

[METRIC]
A-A-59261
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SUPERSEDING
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COMMERCIAL ITEM DESCRIPTION

CORROSION REMOVING COMPOUND, SODIUM HYDROXIDE BASE; FOR IMMERSION APPLICATION

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

1. **SCOPE.** This commercial item description (CID) covers one type of alkaline corrosion removal compound suitable for rust, paint, scale, grease, dirt, asphalt and carbon removal by simple immersion from ferrous surfaces. This also covers one type of rejuvenating compound to be used as an additive for the purpose of prolonging the tank life of the corrosion removal compound.

2. **CLASSIFICATION.** The types shall be as follows:

Type I - Corrosion removing compound.

Type II- Rejuvenating additive (for use in replacement of type I solutions.)

3. **SALIENT CHARACTERISTICS**

3.1 Type I. The type I corrosion removing compound shall be equal to or superior in effectiveness to the type I comparison formula of table I, in all respects, when tested in accordance with 3.3 through 3.7.

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.

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TABLE I. Type I comparison formula.

Ingredient	Percentage by weight
Sodium hydroxide	66.0
Mineral seal oil	1.00
Fluorochemical surfactant	0.02
Sodium carbonate	1.62
Sodium salt of sulfonated oleic acid	1.00
Sodium gluconate	20.0
Sodium resinate	0.25
Trisodium salt of N-hydroxyethyl-ethylenediaminetriacetic acid dihydrate	6.50
Sodium linear alkyl (aryl) sulfonate (85%)	1.00
Sodium metasilicate (anhydrous)	0.10
Zinc silicofluoride, hexahydrate	1.50
Methyl naphthalene sulfonate	1.00
Ferric chloride, hexahydrate	0.01

3.2 Type II. The type II rejuvenating additive shall be made in accordance with the formulation given in table II. It shall pass the tests of 3.9 through 3.14.

TABLE II. Composition of type II.

Ingredient	Percentage by weight	
	Minimum	Maximum
Trisodium phosphate ($\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$)	37.00	---
Mineral seal oil	0.75	1.00
Fluorochemical surfactant	0.02	---
Sodium carbonate	1.50	5.00
Sodium gluconate or glucoheptonate dihydrate	27.0	---
Trisodium salt of N-hydroxyethyl-ethylenediaminetriacetic acid dihydrate	7.00	---
Zinc silicofluoride, hexahydrate	2.00	2.05
Sodium metasilicate (anhydrous)	0.20	0.40
Sodium linear alkyl (aryl) sulfonate (85%) ¹	1.00	1.50
Sodium sulfate	---	15.00
Sodium hexametaphosphate	5.00	---

¹2.00 to 3.00 percent of a 40 percent active material may be used providing the remaining material is sodium sulfate.

3.3 Bluing. When tested in accordance with the following paragraphs, the compound shall not impart a blue color lighter in appearance than that produced by the comparison formula of table I.

3.3.1 Preparation of test panels. The panels, each measuring 65 x 65 x 0.8 millimeter (mm) (2 1/2 x 2 1/2 x 1/32 inches), shall be made of Society of Automotive Engineers (SAE) 1020 cold-rolled steel. A 6 mm (1/4 inch) hole shall be drilled in one corner of each panel. Degrease the panels with acetone and polish both faces with emery cloth, stroking in one direction only. Wash with acetone, using a swab of absorbent cotton, dry with paper toweling, dip in absolute ethyl alcohol and dry again with paper toweling.

3.3.2 Preparation of solution. In a 1200 milliliter (mL) stainless steel beaker, prepare 900 mL each of 36.0 percent (36 grams (g) of compound in 100 mL of solution) solutions in distilled water of both submitted sample and the type I comparison formula of table I.

3.3.3 Test procedure. Bring the solutions prepared as specified in 3.3.2 to a vigorous boil and maintain this temperature throughout the test. Maintain the solution levels by additions of boiling distilled water. Suspend a panel, prepared as in 3.3.1, in each solution 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 beaker. After 60 minutes immersion, remove the panels and rinse for 1 minute in 2 liters of boiling tap water contained in a 3-liter beaker. Allow the panels to dry at room temperature and compare the color as described in 3.3.

3.4 Rust removal. When tested as specified below, the panels cleaned by the compound shall not exhibit a more rusted appearance than that exhibited by the panels cleaned by the comparison formula of table I.

3.4.1 Preparation of rusted panels. The panels, each measuring 65 x 12.5 x 1.25 mm (2 1/2 x 1/2 x 1/20 inches), shall be made of SAE 1010 or 1020 cold-rolled steel. A 6 mm (1/4 inch) hole shall be drilled in one corner of each panel. Thoroughly clean the panels with acetone and expose them to the outside atmosphere for 5 months. For each test, four panels shall be fastened together with iron wire (approximately 0.25 mm (0.01 inch) diameter) interwoven to make a flat assembly measuring 50 x 65 mm (2 x 2 1/2 inches).

3.4.2 Test procedure. Prepare fresh solutions of the sample and comparison formula of table I, prepared as specified in 3.3.2, to a vigorous boil and maintain this temperature throughout the test. Maintain the solution levels by additions of boiling distilled water. Suspend a panel, prepared as in 3.3.1, in each solution 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 beaker. After 30 minutes immersion, remove the panels and rinse under hot tap water while brushing lightly with a fiber brush. Dry the panels with paper toweling and examine the rusted appearance.

3.5 Stability. When tested as follows, the panels cleaned by the corrosion removal compound shall not appear more rusted than those cleaned by the comparison formula of table I. Boil the solutions used in 3.3.3 for 8 hours. Maintain the solution levels by additions of boiling distilled

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water, than repeat the rust removal test of 3.3.3 with unused panel assemblies. Examine and compare the panels for rusted appearance as before.

3.6 Cleaning efficiency. When tested as specified below, the corrosion removal compound shall completely remove mineral oil from steel test panels, the removal being indicated by the absence of any residue or residue stains.

3.6.1 Preparation of soiled panels. The soiling material shall be mineral oil conforming to SAE J1966. Suspend a panel prepared as specified in 3.3.1 on a wire hook and dip into a 400 mL beaker of oil at a temperature of $25 \pm 2^\circ\text{C}$ ($77 \pm 3^\circ\text{F}$). Remove the panel and allow to drain at the same temperature for 30 minutes. Touch the lower corner of the panel with absorbent cotton to remove the hanging drops of oil.

3.6.2 Procedure. In a fresh boiling solution of the sample compound prepared as specified in 3.3.2, suspend a soiled panel (3.6.1) 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 beaker. After 3 minutes immersion, remove the panel and rinse by immersing twice for 6 seconds each time with a 4 second drain between rinses. The rinsing solutions shall consist of two 1-liter beakers, each containing about 800 mL of distilled water at $25 \pm 2^\circ\text{C}$ ($77 \pm 3^\circ\text{F}$). Dry the rinsed panel in a vertical position at $50 \pm 1^\circ\text{C}$ ($122 \pm 2^\circ\text{F}$) for 15 minutes and examine for residue. Run this test in triplicate.

3.7 Dusting. Place 25 g of the sample compound in a clean, dry, glass-stoppered 250 mL graduate. Stopper, invert and immediately return to an upright position. After 5 seconds, remove the stopper and suspend a moistened piece of red litmus paper inside so as to not to touch the sides of the graduate. After 60 seconds, remove the indicator paper and examine for color change. Excessive dusting is indicated by any change in the litmus paper from red to blue.

3.8 Quantitative requirements. Type I and type II compounds shall meet the quantitative requirements of table III when tested in accordance with 3.9 through 3.14 as applicable.

TABLE III. Quantitative requirements.

Ingredient	Percentage by weight	
	Type I	Type II
Sodium hydroxide	60.0 min.	---
Sodium gluconate or glucoheptonate dihydrate	18.0 min.	24.0 min.
Trisodium salt of N-hydroxyethyl-ethylenediaminetriacetic acid dihydrate	3.8 min. ¹	3.9 min. ¹
Total phosphate (as PO ₄).	---	13.0 min.

TABLE III. Quantitative requirements - Continued.

Ingredient	Percentage by weight	
	Type I	Type II
Sodium sulfate	---	16.0 max.
Zinc (as Zinc silicofluoride)	1.3 min.	1.7 min.

¹Minimum requirement for "available" HEDTA as some chelation occurs in the formulation and reduces the amount of excess agent.

3.8.1 Preparation of stock solution (type I corrosion removing compound). Carefully weigh 100 g of the compound as rapidly as possible into a liter beaker. While stirring, add 800 mL of distilled water. Heat the mixture to near boiling and stir to dissolve all the soluble ingredients. Transfer the solution quantitatively to a liter volumetric flask with water. After cooling to room temperature, fill the flask to the mark and mix well. Filter a large portion of this solution, stopper and set aside for the withdrawal of aliquots as needed in the analytical procedures that follow.

3.8.2 Preparation of solution (type II rejuvenating additive). Carefully weigh 100 g of the compound as rapidly as possible into a liter beaker. While stirring, add 800 mL of distilled water. While stirring, adjust the pH of the solution to 3.5 to 4.0 by the addition of concentrated hydrochloric acid (about 25 mL). Heat to boiling, transfer to a liter volumetric flask with water and proceed as in 3.8.1, including the filtration of a portion for aliquot withdrawal.

3.9 Sodium hydroxide.

3.9.1 Preparation of 0.5 N sulfuric acid. Carefully dilute 14 mL of concentrated sulfuric acid to 1 liter with distilled water, mix thoroughly and standardize.

3.9.2 Procedure. Place 200 mL of absolute ethyl alcohol and 30 drops of thymol blue indicator (0.1 percent in ethyl alcohol) in a 500 mL beaker. From a 25 mL burette, add 10 mL of the standardized 0.5 N sulfuric acid to the beaker. While stirring, add 5 mL of the filtered stock solution (3.8.1) from a pipette. Titrate the residual sodium hydroxide with 0.5 N sulfuric acid from the same burette.

Calculation:

$$\text{Percent NaOH} = 8.0 \times \text{mL of acid} \times \text{normality of acid}$$

3.10 Sodium gluconate or glucoheptonate dihydrate.

3.10.1 Preparation of 0.1 N sodium thiosulfate. Dissolve 25 g of reagent grade sodium thiosulfate crystals in distilled water that has been previously boiled and cooled, and dilute to 1 liter. Add 1.0 g of sodium carbonate, mix and allow to stand a minimum of 24 hours before standardizing with resublimed iodine or reagent grade potassium chromate.

3.10.2 Periodic acid, 0.05 M. Dissolve 11.4 g of reagent grade periodic acid dihydrate in distilled water and dilute to 1 liter.

3.10.3 Potassium iodide, 20 percent. Dissolve 200 g of potassium iodide crystals in water and dilute to 1 liter volume.

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3.10.4 Procedure (for type I corrosion removing compound only). Pipette 35 mL of the filtered stock solution (3.8.1) into a 100 mL volumetric flask and dilute to the mark with distilled water. Pipette 5 mL of this diluted sample into a 500 mL glass-stoppered flask. Simultaneously prepare two blanks each containing 5 mL of water in place of the aliquot of sample. Add 2 drops of methyl purple indicator to each flask and make acid by the dropwise addition of 6N sulfuric acid. Pipette 15 mL of the periodic acid solution into each flask, stopper and swirl. Allow the sample and blanks to stand for 1 hour at room temperature in a dark place. At the end of this time, add 100 mL of water, 25 mL of 6 N sulfuric acid, and 30 mL of potassium iodide solution. Titrate with the standard 0.1 N sodium thiosulfate solution, stirring constantly. When the solution is pale yellow, add several milliliters of starch solution and continue to titrate to colorless.

Calculation:

Percent sodium gluconate or glucoheptonate dihydrate =
 (mL thiosulfate for blank - mL for sample) X normality thiosulfate X 15.6

3.10.5 Procedure (for type II rejuvenating additive only). Pipette 35 mL of the filtered stock solution (3.8.2) into a 100 mL volumetric flask and dilute to the mark with distilled water. Pipette 3 mL of this diluted sample into a 500 mL glass-stoppered flask and proceed as in 3.10.4, except omit the acidification step and calculate as follows:

Calculation:

Percent sodium gluconate or glucoheptonate dihydrate =
 (mL thiosulfate for blank - mL for sample) X normality thiosulfate X 26.0

3.11 Trisodium salt of n-hydroxyethylethylenediaminetriacetic acid dihydrate (3Na·EDTAH·2H₂O).

3.11.1 Preparation of buffer solution (pH 10). Add 54 g of ammonium chloride and 350 mL of ammonium hydroxide to a liter flask, dilute to the mark with distilled water and mix.

3.11.2 Zinc oxide solution. Weigh exactly 2.0345 g of oven-dried reagent grade zinc oxide into a 500 mL volumetric flask. Dissolve the oxide in some of the buffer solution (3.11.1) and dilute to the mark with buffer solution.

3.11.3 Eriochrome black T indicator, 0.5 percent. Dissolve 0.50 g of eriochrome black T and 2.2 g of hydroxylamine hydrochloride in 100 mL of methanol.

3.11.4 Procedure (for type I corrosion removing compound only). Pipette 30 mL of the filtered stock solution into a 600 mL beaker containing 5 drops of thymol blue indicator (0.1 percent). Add concentrated hydrochloric acid dropwise until the pale blue color changes to yellow. Add 25 mL of the buffer solution and dilute to 300 mL with distilled water. Add 10 drops of eriochrome black T indicator and titrate with the standard zinc oxide solution to a wine-red endpoint.

Calculation:

Percent $3\text{Na}\cdot\text{EDTAH}\cdot 2\text{H}_2\text{O}$ = mL zinc oxide standard X 0.633

3.11.5 Procedure (for type II rejuvenating additive only). Proceed as in 3.11.4, but omit the addition of the thymol blue and hydrochloric acid.

3.12 Total phosphate.

3.12.1 Ammonium molybdate solution. Mix 55 g of ammonium molybdate tetrahydrate and 50 g of ammonium nitrate with 18 mL of 15 N ammonium hydroxide and 20 mL of water. Stir, dilute to about 700 mL with distilled water, heat for 30 minutes with occasional stirring until all of the salts have dissolved. Dilute to 1 liter, let stand overnight, filter, but do not wash the residue.

3.12.2 Procedure. Pipette 10 mL of the filter stock solution from 3.8.2 into a 400 mL beaker. Add 20 mL of concentrated nitric acid and boil gently for 15 minutes. Dilute to 75 mL and add 10 g of ammonium nitrate and warm and stir until all salt has dissolved. If the solution is not clear, filter through fine filter paper using about 25 mL of water for washing. If filtration is not required, add 25 mL of water to the sample. Place the beaker in a 60°C water bath along with a beaker containing 100 mL of molybdate solution. Allow the contents of the beakers to reach the temperature of the bath. While stirring, pour the reagent into the sample and leave in the bath for 15 minutes. Remove the sample from the bath and allow to stand for at least 1 1/2 hours. Filter through a tared Gooch crucible containing a mat of asbestos. Transfer the precipitate with 1 percent nitric acid followed by one filling with water. Dry at 110°C (230°F) for 1 1/2 hours, cool and weigh.

Calculation:

Percent phosphate (as PO_4) = weight of precipitate X 5.029

3.13 Sodium sulfate.

3.13.1 Barium chloride solution. Dissolve 100 g of barium chloride in distilled water and dilute to 1 liter.

3.13.2 Procedure. Pipette 20 mL of the filtered stock solution from 3.8.2 into a 600 mL beaker. Dilute to 300 mL with water and add 5 mL of concentrated hydrochloric acid. Filter if cloudy. Heat to boiling and add 15 mL of barium chloride solution slowly from a pipette, continue the boiling for 5 minutes. Remove the beaker from the heat and allow to stand for at least 2 hours. Filter the precipitate through a tared, pre-ignited Gooch crucible containing a mat of asbestos. Transfer and wash the precipitate with 200 mL of hot water. Ignite the crucible at 700°C for 1 hour, cool and weigh.

Calculation:

Percent sodium sulfate = weight of precipitate X 30.43

3.14 Zinc silicofluoride.

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3.14.1 Formic acid mixture. Mix together in a liter volumetric flask, 200 mL of formic acid, 30 mL of ammonium hydroxide and 250 g of ammonium sulfate. Dilute to volume with water.

3.14.2 Procedure. Pipette into a 400 mL beaker, a 50 mL aliquot of the compound (3.8.1) or additive (3.8.2). Acidify with sulfuric acid and add 50 mL of concentrated sulfuric acid and 25 mL of concentrated nitric acid. Evaporate to fumes of sulfuric acid, let cool and add 10 mL of concentrated nitric acid. Repeat the additions of nitric acid and fuming until the solution remains light colored on fuming. Continue the fuming until most of the sulfuric acid has been expelled. Dilute the sample, wash and filter through medium porosity paper, washing the beaker and paper thoroughly with water. Add 25 mL of a 25 percent solution of tartaric acid. Neutralize the solution for 30 minutes. Allow to stand for at least 30 minutes and filter through a weighed Gooch crucible that was prepared with a thick mat of asbestos and pre-ignited at 800°C. Transfer the precipitate and wash the beaker and crucible with 0.1 N formic acid that is saturated with hydrogen sulfide. Dry the crucible at 110°C for 30 minutes and ignite in a muffle furnace at 800°C for 30 minutes. Cool and weigh.

Calculation:

Percent zinc silicofluoride = weight of precipitate X 77.586

4. REGULATORY REQUIREMENTS

4.1 Marking, packaging, and labeling. Material shall be labeled, packed, and marked in accordance with Title 49, Code of Federal Regulations (CFR) paragraphs 100 to 185.

4.2 Recycled materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practical, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

4.3 Material safety data sheet (MSDS). An MSDS shall be prepared and furnished in accordance with 29 CFR, paragraph 1910.1200.

5. QUALITY ASSURANCE PROVISIONS

5.1 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.

5.2 Market acceptability. The item offered must have been sold to the government or commercial market.

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

7. NOTES. This section contains information of a general or explanatory nature that is helpful, but is not mandatory.

7.1 Source of documents.

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

7.1.2 Society of Automotive Engineers standards may be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

7.2 Ordering data. Acquisition documents must specify the following:

- a. Title, number, and date of this CID.
- b. Type required (see 2).
- c. Unit and quantity required.
- d. Packaging requirements (see 6).

7.3 National stock number (NSN). The following NSN corresponds to this CID: 6850-00-550-5565. This may not be indicative of all possible NSNs associated with this document.

7.4 Part identification number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor.

TABLE IV. Part identification number.

Type	PIN
Type I	A-A-59261-I
Type II	A-A-59261-II

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

Fine Organics Corporation
205 Main Street
Lodi, NJ 07644
(201) 472-6800

Oakite Products Incorporated
P.O. Box 602
50 Valley Road
Berkeley Heights, NJ 07922
(800) 526-4473

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MacDermid Incorporated
245 Freight Street
Waterbury, Conn. 06702
(203) 575-5700

MILITARY INTERESTS:

Custodians

Army -MR
Air Force - 68
Navy - SH

Reviewer

Army - AR

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - 10FTE

Preparing Activity:
DLA - GS

(Project 6850-1181)