

O-C-1824  
September 13, 1973  
 (see 6.3)

FEDERAL SPECIFICATION  
 CLEANING COMPOUND, SOLVENT,  
 HEAVY DUTY, LIQUID

This specification was approved by the Commissioner,  
 Federal Supply Service, General Services Adminis-  
 tration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a heavy duty, liquid compound suitable for removing such materials as oils, greases, asphalts, tars and some rust preventive compounds, from copper alloy (brass, bronze) and ferrous surfaces. It is not intended for use on aluminum or zinc.

1.2 Classification. The cleaning compound covered by this specification shall be a liquid and of one grade only.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

SS-A-706 - Asphalt, Petroleum: Road and Pavement Construction.  
 TT-P-350 - Pigment, Lampblack-Dry.  
 TT-X-916 - Xylene (For use in Organic coatings).  
 VV-G-632 - Grease, Industrial, General Purpose.  
 PPP-D-729 - Drums, Metal, 55-Gallon.  
 PPP-P-704 - Pails, Metal: Shipping Steel, 1 through 12-Gallon.

Federal Standards:

Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).  
 Fed. Std. No. 313 - Symbols for Packages and Containers for Hazardous Industrial Chemicals and Materials.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. 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 and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

MIL-B-892 - Bronze, Phosphor, Rolled or Drawn; Bars, Plates, Rods, Sheets and Strips.  
 MIL-S-7952 - Steel, Sheet and Strip, Uncoated, Carbon.  
 MIL-L-15016 - Lubricating Oil, General Purpose.  
 MIL-L-15173 - Magnesium Silicate (Flatting Extender Pigment).

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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 suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Law and Regulations:

## 21 CFR # 91 Federal Hazardous Substances Act

(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, DC 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 request for proposal shall apply.

National Motor Freight Traffic Association, Inc., Agent:

## National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

## Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

American Society for Testing and Materials (ASTM) Standards:

- D 92 Test for Flash and Fire Points by Cleveland Open Cup.
- D 97 Test for Pour Point.
- D 611 Test for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents.

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

## 3. REQUIREMENTS

3.1 Material. The compound shall be a clear, homogeneous liquid consisting essentially of organic solvents, soap and water. The compound shall be stable and shall not deteriorate when stored in a closed container. The solvent content shall not be less than 45 percent by weight when tested in 4.2.2.

3.1.1 Excluded ingredients. The compound shall not contain any chlorinated solvents when tested in 4.2.2, or other toxic solvents.

3.2 Chemical and Physical Requirements. This cleaning compound shall conform to the requirements in table I.

TABLE I. Chemical and Physical Requirements

Characteristics	Requirement	Test Paragraph
Flash Point	180°F minimum	4.2.2
Pour Point	10°F maximum	4.2.2
pH	11.0 minimum	4.2.2
Solubility (in water)	Forms clear or opalescent single stable homogeneous phase	4.2.2
Mixed Aniline Point	95°F maximum	4.2.2

**3.3 Corrosion Requirements.** This cleaning compound shall show no greater change in weight of steel and bronze than as follows when tested in 4.2.2.

Steel 0.0002 grams per square inch.  
Bronze 0.0003 grams per square inch.

**3.4 Cleaning Efficiency.** This cleaning compound shall give complete removal of soil and shall not show any redeposition of soil when tested in 4.2.2.

**3.5 Instruction Labels.** A suitable label with the following instructions printed thereon shall be attached to each container.

**Directions for Use:**

1. This product is designed to remove such materials as oil, grease, asphalt, tar, and some rust preventive compounds, from ferrous and copper alloy (brass, bronze) surfaces. It will not remove rust and corrosion. It shall not be used on aluminum or zinc.
2. Heavy duty cleaning compound is concentrated and shall be diluted with from two to ten parts of fresh water depending upon the type and degree of soil to be removed.
3. Apply the diluted compound to the soiled object by spraying, dipping or brushing, and allow to soak until the soil is softened. A high pressure water rinse will emulsify the compound and remove the soil.
4. For closed systems, such as fuel oil heaters, the following procedure shall be used: Drain the system and steam for one hour or until no more oily drops appear in the exit steam. Recirculate diluted compound heated to about 150°F through the system for one to two hours. Rinse system with hot water for approximately 15 minutes and then steam for 15 to 30 minutes. If desired, a final blow-out with air may be made.

**4. QUALITY ASSURANCE PROVISIONS**

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary that supplies and services conform to prescribed requirements.

**4.1.1 Inspection.** Sampling for inspection shall be performed in accordance with MIL-STD-105, except where otherwise indicated.

**4.1.2 Sampling.** Samples of shipping containers and filled containers shall be examined for the defects set forth in the applicable paragraphs. The inspection level shall be I and acceptable quality levels (AQLs) shall be 2.5 defects per hundred units. For sampling purposes, the lot shall consist of all of the same package size, manufactured under the same conditions and essentially at the same time and presented for inspection at one time.

4.1.2.1 Sampling for acceptance. From each inspection lot offered for Government inspection, one 1-gallon specimen shall be taken and placed in separate, clean, dry, metal or glass containers, sealed, marked, and one shall be forwarded to the testing laboratory designated by the bureau or agency concerned (see 6.2). Samples will be taken from a minimum of two containers randomly selected from the lot.

#### 4.2 Quality Conformance Inspection.

4.2.1 Examination of preparation for delivery. An examination shall be made to determine whether markings, materials, and workmanship comply with the requirements of section 5. The sample unit shall be one shipping container, fully filled and closed ready for shipment. Examine for defects in table II.

TABLE II. Examination of preparation for delivery

Examine	Defect
Marking	Incorrect; incomplete; illegible; omitted; improper size, location, sequence, or method of application.
Containers	Not as specified.
Material	Not as specified, damaged, leaking, or otherwise defective, not new.
Workmanship	Dents, improper closure.
Contents	Not as specified.

4.2.2 Examination of the end item. One of the sample specimens selected in 4.2.1 shall be subject to tests specified in Table III. If the specimen fails one or more of these tests, the lot shall be rejected. Contractors not having satisfactory laboratory facilities shall engage the services of a commercial testing laboratory acceptable to the Government. The contractor shall furnish the inspector test reports, in duplicate, showing quantitative results for all the required tests, and signed by the director of the laboratory or his authorized assistant. Acceptance or approval of material during the course of manufacturing shall not be construed as a guaranty of approval of the finished product.

TABLE III. Instructions for Testing Material

Characteristic	Requirement Reference	Reference Test Method	Requirement Applicable to	Results Reported to Nearest
Solvent Content	3.1	4.3.1	Lot average	1 percent
Chlorinated Solvent	3.1.1	4.3.2	Lot average	Pass/Fail
Flash Point	3.2	ASTM D92	Lot average	5°F
Pour Point	3.2	ASTM D97	Lot average	5°F
pH (50%)	3.2	4.3.3		
Solubility	3.2	4.3.4	Lot average	Pass/Fail
Mixed Aniline Point	3.2	ASTM D611	Lot average	5°F
Corrosion	3.3	4.3.5	Lot average	0.0005 grams per square in.
Cleaning Efficiency	3.4	4.3.6	Lot average	Pass/Fail

#### 4.3 Test Methods.

4.3.1 Solvent content. The solvent content shall be determined by weighing 100 ± 0.1 gram (g) of compound into a 1000 milliliter (ml) round bottom flask. Add twenty g of anhydrous barium chloride dissolved in 100 ml of water to the flask

and steam distill the mixture. Collect the distillate in 250 ml graduated cylinders. Continue the distillation until not more than 1 ml of solvent comes over with 250 ml of distillate. Note the total volume of nonaqueous layers. Combine the solvent portions from the several collecting cylinders, dry over anhydrous sodium sulfate and filter through a No. 12 fluted Whatman paper. Determine the specific gravity at 25°C/25°C by pycnometer. Calculate the weight percent of solvent as follows:

$$\text{Percent solvent} = \frac{\text{Volume of nonaqueous steam distillate} \times \text{specific gravity} \times 100}{\text{Weight of sample}}$$

The solvent shall be reserved for mixed aniline point and chlorinated solvent tests.

**4.3.2 Qualitative test for chlorinated solvent.** The presence or absence of chlorinated solvent shall be determined by the Beilstein test, as follows: Make a small loop in the end of a copper wire and heat in Bunsen flame until the flame is no longer colored. Cool the wire and dip the loop in the solvent obtained from the steam distillation. Heat the loop in the edge of the Bunsen flame. A green-colored flame indicates chlorinated solvent.

**4.3.3 pH.** The pH shall be determined at 25 ± 1°C on a 1 to 1 mixture by volume of compound and distilled water using a pH meter with an alkali-resistant glass electrode.

**4.3.4 Solubility in water.** To determine solubility in water add 40 ml of distilled water to 10 ml of compound in a 50 ml glass-stoppered graduated cylinder. Stopper the cylinder and invert two or three times. Examine the solution immediately for clarity.

**4.3.5 Corrosion.** Polish two strips, 3 by 3/4 by 1/16 inch, each of mild steel and bronze, conforming to Specification MIL-S-7952 and MIL-B-892, respectively, with No. 1 emery paper. Degrease the strips by swabbing in a mixture of equal parts of alcohol and acetone. Allow the solvent to evaporate, heat in an oven at 105°C for 30 minutes and cool and weigh the strips to the nearest 0.1 milligram (mg). Into test tubes measuring approximately 1 by 12 inch pour 160 ml of a mixture of 1 part of compound to 2 parts of distilled water by volume. Heat the tubes in an oven until the temperature of the liquid reaches 54 ± 2°C, add one piece of test metal to a tube and seal with a stopper. Maintain at 54 ± 2°C for 24 hours. At the end of 24 hours, remove the strips, rinse thoroughly with cold tap water, then with acetone, and dry for 30 minutes in an oven at 100 to 105°C. Cool, reweigh the strips to the nearest 0.1 mg and calculate the average weight change for each metal as grams per square inch of exposed surface.

#### **4.3.6 Cleaning efficiency.**

**4.3.6.1 Preparation of soiled panels.** Polish four pickled mild steel squares and four bronze squares, each approximately 1 by 1 by 1/16 inch, with No. 1 emery paper. Completely cover one side of two steel and two bronze squares by brushing on the following well-mixed soil of the following components by percent weight:

Grease, conforming to type B, grade 2 of Specification VV-G-632 . . . . .	75
2190 lubricating oil conforming to Specification MIL-L-15016 . . . . .	18
Magnesium silicate conforming to type B of Specification MIL-L-15173 . . . . .	5
Lampblack conforming to Specification TT-P-350 . . . . .	2

Completely cover one side of the other two steel and two bronze squares by brushing on, with the squares in a horizontal position, the following well-mixed soil:

Asphalt, conforming to grade 100 to 120, of Specification SS-A-706 . . . . .	50 g
Xylene conforming to Specification TT-X-916 . . . . .	50 g

The soiled squares shall then be baked in a horizontal position in a circulating oven at 105 ± 2°C for one hour.

**4.3.6.2 Preparation of solution.** Mix 400 ml of compound with 1600 ml of distilled water.

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4.3.6.3 Apparatus. Apparatus shall be a launderometer or similar machine in which tightly capped one-pint jars are held with their bases toward a horizontal shaft two inches from the center of rotation with the shaft rotating at a speed of 40 to 45 r.p.m. Provision is made for maintaining the required temperature of the contents of the jar within plus or minus 1.1°C (2°F) by means of a water bath in which the jars are rotated.

4.3.6.4 Procedure. Pour 200 ml of solution into each of 8 one-pint Launderometer jars. Immerse a soiled metal square in each solution. Seal the jars, place them in a Launderometer and rotate for 15 minutes at 140°F. Remove the squares from the solution and rinse under cold tap water. Examine the squares visually and note whether all of the soil has been removed and also whether there is any redeposition on the unsoiled reverse side on each panel.

## 5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A or C, as specified (see 6.2).

5.1.1 Level A. The cleaning compound shall be furnished in five-gallon pails conforming to PPP-P-704, type I or in 55 gallon drums conforming to PPP-D-729, type III, as specified (see 6.2). Closure of the pails or drums shall be in accordance with the appendix to the applicable specifications.

5.1.2 Level C. The cleaning compound in quantities as specified (see 6.2) shall be packed to insure protection during shipment and safe delivery to destination in compliance with the National Motor Freight Classification rules or the Uniform Freight Classification rules.

5.2 Palletization. Unless otherwise specified (see 6.2) the cleaning compound furnished in 5 gallon quantities shall be palletized in accordance with MIL-STD-147.

5.3 Marking. The labeling and marking shall comply with the Federal Hazardous Substances Labeling Act and Regulations Promulgated thereunder. In addition to any special marking required in the procurement documents, the marking of the containers shall be in accordance with diagram I, Fed. Std. No. 313 and Fed. Std. No. 123 for Civil agencies or MIL-STD-129 for Military agencies, as applicable (see 6.2).

## 6. NOTES

6.1 Intended use. The cleaning compound covered by this specification is intended for use in the cleaning of copper alloy (brass and bronze) and ferrous surfaces from oils, greases, asphalts, tars, and some rust preventative compounds. It will not clean rust and corrosion. IT SHALL NOT BE USED ON ALUMINUM OR ZINC SURFACES. This compound may be diluted with fresh water depending on the type and degree of soil to be removed. Use may be by spraying, dipping or brushing.

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

- (a) Title, number, and date of this specification.
- (b) Quantity per container (see 5.1).
- (c) Marking requirement (see 5.3).
- (d) Level of packing required (see 5.1).
- (e) When palletization is not required for 5 gallon quantities (see 5.2).

6.3 This specification supersedes the requirements of Military Specification MIL-C-20207C.

MILITARY INTEREST:

Preparing Activity: GSA-FSS

Custodians:

CIVIL AGENCY COORDINATING ACTIVITIES: GSA-FSS

Army-MU  
Navy-SH

Coordinating Activity: GS

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein. Price 10 cents each.