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2 November 1995
SUPERSEDING
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(See 6.6)

MILITARY SPECIFICATION

LUBRICANT, COLLOIDAL GRAPHITE IN ISOPROPANOL

1. SCOPE

1.1 Scope. This specification covers a noncorrosive, dry, adherent lubricant consisting of a colloidal dispersion of graphite in isopropanol, intended for use with metal parts having limited clearances in applications where control of impurities is required.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

TT-I-735	-	Isopropyl Alcohol.
PPP-P-1892	-	Paint, Varnish, Lacquer and Related Materials; Packaging, Packing, and Marking of.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 9150

STANDARDS

MILITARY

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

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

Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D516 - Sulfate Ion in Industrial Water and Industrial Waste Water, Tests for.
D1179 - Fluoride Ion in Industrial Water and Industrial Waste Water, Tests for.
D1208 - Common Properties of Certain Pigments

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

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services).

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for associated detailed specifications, specification sheets or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.3 Qualification. The lubricant furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.2 and 6.4).

3.2 Materials. The lubricant shall consist of colloidal graphite dispersed in isopropanol with a binder and dispersant.

3.2.1 Isopropanol. The volatile diluent shall be isopropyl alcohol in conformance with the requirements of grades A or B of TT-I-735.

3.2.2 Binder and dispersant. The binder and the dispersant shall be nonionic organic materials which are not corrosive to metals. The binder and dispersant shall form a dry film which holds the graphite to the surface to which the lubricant is applied. The lubricant shall not form a hard unstirrable cake on settling in storage.

3.2.3 Graphite. Electric furnace graphite, 99 percent purity or higher, shall be used in the preparation of the lubricant.

3.2.4 Dried solids composition (washed solids). Dried solids from the lubricant shall contain 75 percent ± 5 percent graphite (see 4.4.3).

3.3 Physical and chemical requirements. Each batch of lubricant shall conform to the requirements specified in table I.

Table I - Physical and chemical requirements.

Total solids content; weight percent	3.3 ± 0.5
Graphite content (percent of total solids)	75 ± 5
Particle size, microns	
Maximum dimensions of 90 percent of the particles	4
Maximum dimension of any particle	10
Ash; weight percent,	
Maximum on total solids	0.75
Fluorine, parts per million, (ppm)	
Maximum on total solids	20
Chlorine, parts per million,	
Maximum on total solids	200
Sulfur, parts per million	
Maximum on total solids	200
Lead, parts per million	
Maximum on total solids	150

Film properties:	
Adherence	The coated surface shall be dry and shall not become exposed when subjected to light abrasion.
Spalling	Film continuity shall not be broken, metal surface shall not be exposed.
Appearance	Dry, nonoily.

3.4 Package stability. The lubricant shall be capable of being manually stirred or blended to a smooth lump-free dispersion with no hard cake sediment remaining for a period up to six months after delivery (see 4.4.2).

3.5 Mercury, lead, and boron prohibitions.

(a) Mercury. Instruments and equipment containing mercury or compounds of mercury shall not be used in the manufacture and packaging of the lubricant, nor in testing and inspection unless samples are discarded after test.

(b) Lead. Ingredients, processing equipment, and containers shall be sufficiently free of lead or compounds of lead that the dried solids of the lubricant shall not contain more than 150 ppm of lead (see 4.4.1).

(c) Boron. Compounds containing boron shall not be used in cleaning and processing equipment or containers.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements, examinations and tests as specified herein. Except as otherwise specified in the contract or purchase order, or disapproved by the Government, the contractor may use his own or other facilities suitable for the performance of the inspection requirements herein. The authorized representative 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.

4.1.1 Inspection system. The contractor shall provide and maintain an inspection system. In addition, the contractor shall maintain a traceability system to ensure the proper identity of material.

4.1.2 Reports. Three copies of certified reports, with the information listed below and in the format shown in Figure 1, shall be furnished by the supplier. These reports shall include:

(a) Lot number of the supply, purchaser's order number.

(b) The batch number(s) of the high solids mill dispersion.

(c) The batch number(s) of the solvent (isopropanol) used in the high solids mill dispersion and in the final product.

(d) The actual results of each production inspection and test.

(e) The certification of cleanliness required by 4.3.4.3(b), when applicable.

(f) A statement of compliance to the qualification approval requirements and the date and a copy of the record of approval of qualification tests and inspection data by NAVSEA or its authorized representative.

4.2 Qualification tests. Qualification tests shall be conducted at a laboratory satisfactory to NAVSEA. Qualification tests shall consist of the tests specified in 4.4, in addition to the quality conformance inspections and tests specified in 4.3. Application for qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.4 and 6.5).

4.3 Quality conformance.

4.3.1 Inspections, tests, sampling and reports shall be in accordance with the requirements of this specification.

4.3.1.1 Lot. A lot of lubricant offered for delivery shall consist of all material manufactured in one operation using high solids graphite mill dispersion and solvent (isopropanol), each of one batch designation.

4.3.1.2 Batch. A batch of ingredient or semi-finished materials shall consist of a quantity of material produced at one time for use in the final product and identified by a designation characteristic of the one batch.

4.3.2 Samples. Samples taken shall be from the final product in the marked approved containers (see 5.2 and 5.3). Samples shall be held in the container for at least 24 hours and shaken thoroughly before specimens are taken for test. When the election to perform the analysis for ash, chlorine, fluorine and sulfur on the high solids graphite mill dispersion is made, the supplier shall also take at least two representative samples from each storage tank or storage container.

4.3.3 Quality conformance inspection.

4.3.3.1 Film properties. Film properties shall be determined on both regular and irregular surfaces.

4.3.3.1.1 Regular surface. A single thickness of lubricant approximately 2 square inches in area shall be brushed on a metal surface and permitted to dry for at least 5 minutes to determine compliance with table I. The metal shall be at least 1/4 inch thick and the surface shall be dry, clean, free of mill scale, and have a surface finish of 32 to 63 microinches. Film properties shall be determined as follows:

(a) Appearance - The film shall be examined visually.

(b) Adherence - Adherence shall be determined by rubbing the dry film with the finger, using moderate pressure.

(c) Spalling - Spalling shall be determined by sharply tapping the metal surface with the edge of a spatula while the metal is held above a white surface. The metal shall be tapped in an area of the metal surface not coated with lubricant.

4.3.3.1.2 Irregular surface. A single coat of lubricant shall be brushed on the threads of a 3/4-10 steel machine bolt and permitted to dry for at least 5 minutes to determine compliance with table I. The threads shall be dry, clean, and free of rust and scale. Film properties shall be examined as follows:

(a) Appearance - The film shall be examined visually.

(b) Adherence - Adherence shall be determined by running an unlubricated 3/4-10 nut on and off the bolt by hand.

(c) Spalling - Spalling shall be determined by tapping the head of the bolt with a spatula while the bolt is held upright above a white surface.

4.3.4 Quality conformance tests.

4.3.4.1 Particle size. The particle size shall be determined optically by the following procedure or by an equally accurate alternate procedure which has been approved in writing.

4.3.4.1.1 Procedure. Dilute a sample of the thoroughly mixed lubricant with isopropanol to yield a mixture with 0.2 weight percent solids. Place one drop of the thoroughly mixed diluted lubricant on a microscope slide and immediately protect the lubricant by placing a cover glass over it. Place a drop of immersion oil on the cover glass and place the microscope slide with cover glass on the stage of a microscope with lighting furnished through the window in the stage and through an Abbe type condenser or equal. Bring the oil immersion lens into contact with the drop of oil and observe the lubricant particles at 1000 diameters. Make a search of the drop of lubricant in areas thin enough to permit inspection of the separated particles.

4.3.4.2 Total solids. Total solids (non-volatile) shall be determined in the following manner or by an equally accurate alternate procedure which has been approved in writing.

4.3.4.2.1 Procedure. Dry a clean Vycor evaporating dish at 570°F ± 5°F for approximately 30 minutes, cool in a dessicator and determine its tare weight to ± 0.0001 gram. Repeat this step until constant weight is obtained. Mix the contents of the bulk lubricant container thoroughly. Weigh approximately 3 grams of lubricant to ± 0.0001g into the tared Vycor dish. Allow bulk solvent to evaporate overnight at room temperature in a clean, well ventilated area prior to any heating of sample. Heat the Vycor dish and lubricant contents to 230°F ±5°F for 1.5 hours in a ventilated laboratory oven.

Cool the Vycor dish and residue in a dessicator and weigh. Identify this residue s residue (1) and store the Vycor dish and residue in a dessicator until ready to perform graphite content testing in accordance with paragraph 4.4.3. From the weight of the residue in the dish and the weight of sample taken, calculate the percent by weight of total solids using the following expression:

$$\text{Total solids, weight percent} = \frac{\text{wt of residue (1)}}{\text{wt of sample}} \times 100$$

The total solids (non-volatile) content shall be in accordance with table I.

4.3.4.3. Ash, chlorine, fluorine, and sulfur. Analysis shall be made on oven dried solids obtained by the methods of 4.3.4.2 and reported in parts per million (ppm) found in the oven dried solids.

(a) If the supplier elects to perform the analysis on the high solids graphite mill dispersion, he shall clean all equipment used for storage of the mill grind and for all subsequent processing and filling to be free of all contamination, including cleaning materials. Inspections shall be performed visually. Compounds containing boron, halides, or sulfur shall not be used in cleaning. Equipment segregated for use in preparing this lubricant only, may be cleaned by rinsing with isopropanol using new or segregated cleaning tools.

(b) The supplier shall certify that the requirements of 4.3.4.3(a) have been met and that no additions other than isopropanol have been made to the high solids graphite mill dispersion.

4.3.4.3.1 Ash shall be determined by the Loss on Ignition and Ash test of ASTM D1208 or by an equally accurate alternate procedure which has been approved in writing.

4.3.4.3.2 Analytical procedures for chlorine and sulfur. Either spectrophotometric method (see 4.3.4.3.3) or the X-ray method (see 4.3.4.3.4) shall be used for chlorine determination. Either the X-ray emission method or turbidimetric method (see 4.3.4.3.5) shall be used for sulfur determination. Equally accurate alternate methods, approved in writing, may also be used.

4.3.4.3.3 Spectrophotometric method for chlorine.

(a) Optical density shall be measured on a prepared solution against a reference solution in 5 centimeter (cm) cells by a Beckman Model "B" Spectrophotometer, or equal, at 470 millimicron (mu) and compared to the readings obtained on a series of standard solutions containing no more than 2000 micrograms of chlorine per liter. A blank determination shall be made in all cases.

(b) A solution shall be prepared by fusing a 0.1-gram (g) sample with 1.0 gram of sodium carbonate at 1620°F for 2 hours in a platinum crucible. The melt shall be dissolved in a limited amount of water, filtered, if necessary, and the solution prepared as in (c).

(c) Add in turn to a 50 milliliter (ml) volumetric flask the dissolved melt, 3 ml of 6N nitric acid, 2 ml each of reagents 1 and 2 and water to 50 ml, mixing thoroughly at each addition. Then read 15 minutes after preparation. The reference solution shall be water.

(d) Reagents. Reagents, including water, shall be of suitable analytical grade. Reagent solutions shall have the following composition:

(1) 99.7 grams of $Fe_2 (SO_4)_3 \cdot (NH_4)_2SO_4 \cdot 24H_2O$ per liter dissolved in 6N nitric acid. Store in a brown bottle for 24 hours before use.

(2) 7.5 grams of $Hg (SCN)_2$ dissolved in 500 ml methyl alcohol, mixed at least 1 hour with a magnetic stirrer and filtered through Whatman No. 41 paper, or equal.

4.3.4.3.4 X-ray emission method for sulfur or chlorine.

(a) Apparatus. An X-ray emission spectrograph with provision for vacuum or helium operation, pulse height selection, a thin window (i.e. 1/4 mil mylar or thin formvar with P-10 gas of 1 mil nonporous beryllium, if sealed), proportional counter tube and a crystal with a 2 d (lattice spacing) greater than 5.6Å (Angstrom) shall be used. For most efficient operation on chlorine or sulfur in the ppm range, an optimum high voltage, a chromium target tube and a wide (about 20 mil) collimator, shall be used.

(b) Standards. Matrix material shall be colloidal graphite powder with the content of the element(s) being determined sufficiently low so that the additional count rate due to the element is less than 10 percent of the background. Standards covering the concentration range expected shall be made by adding a uniform dispersion of known amounts of the element as salts. The standards shall be compacted with a flat surface large enough to cover the aperture in the specimen holder. The net count rate shall increase linearly with concentration.

(c) Specimen. Evaporate the isopropanol from a quantity of lubricant sufficient to yield 2-3 grams of solid graphite. Compress the powder into a pellet one inch in diameter.

(d) Procedure.

(1) Spectrographic operating conditions, including line angle, background angle, pulse height adjustment and alignment, shall be established on a standard containing about 10 percent of the element (chlorine or sulfur) to be determined.

(2) Counting time for the specimen and for standards shall be adequate to determine the net count rate (count at line angle less count at background angle) with the desired precision.

(3) The specimen and standards bracketing the concentration range of the specimen are counted using identical procedures, and the element concentration is read from a plot of net count rate against the element concentrations of the standard.

NOTE: Line interferences of first and higher order are rare. If a particular interference is suspected, other lines of the interfering element should be sought, and if found, the chlorine or sulfur count rate corrected for the contribution of the interfering lines.

4.3.4.3.5 Turbidimetric method for sulfur. Turbidimetric method for sulfur shall be as follows:

(a) Solutions shall be prepared by fusing one gram samples of solid with 10 grams of sodium carbonate at 1620°F for two hours in a platinum crucible. The melt shall be dissolved in about 25 ml of water. Approximately 16 ml of concentrated hydrochloric acid (HCl, Sp. gr. = 1.19) shall be added to the solution, and the solution shall be filtered. The volume of the filtrate shall be adjusted to 50 ml with water and the temperature of the solution shall be adjusted to between 60° and 85°F.

(b) From this point follow ASTM D516, Non-Referee Method A (turbidimetric method), for sulfate in industrial water, with the following modifications:

(1) To each of the standards prepared in accordance with the calibration method of ASTM D516, add 10.8 grams of sodium chloride.

(2) Read absorbance versus time and use the maximum absorbance reading. For the concentration normally found in colloidal graphite in isopropanol, attainment of maximum absorbance will require more than five minutes.

(c) Calculate ppm sulfur by multiplying ppm sulfate by 0.3337.

4.3.4.3.6 Colorimetric method for fluorine. The sample shall be fused with sodium carbonate and dissolved in water. The fluoride shall be distilled as hydrofluosilicic acid and shall be determined colorimetrically, using the zirconium-alizarin visual method. Equally accurate alternate test methods, approved in writing, may also be used.

(a) Apparatus. A distillation assembly similar to that described in ASTM D1179. A burner can be used if a quartz heating mantle is not available.

(b) Reagents.

(1) Acid-zirconyl-alizarin reagent. This is a mixture of two solutions:

Solution A - Dilute 101 ml of concentrated HCl to approximately 400 ml with water. Add carefully 33.3 ml of concentrated H_2SO_4 to approximately 300 ml of water. After cooling, mix the two acids.

Solution B - Dissolve 0.30g of zirconyl chloride octahydrate ($ZrOCl_2 \cdot 8H_2O$) in approximately 50 ml of water in a 1 liter volumetric flask. In a separate container, dissolve 0.07g of sodium alizarin sulfonate (alizarin red S) in approximately 50 ml of

water and pour slowly into the zirconyl solution. The resulting solution, after mixing, clears after standing for a few minutes. (At this point, do not dilute.)

Add solution A to solution B, dilute to 1 liter, and mix thoroughly.

(2) Standard. (1.0 ml - 0.01 milligram (mg) F) Dissolve 0.221g of sodium fluoride (NaF) in water and dilute to 1.0 liter. Dilute 100 ml of this solution to 1.0 liter with water. Store in a polyethylene bottle.

(c) Procedure.

(1) Fuse 2.5g of solids with 10g of sodium carbonate at 1650°F for 2 hours in a platinum crucible. Dissolve the melt in about 200 ml of water. Filter through Whatman No. 31 filter paper. Add 9 ml of 1:1 H_2SO_4, and dilute to 250 ml.

(2) Distillation. Perform the preliminary procedure as described in ASTM D1179 paragraph 11.1.1. Cool the acid-water mixture to below 100° Celsius (C) and add slowly the 250 ml of sample solution. Mix thoroughly and distill until 250 ml of distillate is collected.

(3) Prepare a series of standards by diluting 1, 2, 3 and 4 ml of the fluoride working standard to 100 ml in Nessler tubes. Transfer 100 ml of distillate into a Nessler tube. Add 5.0 ml of the acid zirconyl-alizarin reagent to each solution and mix thoroughly. Compare the sample and standard visually after standing 1 hour.

$$\text{Fluorine, ppm} = \frac{A \times 1000}{S}$$

Where A = mg of F in standard
S = g of sample in 100 ml of the distillate

4.4 Tests.

4.4.1 Lead. Analysis shall be made on oven dried solids obtained by the methods of 4.3.4.2 and reported in parts per million (ppm) found in the oven dried solids. Lead shall be determined by emission spectroscopy or x-ray emission methods. Equally accurate alternate test methods, approved in writing, may also be used.

4.4.2 Package stability. A sample container shall be held in undisturbed shelf storage for 60 days. At the expiration of this storage time, the contents shall be manually stirred and blended with a spatula for a period not exceeding five minutes. The lot shall be acceptable for package stability if within the 5 minutes no undispersed material can be found in the container by using the spatula, and no obviously undispersed material is visible on the spatula blade as it is removed from the container and allowed to drain.

4.4.3 Graphite content. The following procedure shall be used for the determination of graphite content. An equally accurate alternate procedure, approved in writing, may also be used. Heat the Vycor dish and total solids residue (1) form 4.3.4.2.1 to 570°F ±5°F for approximately 1.5 hours in a muffle furnace. Cool the Vycor dish and residue in a dessicator and weigh to ± 0.0001 gram. Identify this residue as residue (2). The graphite content shall be 75 percent ± 5 percent of the total solids (4.3.4.2.1, residue (1)) as determined by the following formula:

$$\text{Graphite content (percent of total solids)} = \frac{\text{Residue weight (2)}}{\text{Residue weight (1) (4.3.4.2.1)}} \times 100$$

4.5 Duration of files. The manufacturer shall maintain for a period of 7 years from shipment date, a record file for products furnished on a particular order. The file shall be disposed of or sent to Government storage facilities at the end of 7 years at the discretion of NAVSEA or its authorized representative. This file shall contain all test reports and examination records compiled in compliance with this specification.

4.6 Inspection of preparation for delivery. Packaging, packing, and marking shall be examined to determine conformance with the requirements of Section 5 of this specification.

4.6.1 Container leakage. Filled lubricant containers shall meet the leakage requirements of PPP-P-1892.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing. The lubricant shall be packaged and packed in accordance with level C of PPP-P-1892, unless otherwise specified (see 6.1), and in accordance with 5.2 and 5.3.

5.2 Containers.

5.2.1 Lubricant containers shall have a capacity of either two to three fluid ounces or eight to ten fluid ounces net, as specified (see 6.1), and shall have a screw cap with brush applicator. The container shall be leak tight and unbreakable and shall be identical to that recorded as having been used in qualification tests approved by NAVSEA or its authorized representative.

5.2.2 The containers and caps shall be either nonhalogenated plastic or seamless uncoated tinned metal and shall be essentially unaffected by the lubricant. The container materials in contact with the lubricant shall be sufficiently inert, corrosion resistant and sufficiently free of lead, halides, sulfur or other contaminants that the requirements of 3.2 and 3.4 can be met throughout the shelf life of the lubricant.

5.3 Marking and labeling. Marking and labeling shall be in accordance with the requirements of MIL-STD-129. A legend in black letters against a strong yellow background shall appear on each lubricant container. The legend may be printed or be on an affixed label, but shall be of such quality that it will withstand normal handling and use without obliteration or loss. The legend shall include the following:

WARNING - FLAMMABLE

Graphite in isopropanol - (The number of this specification)
Manufacturer's information: (Name - address)
Lot number _____ Date _____
Federal stock number _____
Keep container closed, mix thoroughly before using

The words, "Graphite in isopropanol" and "Keep container closed, mix thoroughly before using" shall be in larger letters than the other lettering.

6. NOTES

6.1 Ordering data. Procurement documents should specify the following:

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

(b) Packaging and packing levels, if other than level C (see 5.1).

(c) Capacity of container required (see 5.2.1).

6.2 Definitions.

(a) Approval or approved. Unless specifically otherwise stated, approval or approved means action taken by the Naval Sea Systems Command (NAVSEA) or its authorized representative.

(b) Authorized representative.

1. The Commander of a naval shipyard, for vendors to the shipyard.
2. The Supervisor of Shipbuilding, for commercial shipyards.
3. The shipbuilder, for commercial shipyard subcontracted acquisitions.
4. That prime contractor of NAVSEA, other than a shipbuilder, who has design or procurement responsibility, for vendors to the contractor.
5. NAVSEA, for naval shipyards.

(c) Naval Sea Systems Command (NAVSEA). The command of the Government having cognizant authority.

(d) Supplier. The Seller under the contract or purchase order which incorporates this specification.

6.3 Supplier submittal requirements. The following is a list of supplier submittals required by this specification.

6.3.1 Prior to use. The following submittals are required prior to use:

(a) Alternate test methods for qualification, quality conformance and other tests for approval (see 4.3, 4.3.4, 4.4).

6.3.2 At time of delivery. The following submittal is required at time of delivery.

(a) Quality conformance test report (see 4.1.2).

6.4 With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in applicable Qualified Products List QPL-24131 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 Lists is NAVSEA, and information pertaining to qualification of products may be obtained from that activity. Application for Qualification tests shall be made in accordance with "Provisions Governing Qualification SD-6" (see 6.5).

6.5 Copies of "Provisions Governing Qualification SD-6" may be obtained upon application to Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Preparing activity:
Navy - SH
(Project 9150-N825)

Properties of product materials
Lot number Purchase order number
Batch number of concentrate
Batch number of isopropanol
(a) Used in concentrate
(b) Used in product dilution
Leakage

Film properties	Regular surface	Irregular surface
(a) Appearance	_____	_____
(b) Adherence	_____	_____
(c) Spalling	_____	_____

Particle size
(a) Percent under 4 microns
(b) Percent over 10 microns
Total solids (percent)
Graphite content (percent of total solids)
Analysis based on total solids
(a) Ash (percent)
(b) Chlorine ppm
(c) Sulfur ppm
(d) Fluorine ppm
(e) Lead ppm
(ppm - parts per million)
Qualification approval
Approving organization
Date of approval letter

The above tests were conducted in accordance with the applicable paragraphs of this and reference documents.

Signature _____

Title _____

FIGURE 1. Sample of certification of quality conformance form.