

MIL-P-15931B  
25 August 1964  
SUPERSEDING  
MIL-P-15931A  
15 February 1952

MILITARY SPECIFICATION  
PAINT, ANTIFOULING, VINYL-RED  
(FORMULA NO 121/63)

This specification is mandatory for use by all Departments and Agencies of the Department of Defense

1 SCOPE

1 1 This specification covers one grade of paint, antifouling, vinyl-red Formula No 121/63 The paint is formulated at high viscosity for hot or airless spray but may be thinned if necessary for conventional spray or brush application (see 6 1)

2 APPLICABLE DOCUMENTS

2 1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein

SPECIFICATIONS

FEDERAL

- RR-S-366 - Sieves, Standard, For Testing Purposes
- TT-M-268 - Methyl Isobutyl Ketone (For Use in Organic Coatings)
- TT-P-143 - Paints, Varnish, Lacquer, and Related Materials, Packaging, Packing, and Marking Of
- TT-T-656 - Tricresyl Phosphate
- TT-X-916 - Xylene (For Use in Organic Coatings)
- LLL-R-626 - Rosin, Gum Rosin, Wood, And Rosin, Tall Oil

MILITARY

- MIL-P-15169 - Pigment, Cuprous Oxide
- MIL-P-15328 - Primer, Pretreatment (Formula No 117 For Metals)
- MIL-P-15929 - Primer Coating, Shipboard, Vinyl-Red Lead (Formula No 119, For Hot Spray)
- MIL-P-15930 - Primer Coating, Shipboard, Vinyl-Zinc Chromate (Formula No 120, For Hot Spray)
- MIL-L-19868 - Labels, Paper Pressure Sensitive Adhesive (For Hazardous Industrial Chemicals and Materials)

STANDARDS

FEDERAL

- FED-STD-141 - Paint, Varnish, Lacquer, And Related Materials, Methods of Inspection, Sampling, And Testing

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer )

3 REQUIREMENTS

3 1 The paint shall consist of ingredients conforming to the applicable specifications in the proportions specified in table I Adjustment of solvent other than decrease in amount of methyl isobutyl ketone may be

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1175

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made to meet viscosity requirement provided corresponding adjustment is made in price or gallonage Allowance in other properties shall be made accordingly

3 1 1 The formula specified in table I is designated Navy standard formula No 121/63 and shall conform to the requirements of table I

Table I - Formula No 121/63

| Ingredients                      | Specifications               | Pounds <sup>1/</sup> |
|----------------------------------|------------------------------|----------------------|
| Cuprous oxide                    | MIL-P-15169                  | 1440                 |
| Rosin                            | LLL-R-626, class A, grade WW | 215                  |
| Vinyl resin <sup>2/</sup>        |                              | 55                   |
| Tricresyl phosphate              | TT-T-656                     | 50                   |
| Methyl isobutyl ketone           | TT-M-268                     | 165                  |
| Xylene                           | TT-X-916                     | 115                  |
| Antisettling agent <sup>3/</sup> |                              | 5 to 9               |

<sup>1/</sup> The formula given is slightly in excess of 100 gallons to allow for normal manufacturing loss, may be proportioned to the size batch desired

<sup>2/</sup> The resin shall be a vinyl chloride-vinyl acetate copolymer It shall contain 85 to 88 percent vinyl chloride and 12 to 15 percent vinyl acetate The resin shall have a specific gravity of 1 35 to 1 37 Material shall be furnished as a powdered white solid, not less than 98 percent of which shall pass through a No 20 sieve, conforming to RR-S-366

<sup>3/</sup> The antisettling agent shall be sufficient to prevent hard pigment settling and otherwise meet requirements of 3 4 6

3 2 Manufacture - The component raw materials shall be incorporated and ground in such a manner as to produce a product which is uniform, homogeneous, free from grit, entirely suitable for the purpose intended, and in full conformity to the requirements of this specification

3 3 The quantitative requirements specified in table II shall be the criteria, by laboratory tests specified in 4 3, that the paint has been manufactured in accordance with good practice and proper quality assurance and testing techniques The range provided is not intended to accommodate or permit willful variation in formula proportions

Table II - Quantitative requirements

| Characteristics                                                                                                      | Requirements |         |
|----------------------------------------------------------------------------------------------------------------------|--------------|---------|
|                                                                                                                      | Minimum      | Maximum |
| Pigment, percent by weight of paint                                                                                  | 70 0         | 72 0    |
| Volatiles, percent by weight of paint                                                                                | 12 0         | 14 0    |
| Nonvolatile vehicle, percent by weight of paint (calculated by difference)                                           | 15 0         | 17 0    |
| Water, percent by weight of paint                                                                                    | - -          | 0 5     |
| Coarse particles and skins, as residue retained on standard No 325 mesh sieve (RR-S-366), percent by weight of paint | - -          | 0 5     |
| Viscosity, Krebs units                                                                                               | 85           | 100     |
| Weight per gallon, pounds                                                                                            | 19 6         | 20 1    |
| Fineness of grind                                                                                                    | 5            | - -     |
| Time of setting to touch, minutes                                                                                    | - -          | 15      |
| Time of drying hard, minutes                                                                                         | - -          | 45      |
| Total copper in pigment, percent by weight of pigment                                                                | 86 0         | - -     |

3 4 Qualitative requirements - The paint shall meet the following qualitative requirements

3 4 1 Odor - The odor of the paint shall be normal for the volatiles permitted (see 4 3 2 1)

3 4 2 Color - The color shall be a brown red characteristic of the pigment used (A card approximately the color desired may be obtained from the Chemical Laboratory, Norfolk Naval Shipyard, Portsmouth, Virginia )

3 4 3 Compatibility with thinner - When one volume of the paint is diluted with one volume of thinner (equal volumes of methyl isobutyl ketone and xylene), there shall be no evidence of incompatibility (see 4 3 2 4)

3 4 4 Adhesion - The paint shall show good adhesion when tested as specified in 4 3 2 5

3 4 5 Film characteristics - The panel prepared as specified in 4 3 2 5, after a 24-hour dry, shall be smooth and uniform, and shall show no evidence of cracking, alligatoring, or other defects

3 4 6 Condition in container - The product shall be capable of being readily broken up with a paddle to a smooth, uniform consistency and shall not liver, shall not exceed 110 Krebs units in viscosity nor exceed one hour dry hard time, shall not curdle, irreversibly gel, nor show any other objectional properties for at least one year after date of manufacture

3 4 7 Additional chemical and physical tests shall be run as may be necessary to determine that the ingredients and proportions specified in 3 1 have been used (see 4 3 1)

#### 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 to assure supplies and services conform to prescribed requirements

4 2 Quality assurance - Quality assurance shall be provided in accordance with method 1031 of FED-STD-141

4 2 1 Ingredient materials - Unless otherwise specified, for quantities of paint of 250 gallons or over one pint of each ingredient shall be taken by the Government representative for verification test purposes prior to manufacture of the paint

4 2 2 The samples taken by the Government representative as required for verification test purposes shall be forwarded to Industrial Laboratory, Mare Island Naval Shipyard, Vallejo, California, or to the Chemical Laboratory, Norfolk Naval Shipyard, Portsmouth, Va

#### 4 3 Test procedures -

4 3 1 Ingredient materials - The vinyl resin shall be tested to determine compliance with note 2 of table I. The cuprous oxide and other ingredient materials submitted shall be tested to determine compliance with the applicable specifications

#### 4 3 2 Finished paint -

4 3 2 1 The following test shall be conducted in accordance with the methods specified in FED-STD No 141

| <u>Test</u>                                    | <u>Method</u> |
|------------------------------------------------|---------------|
| Pigment (using extraction mixture "C")         | 4021          |
| Volatiles                                      | 4041          |
| Nonvolatile vehicle (calculated by difference) | 4053          |
| Water                                          | 4081          |

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| <u>Test</u>                                                          | <u>Method</u> |
|----------------------------------------------------------------------|---------------|
| Coarse particles and skins (using 1:1 xylene-methyl isobutyl ketone) | 4092          |
| Viscosity                                                            | 4281          |
| Weight per gallon                                                    | 4184          |
| Fineness of grind                                                    | 4411          |
| Odor                                                                 | 4401          |

3 2 2 Drying time - Drying time shall be determined by method 4061 of FED-STD-141, except that the conditions of temperature and humidity shall apply only for referee tests in case of dispute. Other shall be conducted under prevailing laboratory conditions.

3 2 3 Total copper - Weight accurately 1.0 gm of the extracted pigment, transfer to a 300 ml lytic beaker, add 10 ml nitric acid (sp gr 1.42) and boil for several minutes. (If solution is not cool, and dilute with 100 ml water, filter, and wash with hot water, hot 10 percent nitric acid and with hot water.) Add 10 ml perchloric acid and fume for 5 minutes. Cool and dilute to a volume of 150 ml. Add 1 ml of concentrated nitric acid, 1 gm of ammonium sulfate and electroplate per on a platinum electrode at 2 amperes current for 2 hours. Dilute with water and continue the lysis for 15 minutes. If the deposition is complete, remove electrode, wash with water and acetone, and weigh. Calculate the percentage of total copper.

2 4 Compatibility with thinner - Compatibility with thinner shall be determined in accordance with method 4203 of FED-STD-141, using 50 milliliters (ml) of paint and 50 ml of a 1:1 mixture of xylene methyl isobutyl ketone. Observe immediately after mixing and also 30 minutes after mixing.

2 5 Adhesion - Apply a coat (0.3 to 0.5 mil dry) of primer, pretreatment (MIL-P-15328) to a steel. After a 1-hour dry, coat with vinyl-red lead primer (MIL-P-15929) or vinyl-zinc chromate primer (MIL-P-15930) (approximately 1 mil dry film thickness). After a 1-hour dry, coat with the sample paint of specification to a dry film thickness of about 2 mils. After a 24-hour dry, the film shall be subjected to a test to determine whether the paint exhibits good adhesion to the vinyl primer.

#### PREPARATION FOR DELIVERY

Unless otherwise specified in the contract or order, paint shall be furnished, in accordance with method 143, in 5-gallon steel pails. Paint shall be packaged level A or C, packed level A, B, or C as specified in 6 2.)

#### Marking -

1 Packaging and unit containers shall be marked in accordance with TT-P-143.

2 Each unit container shall have the following special marking:

Special Instructions Contents may be applied by hot spray (temperature not to exceed 120°F), airless spray, or regular cold spray (normally no thinning required). Where thinning is necessary, use methyl isobutyl ketone.

3 In addition to any special marking specified in the contract or order, each container shall have a warning label of appropriate size similar to class 2 of MIL-L-19868 or shall be lithographed or printed with a reasonable likeness thereof. Under "contains" shall be inserted the solvent composition, methyl isobutyl ketone and xylene. For unit containers that also serve as shipping containers any conflict with ICC Regulations shall be resolved by reasonable modification of size of label or use of warning label without label design.

#### NOTES

Intended use - Formula No. 121/63 vinyl-red antifouling paint is intended for use on shipbottom surfaces. It should be used alone or preferably over primer, pretreatment (formula 117, 15328), on wood or plastic and additionally over vinyl-red lead primer (formula 119, MIL-P-15929) or zinc chromate primer (formula 120, MIL-P-15930) on metal.

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6 2 Ordering data - Procurement documents should specify the following

- (a) Title, number, and date of this specification
- (b) Size container if other than specified (see 5 1)
- (c) Selection of applicable level of packaging and packing required (see 5 1)
- (d) Special marking required (see 5 2 3)
- (e) Provision for price and gallonage adjustment in event of modification of formula (see 3 1)

6 3 Composition by volume - For information only, and with the understanding that weight-volume relationship of ingredients may vary slightly, the following approximation of composition by volume is included

| <u>Ingredients</u>     | <u>Gallons<br/>per 100 gallons</u> |
|------------------------|------------------------------------|
| Cuprous oxide          | 27 40                              |
| Rosin                  | 23 07                              |
| Vinyl resin            | 4 69                               |
| Tricresyl phosphate    | 4 92                               |
| Methyl isobutyl ketone | 23 88                              |
| Xylene                 | 15 42                              |
| Antisettling agent     | 0 62 <sup>1/</sup>                 |

<sup>1/</sup>This is an average value The actual volume will depend upon  
choice of antisettling agent

6 4 The paint should be purchased by volume, the unit being a United States gallon at 15 5°C (60°F)

Custodians  
Army - MO  
Navy - SH  
Air Force - 69

Preparing activity  
Navy - SH  
(Project 8010-0253)

Review activities  
Army - MU, MR  
Navy - SH  
Air Force - 69

User activities  
Army - MO

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MIL-P-15931B  
AMENDMENT-2  
13 April 1970  
SUPERSEDING  
AMENDMENT-1  
4 August 1967

# MILITARY SPECIFICATION

PAINT, ANTIPOULING, VINYL-RED

(FORMULA NO. 121/63)

This amendment forms a part of Military Specification MIL-P-15931B, dated 25 August 1964, and is mandatory for use by all Departments and Agencies of the Department of Defense.

Page 1

2.1. Under "SPECIFICATIONS, FEDERAL": Delete "RR-S-366" and all reference thereto and substitute "RR-S-366 - Sieve Test". And under "SPECIFICATIONS, MILITARY": Delete all reference to "MIL-P-15328" and "MIL-L-19868" and substitute "MIL-P-15328 - Primer (Wash), Pre-treatment, Blue (Formula No. 117B For Metals)".

2.11. Under "STANDARDS" add:

MILITARY

MIL-STD-755 - Labels Containing Symbols for Packages and Containers for Hazardous Industrial Chemicals and Materials

3.1. Delete the second and third sentences.

Page 2

3.1.1. table I, column 1, line 21. Insert "type 1" between "LLL-R-626" and "class A".

3.3. table II, column 3, line 5. Delete "0 1" and substitute "0 2".

Page 3

3.4.2. Delete and substitute:

3.4.2. Color. The color shall be characteristic of the pigment used and shall be approximately the same as the standard color card (see 3.5).

3.4.3. Delete and substitute:

3.4.4. Knife test. The coating when applied and tested as specified in 4.3.2.3 shall adhere tightly to and shall not flake from the metal. The film shall ribbon or curl from the metal on cutting. There shall be no separation between coats.

3.4.7. Delete

4.1. Delete and substitute:

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 in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the in-

CHANGES FROM PREVIOUS ISSUE. THE OUTSIDE MARGINS OF THIS DOCUMENT HAVE BEEN MARKED "1" TO INDICATE WHERE CHANGES (DELETIONS, ADDITIONS, ETC.) FROM THE PREVIOUS ISSUE HAVE BEEN MADE. THIS HAS BEEN DONE AS A CONVENIENCE ONLY AND THE GOVERNMENT ASSUMES NO LIABILITY WHATSOEVER FOR ANY INACCURACIES IN THESE NOTATIONS. BIDDERS AND CONTRACTORS ARE CAUTIONED TO EVALUATE THE REQUIREMENTS OF THIS DOCUMENT BASED ON THE ENTIRE CONTENT AS WRITTEN IRRESPECTIVE OF THE MARGINAL NOTATIONS AND RELATIONSHIP TO THE LAST PREVIOUS ISSUE.

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specification 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 2 1 and 4 2 2: Delete and substitute

"4 2 1 When procured by Government activities in quantities of 250 gallons or over, one quart sample of each of the following: cuprous oxide, rosin, methyl isobutyl ketone, and xylene, plus one pint sample of each of the following: vinyl resin and tricresyl phosphate, shall be taken by the Government representative for acceptance testing by the appropriate General Services Administration (GSA) laboratory for approval prior to manufacture

"4 2.2 Finished paint. When procured by Government activities at least one unopened container from each lot shall be taken by the Government representative for acceptance test purposes by the appropriate GSA laboratory prior to acceptance"

4.3 1 and 4 3.2 Delete

Page 4

4.3 2 1 Add at end of listing in column 1 "Time of setting to touch" and opposite in column 2 add "4061" Add the following:

"All replicate numerical test results deemed valid shall be averaged, but only for the material from one original container. Failure of the material from any container shall result in lot rejection."

4.3 2 2 line 1. After "4061" add "(dry hard time procedure)".

4 3 2 5 Delete and substitute

"4 3.2 5 Knife test. A 0.3 to 0.5 mil. (dry) film of pretreatment coating (MIL-P-15328) shall be applied to a steel panel. After 1 hour dry apply a 1 mil. (dry) film of either vinyl-red lead primer (MIL-P-15929) or vinyl-zinc chromate primer (MIL-P-15930) over the pretreatment coating. After drying for 1 hour, apply a 2 mil. (dry) film of the sample paint to the coated panel and dry for 24 hours. The coating system shall be subjected to the knife test in accordance with Method 6304 of FED-STD-141. Observe for compliance with 3.4.4."

5 - Add the following sentence after "7. PREPARATION FOR DELIVERY":

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

5.1 Add at the end: "The paint shall be packaged in containers having an interior coating which is impervious to the vinyl and coumarone resins."

5 2.3, line 2: Delete "MIL-P-15968" and substitute "MIL-STD-785"

Page 5

6.2, item (e): Delete

Add new paragraph 6.5:

"6.5 Color cards. Color cards may be obtained upon application to the Laboratory Superintendent, Chemical Laboratory, Norfolk Naval Shipyard, Portsmouth, Virginia 23704. The purpose for which the cards are desired should be specified."

Custodians  
Army - MU  
Navy - SH  
Air Force - 84

Preparing activity  
Navy - SH  
(Project 8010-0868)

Review activities  
Army - MU  
Navy - SH, SA  
Air Force - 84, 85

User activities:  
Navy - AS, OS, XD.

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OF 2 PAGES

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