

[METRIC]  
A-A-59146  
17 December 1997  
SUPERSEDING  
P-C-436E  
NOTICE 1  
4 APRIL 1991

## COMMERCIAL ITEM DESCRIPTION

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

The General Services Administration has authorized the use of this commercial item description by all federal agencies.

1. **SCOPE.** This commercial item description (CID) covers one grade of alkaline cleaning compound for use in the hot soak tank cleaning of ferrous and nonferrous alloy parts. It is also used in hydrosteam units operating on existing steam supply for steam cleaning.

#### 2. SALIENT CHARACTERISTICS

2.1 Performance requirements. The steam cleaning compound shall be equal to or superior in effectiveness to the comparison formula of table I. This shall be demonstrated by meeting the performance requirements of table II when tested as specified therein.

##### 2.2. Cleaning efficiency test.

2.2.1 Performance requirements. When tested as specified in 2.2.4, a 4.75 percent distilled water solution of the cleaning compound shall completely remove mineral oil and asphalt soils from steel test panels. (The removal of the mineral is indicated by freedom from water-break and "residue pattern" stains.)

2.2.2 Preparation of test panels. Test panels of Society of Automotive Engineers (SAE) 1020, 18-20-gage, cold rolled steel shall be prepared 5.6 x 5.6 centimeters (cm) (2 1/2 x 2 1/2 inches) in size. Each test panel shall have a hole 6 millimeters (mm) (1/4 inch) in diameter placed 3 mm (1/8 inch) from one corner. Sharp edges shall be smoothed with No. 1 coarse emery cloth. The

Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any data which may improve this document should be sent by letter to: Defense Supply Center Richmond (DSCR), ATTN: DSCR-VBD, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610.

AMSC N/A

FSC 6850

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

A-A-59146

panels shall then be degreased in American Chemical Society (ACS) grade acetone. Both faces of each panel shall be polished with the same abrasive, 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.

Table I. Composition of comparison compound.

Component	Percent by weight
Sodium metasilicate, anhydrous	31.3
Sodium phosphate, monobasic anhydrous	12.3
Trisodium phosphate anhydrous	24.8
Nonionic surfactant (ethoxylated straight chain primary alcohol, ethoxylated straight chain secondary alcohol, ethoxylated straight chain alkylphenol, Triton X100)	7.9
Anionic surfactant (straight chain sodium alkyl benzene sulfonate (C <sub>12</sub> to C <sub>18</sub> alkyl), 40 percent active)	22.7

Table II. Performance Requirements.

Performance Requirement	Limits	Test Paragraph
Cleaning efficiency	paragraph 2.2.1	paragraph 2.2.6
Stability	paragraph 2.3.1	paragraph 2.3.3
Corrosion	paragraph 2.4.1	paragraphs 2.4.4 & 2.4.5
pH Value	pH $\leq$ 12.2	paragraph 2.5
Surface tension	36 dynes/centimeter	paragraph 2.6
Dust forming properties	Change in color	paragraph 2.7
Penetration	$\geq$ 30.0	paragraph 2.8
Segregation	2%	paragraph 2.9
Biodegradability	$\geq$ 80%	paragraph 2.10

**2.2.3 Preparation of mineral oil soiled panels.** The soiling material shall be mineral oil conforming to SAE-J1966. The cleaned panels, prepared as described in 2.2.2, shall be suspended on an “S” hook and dipped, one at a time, into a 400 milliliter (mL) beaker of the oil maintained at a temperature of  $26 \pm 1^{\circ}\text{C}$ . They shall be removed and allowed to drain at the same temperature 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 g.

**2.2.4 Preparation of asphalt soiled panels.** The soiling material shall be petroleum asphalt conforming to American Society for Testing and Materials (ASTM) D946, grade 85-100. The soil, heated to approximately  $50^{\circ}\text{C}$ , 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 6 mm (1/4 inch) hole. The amount of asphalt of each panel shall be 0.32-0.34 g, determined by trial and error. Allow each panel to stand for 15 minutes before stripping.

**2.2.5 Preparation of cleaning solution.** In a 2-liter beaker, prepare 1600 mL of a 4.75 percent (4.75 g 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.

**2.2.6 Test procedure.** Three test panels for each type of soil, prepared as specified in 2.2.2, 2.2.3 and 2.2.4, 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 2.2.5 by means of an iron hook, one end of which passes through the 6 mm (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 two 1-liter beakers, each containing 800 mL of distilled water at  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$ .

**2.2.7 Measurement of residual soil - asphalt.** Rinsed asphalt test panels, after treatment specified in 2.2.6, shall be dried for 15 minutes in an oven at a temperature of  $75^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , followed by cooling at room temperature for 30 minutes. They shall then be examined for residual soil. Test shall be run in triplicate.

**2.2.8 Measurement of residual soil - mineral oil.** Rinsed mineral oil test panels, after treatment specified in 2.2.6, shall be examined for the presence or absence of water-break. They shall then be dried for 15 minutes in an oven at a temperature of  $50^{\circ}\text{C} \pm 1^{\circ}\text{C}$ , followed by cooling at room

A-A-59146

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. Test shall be run in triplicate.

## 2.3 Stability

2.3.1 Performance requirements. A 4.75 percent distilled water solution of the cleaning compound, after boiling for 40 hours and tested as specified in 2.3.3, shall completely remove mineral oil and asphalt soils from steel test panels. The removal of the mineral is indicated by freedom from water-break and “residue pattern” stains.

2.3.2 Preparation of solution. In a 3-liter beaker, prepare 1600 mL of a 4.75 percent (4.75 g 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 needed. 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.

2.3.3 Test procedure. Using the solution prepared in 2.3.2, three test panels for each type of soil prepared and soiled in accordance with 2.2.2, 2.2.3 and 2.2.4, shall be cleaned successively as specified in 2.2.6, (a total of six test panels). The residual soil on each panel shall be determined in accordance with 2.2.7 and 2.2.8.

## 2.4 Corrosion test

2.4.1 Performance requirement. The cleaning compound shall not attack aluminum. When tested in accordance with 2.4.4, there shall be no loss in weight of aluminum test panels and a maximum of 0.5 milligram (mg) increase in weight. When tested galvanically coupled to magnesium test panels as described in 2.4.5, aluminum test panels shall gain between 1.0 and 2.0 mg in weight. In both tests, aluminum shall remain bright, unstained, and unetched.

2.4.2 Preparation of test panels. Test panels of 2024 aluminum shall be cut 7.6 cm by 1.9 cm (3 inches by 3/4 inch) in size from approximately 0.9 mm (0.034 inch) thick sheet aluminum conforming to QQ-A-250/4, T3 or T4 temper. Sharp edges shall be smoothed with No. 150 aluminum ( $\text{Al}_2\text{O}_3$ ) polishing paper. Polish both faces with the same abrasive, stroking in one direction only.

2.4.3 Cleaning of panels. Panels shall be cleaned with ACS grade 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.

2.4.4 Test procedure - corrosion. Each cleaned test panel shall be weighed to 0.0001 gram and immersed completely in 200 mL of the boiling 4.75 percent (4.75 grams in 100 mL of solution) distilled water solution of the compound contained in a 500 mL tall-form beaker. The solution is kept at a boil throughout the test, the solution 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), dipped in absolute alcohol, wiped dry with paper toweling, and reweighed. The presence of corrosion products shall be noted. Test shall be run in duplicate.

**2.4.5 Test procedure - galvanic corrosion.** Test panels of 2024 aluminum shall be cut 3.8 cm by 1.9 cm (1 1/2 inches by 3/4 inch) in size from approximately 0.9 mm (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 (Al<sub>2</sub>O<sub>3</sub>) polishing paper. Polish both faces with the same abrasive, stroking in one direction only. Test panels of magnesium shall be cut 7.6 cm by 1.9 cm (3 inches by 3/4 inch) in size from approximately 0.9 mm (0.034 inch) thick sheet magnesium conforming to SAE AMS4376 or AMS4377. Sharp edges shall be smoothed with No. 150 alundum (Al<sub>2</sub>O<sub>3</sub>) polishing paper. Polish both faces with the same abrasive, stroking in one direction only. Two 1.6 mm (1/16 inch) holes shall be 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 can be fastened together. The panels shall be cleaned as specified in 2.4.3, and weighed to the nearest 0.0001 g. A magnesium and an aluminum panel are then fastened together, by means of a cotton string, and immersed completely in 200 mL of the boiling 4.75 percent (4.75 g in 100 mL of solution) distilled water solution of the compound contained in a 500 mL tall-form beaker. The solution is kept at a boil for two hours, the solution level being maintained 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 alcohol, wiped dry with paper toweling, and the members of the couple reweighed. Test shall be run in duplicate.

**2.5 pH value.** The pH value of a distilled water solution of the compound at a concentration of 4.75 percent (4.75 g of compound in 100 mL of solution) shall be not more than 12.2 when tested at 25°C in accordance with ASTM E70.

**2.6 Surface tension.** The surface tension of a 0.0317 percent solution (0.0317 g of compound in 100 mL of solution) of the compound in distilled water at 25°C shall not be more than 36 dynes per centimeter when determined in accordance with ASTM D1331.

**2.7 Dust forming properties.** 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 graduate. The graduate 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 graduate, shall be removed and a moistened piece of red litmus paper suspended in the graduate, 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, the litmus paper shall be removed and examined for any color change. Excessive dusting is indicated by any change in the litmus paper from red to blue.

**2.8 Penetration.** Place 100 g of the compound in a flat bottom, straight side, Pyrex glass crystallizing dish, 40 mm high by 80 mm diameter. Place sufficient lead shot into a 250 mL low form beaker so that the combined weight of the beaker and shot equals 800 g. Place the weighted 250 mL beaker on top of the 100 g of compound. Place the assembly in a dessicator containing a

A-A-59146

saturated solution of potassium sulfate ( $K_2SO_4$ ). Place the dessicator in an oven maintained at  $43^\circ C - 46^\circ C$  for 24 hours. Remove the assembly from oven and dessicator; remove weighted 250 mL beaker from compound, and allow the 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 g total weight of the cone and attachments and the temperature of the compound at  $25^\circ \pm 1^\circ C$ . Run test in duplicate and take average.

2.9 Segregation. Samples taken from different portions of the container shall be analyzed for one constituent of the compound (such as silicates) using ASTM D800.

2.10 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.

### 3. REGULATORY REQUIREMENTS

3.1 Labeling, packaging and marking. Item shall be labeled, packed and marked in accordance with Title 49 Code of Federal Regulations (CFR), Parts 100 to 199.

3.2 Recovered materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with 23.403 of the Federal Acquisition Regulations.

### 4. QUALITY ASSURANCE PROVISIONS

4.1 Product conformance. The product provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

4.2 Market acceptability. The item offered must have been sold to the Government or commercial market.

5. **PACKAGING**. Preservation, packing, labeling, and marking shall be as specified in the contract or order.

6. **NOTES**. This section contains information of a general or explanatory nature which is helpful, but is not mandatory.

#### 6.1 Source of documents

6.1.1 The Code of Federal Regulations and the Federal Acquisition Regulations may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-0001.

6.1.2 The Soap and Detergent Association publications may be obtained from the Soap and Detergent Association, 475 Park Avenue South, New York, NY 10016.

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

6.1.4 American Chemical Society (ACS) specifications may be obtained from the American Chemical Society, 1155 Sixteenth Street, N.W., Washington, DC 20036.

6.1.5 Society of Automotive Engineers (SAE) specifications are available from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

6.2 Ordering data. Acquisition documents must specify the following:

- a. Title, name, and date of this CID.
- b. Unit quantity required.
- c. Packaging requirements (see section 6).

6.3 National stock number (NSN). The following NSN corresponds to this CID. This list may not be indicative of all possible NSNs associated with this document.

6850-00-664-7530

6.4 Sources of supply. The following products are known to meet the requirements of this CID. Competition is not limited to these suppliers.

<u>Company</u>	<u>Product</u>
West Penetone 74 Hudson Avenue Tenaflly, NJ 07670-3000 (800) 631-1652	Penpower 150H Penpower 225L Penpower 226H
Crest Industrial Chemicals, Incorporated 6341 Beverly Hill Houston, TX 77057 (800) 255-3924	PAC-42
Cal-Tek 693 Hi Tech Parkway Oakdale, CA 95361 (800) 332-1535	Steamite Aviation #1 Steamite - 12

A-A-59146

MILITARY INTERESTS:

Preparing Activity:  
DLA - GS  
(Project No: 6850-1179)

Custodians

Army - MR  
Air Force - 68  
Navy - SH

Reviewers

Navy - MC  
Army - MI, CR4