METRIC

DOD-P-24631(SH)
13 April 1984

MILITARY SPECIFICATION

PAINTS, CAMOUFLAGE FOR SUBMARINES, GENERAL SPECIFICATION FOR (METRIC)

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers requirements for three colors of camouflage paints.

1.2 Classification. Camouflage paints are based on two different resins (epoxy and chlorosulfonated polyethylene) and three colors of each type, which are classified as follows (see 6.2.1):

Type I - Black, R_O 1.8 - wet green reflectance R_W 0.8-1.02 percent. Navy formulas 184 (epoxy) and 187 (chlorosulfonated polyethylene).

Type II - Dark Grey, R_O 3.6 - wet green reflectance R_W 1.74-2.06 percent. Navy formulas 185 (epoxy) and 188 (chlorosulfonated polyethylene).

Type III - White, as white as, or whiter than Fed. Std. 595 color No. 28876. Navy formulas 186 (epoxy) and 189 (chlorosulfonated polyethylene).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

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 by using the self-addressed Standardization Document Improvement Proposal (DD Fom 1426) appearing at the end of this document or by letter.

FSC 8010

SPECIFICATIONS

FEDERAL

TT-B-838 - Butyl Acetate; Normal (For Use in Organic Coatings).
TT-E-781 - Ethylene Glycol Monoethyl Ether, Technical.
PPP-P-1892 - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of.

MILITARY

MIL-E-7125 - Ethylene Glycol Monoethyl Ether Acetate.

STANDARDS

FEDERAL

FED-STD-141 - Federal Test Method Standard.
FED-STD-313 - Material Safety Data Sheets Preparation and the Submission of.

(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 officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

ASTM

D 93 - Flash Point by Pensky-Martens Closed Tester, Test Methods for. (DoD adopted)
D 304 - Normal Butyl Alcohol (Butanol).
D 523 - Specular Gloss, Test Method for. (DoD adopted)
D 562 - Consistency of Paints Using the Stormer Viscometer, Test Method for.
D 822 - Operating Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products, Practice for. (DoD adopted)
D 1210 - Fineness of Dispersion of Pigment - Vehicle Systems, Test for. (DoD adopted)
D 1308 - Effect of Household Chemicals on Clear and Pigmented Organic Finishes, Test for. (DoD adopted)
D 1475 - Density of Paint, Varnish, Lacquer, and Related Products, Test for. (DoD adopted)
D 2244 - Color Differences of Opaque Materials, Method for Instrumental Evaluation of. (DoD adopted)
D 2369 - Volatile Content of Solvent-Reducible Paints. (DoD adopted)
D 2698 - Determination of the Pigment Content of Solvent - Type Paints by High-Speed Centrifuging. (DoD adopted)
D 2805 - Hiding Power of Paints, Test for.

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Rules and Regulations
Rule 102

(Application for copies should be addressed to the South Coast Air Management District, 9150 E. Flair Drive, El Monte, CA 91731.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 First article. When specified (see 6.2.1), a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.3 Description. The paint shall be manufactured (see 6.1), and supplied as a two component system formulated in accordance with the applicable specification sheet to produce a uniform, high quality product which meets all requirements.

3.4 Composition. The paint supplied shall consist of ingredients in the proportions shown in the individual formulas (see 6.4), except that minor variation of the ratio of titanium dioxide to carbon black is permitted to meet the color requirements, provided all other specification requirements are met.

3.5 Quantitative requirements. The paints shall conform to the quantitative requirements (see 6.4) when tested in accordance with 4.4.

3.6 Volatile portion. The volatile portion of the paints shall conform to the following requirements by volume:

(a) Aromatic compounds with eight or more carbon atoms: 8 percent, maximum.
(b) Ethylbenzene and toluene: 1 percent, maximum.
(c) Branched chain ketones or trichloroethane: 1 percent, maximum.
(d) Total of (a), (b), and (c): 10 percent, maximum.

3.6.1 The contractor shall provide certification to this effect (see 4.7).

3.7 Qualitative requirements. The paint shall meet the qualitative requirements as specified in 3.7.1 through 3.7.16.

3.7.1 Brushing properties. The paint, when prepared for application according to the specified directions, shall be brushed out and laid off without excess drag on the brush. When dry, the brushed surface shall be free from sags and runs, and show a minimum of brush marks (see 4.6.7).

3.7.2 Spraying properties. The paint, when prepared for application according to the specified instructions (see 4.6.8), shall spray satisfactorily in all respects, and show no running, sagging or streaking. The film shall show no dusting, mottling or color separation.

3.7.3 Adhesion. The paint shall show good adhesion when tested as specified in 4.6.14.

3.7.4 Water immersion. The paint shall show no whitening, good flexibility and good adhesion when tested as specified in 4.6.15.

3.7.5 Pressure testing. The paint shall show no whitening, good flexibility and good adhesion when tested as specified in 4.6.16.

3.7.5.1 Flexibility. The paint shall show no evidence of cracking when tested as specified (see 4.6.16.1).

3.7.6 Film characteristics. Films of paint shall be prepared as specified in 4.6.2, and shall be smooth and uniform and shall show no evidence of cracking, alligatoring or other defects after a 24-hour dry.

3.7.7 Color fastness. Color fastness as measured by weather-ometer shall be as specified in 4.6.17. The color change shall vary no more than 15 percent from the original R_w measurement on type I and type II paints. For type III paints, the color change shall be no more than 3 National Bureau of Standards units when tested in accordance with ASTM D 2244.

3.7.7.1 Dry opacity. A maximum of 7.0 milliliters (mL) for each 930 square centimeters (cm^2) of the paint shall be required to obtain a dry film contrast ratio of 0.92, when tested as specified (see table I).

3.7.8 Stability in partially full container. Three-quarter filled, closed 8-ounce glass jars of part A and part B shall show no skinning, livering, curdling, seeding, hard caking, loss of thixotropy or gummy sediment after aging for 7 days at 60 degrees Celsius (°C). After this aging, each component shall remix readily to a smooth homogeneous mixture with a consistency not exceeding 525 grams to produce a 200 revolutions per minute (r/min) Krebs-Stormer shear rate (115 Kreb Units).

3.7.9 Odor. The odor shall be characteristic for the volatiles permitted.

3.7.10 Condition in container.

3.7.10.1 Components. Each component shall be readily broken up with a paddle to a smooth, uniform consistency and shall not liver, gel or show any other objectionable properties for at least 1 year after date of manufacture.

3.7.10.2 Paint. Components which have been stored for at least 1 year in their original containers, shall, when mixed in accordance with 4.6.2, produce a paint which meets all requirements of this specification and the applicable specification sheet, except that the consistency of the mixed paint reported in grams shall be no more than 525 grams (115 Kreb Units) to produce the 200 r/min pattern as specified in ASTM D 562.

3.7.10.3 Coarse particles and skins. When tested in accordance with paragraph 4.6.1, residual coarse particles and skins shall be a maximum of 0.25 percent by weight of paint.

3.7.11 Nonvolatile vehicle. The nonvolatile vehicle of components A and B respectively on the epoxy resin paint and part A on the chlorosulfonated polyethylene, when extracted and tested as specified in 4.6.11, shall produce an infrared spectrum which conforms qualitatively to a standard spectrum.

3.7.12 Set-to-touch time. Set-to-touch drying time shall be as specified on the specification sheet and shall be determined in accordance with 4.6 and 4.6.3.

3.7.13 Dry-hard time. The dry-hard time shall be as specified on the specification sheet when prepared and tested in accordance with 4.6 and 4.6.4.

3.7.14 Pot life. Pot life shall be as specified on the specification sheet and shall be determined in accordance with 4.6 and 4.6.5.

3.7.15 Gloss. Gloss shall be as specified on the specification sheet and shall be determined in accordance with 4.6 and 4.6.6.

3.7.16 Dry film. Paint film shall be prepared as specified in 4.6.13.

3.8 Material safety data sheet. The contracting activity shall be provided a material safety data sheet (MSDS) at the time of contract award. The MSDS is form OSHA-20 and found as part of FED-STD-313. The MSDS shall be included with each shipment of material covered by this specification.

3.9 Toxicity. The material shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate service medical department which will act as advisor to the contracting activity.

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 as specified herein. Except as otherwise specified in the contract or purchase order, 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.

4.1.1 Inspection system requirements. The contractor shall provide and maintain an inspection system in accordance with the data ordering document included in the contract or order (see 6.2.2).

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

(a) First article inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall consist of the tests specified in table I.

TABLE I. First article inspection tests.

Tests	Applicable method in FED-STD-141	Applicable ASTM test method	Test paragraph	Requirement paragraph
Pigment content	---	D 2698	---	1/
Volatile content	---	D 2369	---	1/
Nonvolatile vehicle content	4053	---	---	1/
Coarse particles and skins	4092.1	---	4.6.1	3.7.10.3
Consistency	---	D 562	---	1/
Mass/unit volume	---	D 1475	---	1/
Drying time	4061	---	4.6.4	1/
Wet reflectance color	---	D 2244	4.6.12	1/
Flash point	---	D 93	---	1/
Adhesion	6301	---	4.6.14	3.7.3
Fineness of grind	---	D 1210	---	1/
Gloss	---	D 523	4.6.6	1/
Hiding power (contrast ratio)	---	D 2805	---	3.7.7.1
Brushing properties	4321.1	---	4.6.7	3.7.1
Spraying properties	4331.1	---	4.6.8	3.7.2
Flexibility	6221	---	4.6.16.1	3.7.5.1
Water resistance	---	D 1308	4.6.15	3.7.4
Stability	3021	---	4.6.9	3.7.8
Thinning solvent	---	---	---	2/
Cleaning solvent	---	---	---	2/
Color fastness	---	D 822	4.6.17	3.7.7

1/ See applicable specification sheet.
2/ See 5.1.1.2, sample labels.

The contractor shall prepare a first article test report in accordance with the data ordering document included in the contract or order (see 6.2.2).

4.4 Quality conformance inspection.

4.4.1 Lot. For purposes of quality conformance inspection, a lot shall consist of all paint of the same formula number from a single, uniform batch or uniform blend of batches offered for delivery at one time. Two representative samples from each lot of paint (total of two samples per lot) shall be forwarded to a designated Government laboratory for verification tests. The two samples per lot shall be packaged in separate containers. Minimum size for each sample shall be 1 liter (L) (1 quart).

4.4.2 Quality conformance tests. Quality conformance tests for acceptance of individual lots shall consist of tests specified in table I and 4.6.

4.5 Neoprene rubber.

4.5.1 Surface preparation of neoprene rubber. Neoprene rubber as specified in 4.5.2 shall be lightly sanded with no. 240 sandpaper and shall then be wiped with mineral spirits to remove residue and any oils that may be present.

4.5.2 Neoprene rubber specification. Neoprene rubber used for tests shall conform to David Taylor Naval Ship Research and Development Center formula 334-218 (cured 20 minutes at 160°C (320 degrees Fahrenheit (°F)) 400 to 500 pounds per square inch (lb/in^2) pressure).

4.6 Test procedures. The paint shall be tested in accordance with table I and as specified herein. Additional chemical and physical tests shall be run, if needed, to determine the ingredients and proportions specified (see 3.4). Failure of any sample to pass any test and noncompliance with the requirements of this specification shall be cause for rejection of the lot represented by the sample.

4.6.1 Coarse particles and skins. Coarse particles and skins shall be determined in accordance with method 4092.1 of FED-STD-141, except that butyl acetate conforming to TT-B-838 shall be used for solvent.

4.6.2 Preparation of mixed coating. The paint shall be prepared for mixed component tests by thoroughly mixing components A and B in accordance with specific instructions as specified in 5.1.1.2. The thoroughly mixed paint shall be allowed to condition at 23 ± 3°C (73 ± 5°F) for 1/2 hour prior to testing.

4.6.3 Set-to-touch drying time. Duplicate test panels shall be prepared by drawing down material prepared as specified in 4.6.2 to a 3 mil wet film thickness on a ground glass panel. One panel shall be cured in a dust free location at 4 ± 1°C (40 ± 2°F) and the second panel at 23 ± 1°C (73 ± 2°F). The set-to-touch drying time (timing from the drawdown) shall be determined in accordance with method 4061 of FED-STD-141. The set-to-touch drying time shall be checked for compliance with this specification.

4.6.4 Dry-hard time. Duplicate test panels shall be prepared by drawing down material prepared as specified in 4.6.2 to a 3 mil wet film thickness on a glass plate. One panel shall be cured at 4 ± 1°C (40 ± 2°F). The second panel shall be cured at 23 ± 1°C (73 ± 2°F). The dry-hard time on each panel shall be determined in accordance with method 4061 of FED-STD-141.

4.6.5 Pot life of epoxy paint. One L (1 quart) of mixed paint shall be prepared as specified in 4.6.2 and conditioned at 23 ± 1°C (73 ± 2°F). The consistency shall determine the following intervals from initial mixing: once during the first 4 hours and every hour for the next 4 hours. The test shall be terminated when the consistency exceeds 115 Kreb Units, or at the end of 8 hours, whichever comes first.

4.6.6 Gloss. A test panel shall be prepared by spraying out a 4 mil wet film thickness of material as specified in 4.6.2, except allow a maximum of 2 hours conditioning prior to spraying out on plain opaque white glass, or other suitable substrate using a suitable spray apparatus. The film shall be dried in a dust free area for 24 hours at 23 ± 1°C (73 ± 5°F) and the gloss shall be determined in accordance with ASTM D 523. The gloss shall be checked for compliance with this specification.

4.6.7 Brushing properties. The paint shall be prepared as specified in 4.6.2. Without further reduction, the paint shall be applied in accordance with method 4321.1 of FED-STD-141 and shall be observed in compliance with 3.7.1.

4.6.8 Spraying properties. The paint shall be prepared as specified in 4.6.2. Without further reduction, the paint shall be sprayed on a sandblasted steel panel to a 4 mil wet film thickness. The steel panel shall be observed for spraying properties in accordance with method 4331.1 of FED-STD-141 in compliance with 3.7.2. For referee test, use automatic application in accordance with method 2131 of FED-STD-141.

4.6.9 Stability in partially full container. The stability of each component shall be determined after 48 hours in accordance with method 3021 of FED-STD-141. Each component shall be resealed and aged for 7 days at 60°C and shall be observed in compliance with 3.7.8.

4.6.10 Condition in container. The contractor shall determine package condition at time of acceptance testing in accordance with method 3011 of FED-STD-141 and observed in compliance with 3.7.10.1. The Government, at its option, shall test components stored in their original containers in compliance with 3.7.10.2.

4.6.11 Infrared spectrum. The infrared spectrum of the nonvolatile vehicle from components A and B of the epoxy resin paint and component A of the chlorosulfonated polyethylene shall be established on a recording infrared spectrophotometer as follows:

4.6.11.1 Separation of pigments. The pigments from components A and B shall be separated respectively, using ASTM D 2698.

4.6.11.2 Components A and B. The solvents shall be removed from the resinous portion by evaporation on a steam bath. The infrared spectrum of the nonvolatile vehicle shall be determined from 2 to 15 micrometers. The spectrum shall be compared qualitatively with a standard spectrum (see applicable specification sheet), and report any significant deviations.

4.6.12 Wet reflectance color.

4.6.12.1 Apparatus. The reflectometer shall have a geometry conforming to ASTM D 2244 with an illumination angle of 45 degrees from the perpendicular and a viewing angle of 0 degrees from the perpendicular. The reflectometer shall measure the green reflectance in the range 0.8 percent to 4.0 ± 0.05 percent. An electronic null galvanometer is recommended.

4.6.12.2 Reagents. Distilled water containing 0.15 ± 0.05 percent of a clear anionic surfactant shall be used for wetting the specimens.

4.6.12.3 Procedure.

4.6.12.3.1 Preparation of specimen. An air atomizing spray gun shall be used to spray the material onto a smooth steel panel to a 0.05 to 0.08 millimeter (mm) (2- to 3-mil) wet film thickness. The panel shall be dried overnight at room temperature.

4.6.12.3.2 Obtaining reflectance.

4.6.12.3.2.1 General. The reflectometer shall be operated according to the manufacturer's operating manual. The galvanometer shall be zeroed with the reflectometer scale set at mid-range, the light on, the light control window closed, green filter in place, and a dry zero percent reflectance standard in the sample window.

4.6.12.3.2.2 Procedure to be used for Navy formulas 184 and 187, type I (R_w 0.8 to 1.02 percent). The instruments shall be standardized with the green filter using the G=2.2 percent standard (see 4.6.12.4.1) in a dry condition, set on the instrument scale at 0.88. The standard shall be traceable to the National Bureau of Standards. The specimen shall be covered to be tested with a thin film of the water or surfactant mixture (see 4.6.12.2), and immediately obtain the green reflectance reading. The specimen shall be checked after obtaining reading for intact water film. If water film is not intact, the procedure shall be repeated until a satisfactory reading is obtained. The wet reflectance shall be calculated in percent:

$$R_w = 1/4 \text{ reading by } 10$$

4.6.12.3.2.3 Procedure to be used for Navy formulas 185 and 188, type II (R_w 1.74 to 2.06 percent). The instrument shall be standardized with the green filter, using the G=2.2 percent standard (see 4.6.12.4.1) in a dry condition, set on the instrument scale at 0.66. The specimen shall be covered to be tested with a thin film of the water or surfactant mixture (see 4.6.12.2), and immediately obtain the green reflectance reading. The specimen shall be checked after obtaining reading for intact water film. If water film is not intact, the procedure shall be repeated until a satisfactory reading is obtained. The wet reflectance shall be calculated in percent:

$$R_w = 1/3 \text{ reading by } 10$$

4.6.12.3.3 The wet green reflectance values shall be reported.

4.6.12.4 Notes to procedure.

4.6.12.4.1 If other than a 2.2 percent green reflectance standard is used, use the indicated multiplication factor to obtain the instrument scale reading to use with the standard.

4.6.12.4.2 The expanded scale is used so that readings are obtained near the center of the scale. This eliminates the large error introduced when the sensor is close to the specimen at the low end of the scale.

4.6.13 Dry film. The panel shall be prepared for testing by spraying on to neoprene rubber (see 4.6.8), cleaned as specified in 4.5.1, and prepared as specified in 4.6.2. The panel shall be dried for 7 days at room temperature before testing.

4.6.14 Adhesion. According to method 6301 as specified in FED-STD-141, this test shall require the immersion of a coated neoprene panel (see 4.6.13) in deionized water for a 24-hour period. Two parallel cuts shall be made through the coating surface with a sharp knife. The cuts shall be approximately 2.54 cm (1 inch) apart, and at least 2.54 cm (1 inch) in length. A piece of masking tape shall be pressed firmly between the cuts. At this point the tape shall be pulled off rapidly, and the panel shall be examined for any adhesion loss.

4.6.15 Water immersion test. One-half of the coated neoprene panel (see 4.6.13) shall be immersed in deionized water for 21 days. The other 1/2 shall remain exposed to the high humidity over the enclosed area. The adhesion on both halves of the panels shall be evaluated with the knife test (see 4.6.18), to determine whether or not the paint exhibits good adhesion to the neoprene. There shall be no whiteness of the film when the coated neoprene is removed from the water. The panel shall show no cracks when bent double and examined without magnification.

4.6.16 Pressure testing. Test samples shall be prepared from 7.6 cm by 20.3 cm by 0.64 cm (3 by 8 by 1/4-inch) steel (nominal dimensions) and three 2.54 cm (1-inch) holes shall be made in each panel set apart at a uniform distance. The steel panels are then blasted to near white metal and shall then be primed 0.025 mm (1 mil in 1 coat), and aged at least 10 days. Neoprene rubber cover stock shall be coated as specified (see 4.6.13). The rubber cover stock shall be buffed with rough sandpaper and adhered to the steel panel by applying a thin coating of a two component adhesive to the panel and to the buffed tile. Rubber panels shall be adhered to both sides of the steel. Air bubbles are removed by pressure of a handroller over the finished rubber. Panels are aged 10 days before being placed into the pressure cell. The test panels shall be cycled between 0 and 35.2 kilograms per square centimeter (kg/cm^2) (0 and 500 lb/in^2). One cycle shall consist of 3 minutes, this includes 20 seconds to pressurize to 500 lb/in^2, 100 seconds at 500 lb/in^2, 15 seconds to depressurize to 0 lb/in^2 and 45 seconds to 0 pressure. All times are nominal; all cycles are minimum. Performance is recorded as the number of cycles required to reach 0, 25 and 100 percent failure. A suitable apparatus is diagrammed on figure 1.

4.6.16.1 Flexibility. Determine flexibility in accordance with method 6221 of FED-STD-141. Draw down a 50 mm (2-inch wide) film of the enamel with a film applicator that will give a dry film thickness of 0.051 ± 0.0076 mm (0.0020 ± 0.0003 inch) on a flat tin panel prepared in accordance with method 2012 of FED-STD-141, using the aliphatic naphthaethylene glycol monoethyl ether mixture. Air dry the test specimen for 8 hours in a horizontal position; and bend over a 3.2 mm (1/8 inch) mandrel. The coated surface of the panel shall be uppermost during the bending which shall be accomplished at a uniform rate over approximately 2 seconds. The panel shall be examined at the bend, using a seven-power lens and any cracking shall be noted.

4.6.17 Color fastness. Color fastness shall be determined in a Xenon or equivalent weathering device (see table I). The rubber shall be prepared as specified in 4.5.2. The dry film shall be prepared as specified in 4.6.13. After 500 hours exposure, the panels shall be tested as specified in 4.6.12.

4.6.18 Knife test. A film of coating, prepared as specified in 4.6.13 shall adhere tightly to the test panel. It shall be difficult to furrow off with the knife and shall not flake, chip or powder. The knife cut shall show beveled edges.

4.7 Certification data/report. The contractor shall furnish certification data/reports for each lot of paint in accordance with the data ordering document included in the contract (see 6.2.2). The contractor shall specify each lot of paint in accordance with 3.6.1 and 4.4.2 of this specification. In addition to the requirements covered by the data ordering document, the certification data/report shall include the following requirements:

(a) Conformance of each lot of ingredient material, stating test results and source, as applicable (see 3.4).
(b) Certification that volatility requirements are met (see 3.6.1).
(c) Conformance and test results as specified (see 4.4.2) for finished paint.

4.8 Mass determination. Unit containers or groups of unit containers for each lot (see 4.4.1) shall be sampled as specified in MIL-STD-105 and have their mass determined to verify that they contain the required amount of material. Any container having a mass less than the amount corresponding to the required quantity of material shall be rejected. The AQL shall be 1.5 percent. When the mass of containers is determined in groups, the average mass shall be not less than the mass corresponding to the required quantity of material plus the average mass of the empty containers times the number of containers.

4.9 Toxicity. The contractor shall furnish to the contracting activity the toxicological data and formulations required to evaluate the safety of the material for the proposed use.

4.10 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified therein. Selection of samples from each lot (see 4.4.1) shall be done in accordance with MIL-STD-105. The AQL shall be 1.5 percent.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisitions.)

5.1 Packaging, packing, and marking. The paint shall be packaged, packed, and marked in accordance with PPP-P-1892, and as specified herein. The level of packaging shall be A, B or C, and the level of packing shall be A, B or C, as specified (see 6.2.1). The paint shall be furnished in 4-L (1 gallon) cans, or 20-L (5 gallon) pails, as specified (see 6.2.1). The cans or pails shall be completely lined on the interior, including the underside of the lid, with a liner that will not affect nor be affected by the contents. The paint, as specified herein, may gel if stored in contact with metal. In properly lined containers, however, the coating is stable for over 2 years (see 6.9).

5.1.1 Marking. In addition to other markings required on the containers, there shall be the following statement: "The volatile content of the material in this container is not photochemically reactive as defined by Rule 102 of the South Coast Air Quality Management District."

5.1.1.1 Special marking. Each container of component shall have the following additional information (see 6.2.1):

(a) Specification number including slash sheet number.
(b) Type, as applicable.
(c) Color designation and number (if applicable).
(d) Formula number where applicable.
(e) Manufacturer's name.
(f) Manufacturer's batch number and date of manufacture.
(g) Contractor's name and address.

5.1.1.2 Mixing and use instructions. Each component container shall be marked with the mixing instructions. The paints are supplied as a kit, consisting of a component A and component B. The quantity of each component in the kit shall be mixed in the proportions specified. Containers shall be labeled with the appropriate directions as follows:

Type I
R_O = 1.8
Black epoxy paint

FORMULA 184

COMPONENT A

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and Component B thoroughly
Stir component A and Component B together 1:1 by volume
Mix amount for no more than 8 hours work
Allow mixed paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent mixture can be used to clean equipment:
n-butyl alcohol (ASTM D 304)-1 part by volume
Ethylene glycol monoethyl ether (TT-E-781) - 1 part by volume"

COMPONENT B

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and component B thoroughly
Stir component A and component B together 1:1 by volume
Mix amount for no more than 8 hours work
Allow mixed paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent mixture can be used to clean equipment:
n-butyl alcohol (ASTM D 304) - 1 part by volume
Ethylene glycol monoethyl ether (TT-E-781) - 1 part by volume"

Type II
R_O = 3.6
Dark grey epoxy paint

FORMULA 185

COMPONENT A

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and Component B thoroughly
Stir component A and Component B together 1:1 by volume
Mix amount for no more than 8 hours work
Allow mixed paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent mixture can be used to clean equipment:
n-butyl alcohol (ASTM D 304) 1 part by volume
Ethylene glycol monoethyl ether (TT-E-781) - 1 part by volume"

COMPONENT B

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and component B thoroughly
Stir component A and component B together 1:1 by volume
Mix amount for no more than 8 hours work
Allow mixed paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent mixture can be used to clean equipment:
n-butyl alcohol (ASTM D 304) - 1 part by volume
Ethylene glycol monoethyl ether (TT-E-781) - 1 part by volume"

Type III
White epoxy paint

FORMULA 186

COMPONENT A

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and Component B thoroughly
Stir component A and Component B together 1:1 by volume
Mix amount for no more than 8 hours work
Allow mixed paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent mixture can be used to clean equipment:
n-butyl alcohol (ASTM D 304)-1 part by volume
Ethylene glycol monoethyl ether (TT-E-781) - 1 part by volume"

COMPONENT B

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and component B thoroughly
Stir component A and component B together 1:1 by volume
Mix amount for no more than 8 hours work
Allow mixed paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent mixture can be used to clean equipment:
n-butyl alcohol (ASTM D 304) - 1 part by volume
Ethylene glycol monoethyl ether (TT-E-781) - 1 part by volume"

Type I
E_D = 1.8
Black chlorosulfonated polyethylene

FORMULA 187

COMPONENT A

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and Component B thoroughly
Stir component A and Component B together 53:1 by volume
Mix amount for no more than 8 hours work
Allow paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent can be used to clean equipment:
n-butyl acetate (TT-B-838) - 1 part by volume
Ethylene glycol monoethyl ether acetate (MIL-E-7125) - 1 part by volume"

COMPONENT B

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

See label instructions on "COMPONENT A" can."

Type II
R_o = 3.6
Dark grey chlorosulfonated polyethylene

FORMULA 188

COMPONENT A

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and Component B thoroughly
Stir component A and Component B together 48:1 by volume
Mix amount for no more than 8 hours work
Allow paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent can be used to clean equipment:
n-butyl acetate (TT-B-838) - 1 part by volume
Ethylene glycol monoethyl ether acetate (MIL-E-7125) - 1 part by volume"

COMPONENT B

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

See label instructions on "COMPONENT A" can."

Type III
White chlorosulfonated polyethylene paint

FORMULA 189

COMPONENT A

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

Stir component A and Component B thoroughly
Stir component A and Component B together 47:1 by volume
Mix amount for no more than 8 hours work
Allow paint to stand for 1/2 hour before application
DO NOT THIN"

The following solvent can be used to clean equipment:
n-butyl acetate (TT-B-383) - 1 part by volume
Ethylene glycol monoethyl ether acetate (MIL-E-7125) - 1 part by volume"

COMPONENT B

"C A U T I O N

This is one component of a two component system which WILL NOT HARDEN OR CURE unless both components are mixed together."

"INSTRUCTIONS FOR USE

See label instructions on "COMPONENT A" can."

5.1.1.3 Level B packaging. Level B packaging is intended to provide economical but limited protection and should be specified only when it is determined that the paint will be held in covered storage no more than 1 year from date of inital packaging.

5.1.1.4 Additional identification. Each component container, shipping container, and palletized load shall be marked with the appropriate hazardous symbol as applicable in accordance with FED-STD-313.

6. NOTES

6.1 Intended use. This camouflage paint is intended for areas above the waterline when retention of color is essential. This paint was developed principally for rubber substrates. Paints are to be used at rubber and steel interface to maintain continuous camouflage with paints compatible with the substrates.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number and date of this specification.
(b) Title, number and date of specification sheets.
(c) Formula number and color of material (see applicable specification sheets).
(d) Type required (see 1.2).
(e) Whether first article is required (see 3.2).
(f) Level of packaging and packing required (see 5.1).
(g) Size of container (see 5.1).
(h) Special marking required (see 5.1.1.1).

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 aproved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DAR 7-104.9 (n)(2) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

Paragraph no.	Data requirement title	Applicable DID no.	Option
4.1.1	Inspection system program plan	DI-R-4803	----
4.3	First article inspection report	DI-T-4902	----
4.7	Certification data/report	UDI-A-23264	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer).

6.2.2.1 The data requirements of 6.2.2 and any task in section 3, 4, or 5 of the specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract, regardless of whether an identical item has been supplied previously (for example, test reports).

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspections to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

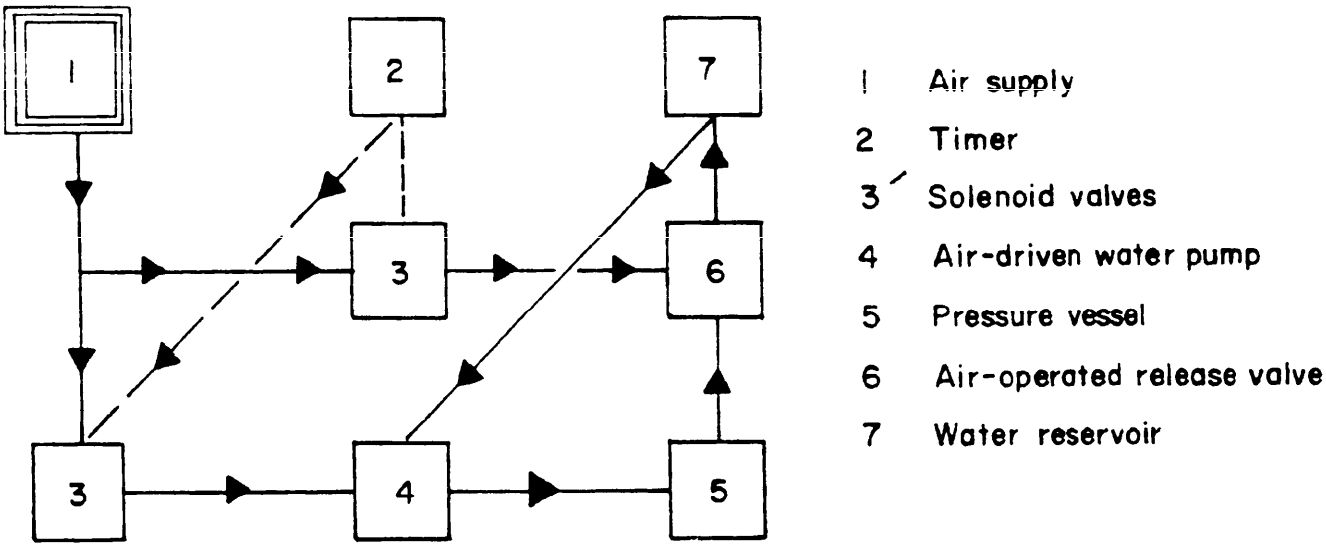
6.4 Pigment separation. ASTM D 2698 should be followed. Since carbon black may be difficult to separate, a volume of a suitable solvent such as methyl ethyl ketone may be mixed with the paint sample to be centrifuged. If quantitative work is to be done on the paint sample or separated vehicle, the mass of the paint sample and the added solvent must be known.

6.5 Volatile content. Although the container marking specifically refers to the Air Pollution District of Los Angeles County, the paints may be used anywhere else a product complying with 3.6 is allowed. This includes other air pollution control districts or similar areas controlling the emission of solvents into the atmosphere. Information regarding Rules 102, 442, and 443 may be obtained from: South Coast Air Quality Management District.

6.6 The paints covered by this specification should be purchased by volume, the unit normally being 1 L or 1 U.S. liquid gallon at 20°C. Does not apply to curing components of chlorosulfonated polyethylene.

6.7 Container lining. Solvent-resistant baked phenolic lining materials have been successfully used in containers for paints covered by this specification.

Preparing activity:
Navy - SH
(Project 8010-N245)



SH 12138

FIGURE 1. Cyclic pressure debond apparatus.

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE. This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY

COMMANDER
NAVAL SEA SYSTEMS COMMAND (SEA 5523)
DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 12503 WASHINGTON D C

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

COMMANDER
NAVAL SEA SYSTEMS COMMAND (SEA 5523)
DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
DOD-P-24631(SH)	Paint, Camouflage For Submarines, General Specification For(METRIC)

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)* _____

5 PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6 REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426

PREVIOUS EDITION IS OBSOLETE.