner shall then be placed on the bottom of the clean tube. The tube shall then be stoppered, inverted, and immediately returned to its original position. After any suspended dust has been allowed to settle for 5 seconds, the stopper of the tube shall be removed and a moistened piece of red litmus paper suspended in the tube without touching the walls so that the lower end of the litmus paper strip coincides with the 210-mL mark at the upper end of the graduate. After 60 seconds immersion, the litmus paper shall be removed and examined for any color change.

4.4.5 Surface tension. Dissolve 6.333 grams of the well mixed compound in distilled water and dilute to volume in a 2-liter volumetric flask. Take a 10-mL aliquot of this solution and dilute to volume in a 100-mL volumetric flask. Determine the surface tension according to ASTM D1331.

4.4.6 Penetration. Place 100 grams of the compound in a flat bottom straight side, Pyrex glass crystallizing dish, 40 mm high by 80 mm diameter. Place sufficient lead shot in a 250-mL, low-form beaker so that the combined weight of the beaker and shot equals 800 grams. Place the weighted 250-mL beaker on top of the 100 grams of compound, then place the assembly in a desiccator containing a saturated solution of potassium sulfate (K_2SO_4). Place the desiccator in an oven maintained at 43° - 46°C (109 - 115°F) for 24 hours. Remove assembly from oven and desiccator; remove the weighted 250-mL beaker from compound, and allow crystallizing dish containing compound to cool at room temperature for 2 hours. Determine penetration at three points on the surface, each at least 12 mm from the side of the crystallizing dish, using the penetrometer and grease penetrometer cone prescribed in ASTM D217 with a 5-second hold, 250 grams total weight of the cone and attachments, and temperature of the compound at 24° - 25°C (75 - 77°F). Run test in duplicate and take average.

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4.4.7 Segregation. Samples taken from different portions of the container shall be analyzed for one constituent of the compound, such as silicate by the appropriate method of 4.4.8.

4.4.8 Composition.

4.4.8.1 Silicate. Prepare sample solution and follow procedure for determination of total silica as SiO_2 in accordance with ASTM D800. Percent silica as SiO_2 is calculated as follows:

$$\text{Percent silicate as SiO}_2 = \frac{A-B}{C} \times 100$$

where:

A = weight ignited residue before treatment with HF
 B = weight ignited residue after treatment with HF
 C = weight sample

4.4.8.2 Phosphate. Prepare sample solution and determine the percentage of phosphates in accordance with ASTM D800. Percent phosphate as P_2O_5 is calculated as follows:

$$\text{Percent phosphate as P}_2\text{O}_5 = \frac{TN \times 7.098}{W}$$

where:

T = mL NaOH solution
 N = Normality of NaOH solution
 W = Weight of sample in solution

4.4.8.3 Total alkalinity. Transfer a 10-gram sample to a 1-liter volumetric flask. Add about 350 mL hot distilled water 88°C (190°F). Agitate to dissolve. Cool to room temperature. Dilute to 1 liter with distilled water. Pipette a 100-mL aliquot into a 300-mL Erlenmeyer flask. Add 3 drops of methyl orange indicator solution, and titrate with 0.5 N HCl. Total alkalinity as Na_2O is calculated as follows:

$$\text{Percent total alkalinity as Na}_2\text{O} = \frac{\text{mL of HCl} \times N \times 3.1}{W}$$

where:

N = Normality of HCl
 W = Weight of sample in aliquot

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4.4.8.4 Alcohol soluble matter. Place a 10-gram sample in a 400-mL beaker. Add 200 mL neutral, absolute ethyl alcohol, and digest on a steam bath with frequent stirring for 30 minutes. Filter thru a Gooch crucible using suction, and retaining as much as possible of the residue in the beaker. Repeat the extraction-decantation procedure three times, using 25 mL hot absolute ethyl alcohol each time. Evaporate the total alcohol filtrate to smaller volume, about 100-150-mL. Dry the residue in the beaker until free from alcohol odor. Add 10 mL distilled water, and dissolve residue. Add 100 mL absolute ethyl alcohol slowly and with stirring. Heat to boiling on steam bath, and filter thru original Gooch crucible into tared 250-mL beaker holding the original alcohol filtrate (evaporated to smaller volume). Wash with hot absolute ethyl alcohol. Evaporate combined alcohol filtrate and washings on steam bath. Dry for 45 minutes at 80°C. $\pm 2^{\circ}\text{C}$ (176° \pm 4°F) in a vacuum oven. Cool in desiccator and weigh as alcohol soluble matter. The calculation is:

$$\text{Percent alcohol soluble matter} = \frac{100A}{W}$$

where:

A = Weight of alcohol soluble material

W = Weight of sample

4.5 Biodegradability. A certificate of compliance shall be furnished by the contractor indicating that each lot of cleaning compound shall be at least 80 percent biodegradable (see 6.2.2).

5. PREPARATION FOR DELIVERY

5.1 Packing.

5.1.1 Level A. Cleaning compound shall be furnished in 5 gallon steel pails conforming to PPP-P-704,, type II, class 3, or in 55 gallon steel drums conforming to PPP-D-729, type II or as specified in the contract or order.

5.1.2 Commercial. Packing shall be in accordance with ASTM D3951.

5.2 Marking.

5.2.1 Military agencies. Containers shall be marked in accordance with the requirements of MIL-STD-129 and CFR 49.

5.2.2 Civil agencies. Containers shall be marked in accordance with Fed. Std. No. 123.

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5.2.3 Additional marking. The labeling shall comply with the requirements of the Federal Hazardous Substances Labeling Act. In addition to the marking specified above the following markings shall be included on each container:

Directions for use - Use compound at a concentration of 7 ounces per gallon of water at a rolling boil for soak cleaning. For hydrosteam cleaning, dissolve compound completely in hot water to obtain a concentration of 7 ounces per gallon of water, and adjust concentrate solution metering device to obtain desired results. Hot water should be used for dissolving and solution of the compound must be complete before using. There must be no undissolved material in concentrate tank.

6. NOTES

6.1 Intended use. Cleaning compound covered by this specification is intended for use in the hot soak tank cleaning of ferrous and nonferrous alloy parts. Aluminum-magnesium assemblies may be cleaned with freedom from galvanic corrosion of the aluminum. Magnesium, when coupled with aluminum may acquire a light brown coating, which, if objectionable, can be removed by a few seconds immersion in 5 percent nitric acid followed by water rinsing. The compound may also be used in injection hydrosteam units using existing plant steam supplies for steam cleaning ferrous and nonferrous alloys. The compound must not be used in steam cleaning machines of the high pressure-continuous tubular coil, vapor generator type.

6.1.1 Improved cleaner (soak or hydrosteam). The effectiveness of the cleaner can be increased by conversion of the aqueous solution of the cleaner into a stable, single phase, alkaline water-base organic solvent solution, which is operated at a boil when used as a soak detergent, or may be used as a

conventional hydrosteam cleaner. The change is accomplished by adding 1 gallon of hexylene glycol (boiling point 192° - 200°C., and specific gravity at 20°/20°C., 0.922+0.025) to 9 gallons of a 7 ounces per gallon water solution of the P-C-436E cleaner. The hexylene glycol content is maintained by periodic test, as follows:

To 50 mL of the solution containing hexylene glycol contained in a 100-mL graduated cylinder, add an excess of anhydrous potassium carbonate, analytical reagent grade. The hexylene glycol collects as the top liquid layer. The mL in the top layer multiplied by two gives the percent by volume of hexylene glycol, which should be maintained at 9.0 to 11.0 percent.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents.

6.2.1 Acquisition requirements.

- (a) Title, number, and date of this specification.
- (b) Quantity of cleaning compound in pounds.

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- (c) Type, class, style, and capacity of containers.
- (d) The level of packing required.
- (e) Instructions regarding availability of inspection records (see 4.1).

6.2.2 Data Requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DoD FAR supplement, Part 27, Sub-Part 27.410-6 are invoked and the DD Form 1423 is not used, the data specified below will be delivered by the contractor in accordance with the contract or purchase order requirements.

Paragraph no.	Data requirements	Applicable DID no.	Options
(a) 3.2.5	Certificate of Compliance	DI-E-2121	

(Copies of data item descriptions required by contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer).

6.3 Treatment of asphalt prior to soiling. Bidders are cautioned against repeated heating of their entire stock of asphalt prior to spreading on the test panel. It is suggested that only enough asphalt be removed from the container on a spatula to soil one panel; soiling may be facilitated by slight heating (not over 50°C) (122°F) of both asphalt and panel.

6.4 Composition. The cleaning compound is contemplated to be comparable in performance to the following approximate composition by weight (see Table I). However, the Government assumes no responsibility for the acceptance of a product claimed to be manufactured under the identical formula. Bidders are cautioned that their product will not meet the asphalt cleaning requirement unless the combination of surfactants is used; either surfactant alone will not impart the required detergency to the product.

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TABLE I. Composition of cleaning compound

Ingredient	Material specification	Percent by weight
Sodium metasilicate anhydrous	Fed. Spec. 0-S-604, Type II	31.3
Primary sodium phosphate, monobasic, anhydrous	Technical grade NaH_2PO_4	12.3
Trisodium phosphate anhydrous	Fed. Spec. 0-S-642, Type I	24.8
Nonionic surfactant	Ethoxylated straight chain primary alcohol	7.9
	Ethoxylated straight chain secondary alcohol	
	Ethoxylated straight chain alkylphenol	
	Triton X100	
Anionic surfactant	Straight chain sodium alkyl benzene sulfonate (C_{12} to C_{18} alkyl), 40 percent active	23.7

MILITARY CUSTODIANS:

Army -- MR
Air Force -- 68

User activities:

Navy -- SH
DSA -- GS

Review activity:

Army -- MI, ME
Navy -- MC

Preparing activity:

Army - MR

Civil Agency Coordinating Activity:

GSA-FSS

Project No. 6850-0792

(KBWP# ID-0277A/DISK 0103A. FOR AMTL USE ONLY)