

MIL-V-16399A(OS)  
16 September 1971

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SUPERSEDING  
MIL-V-16399 (BuOrd)  
27 June 1951

## MILITARY SPECIFICATION

### VARNISH, MOISTUREPROOF

(This specification has been approved by the Naval  
Ordnance Systems Command, Department of the Navy.)

#### 1. SCOPE

1.1 Scope. - This specification covers a moisture-  
proof varnish having a tung oil and phenolic resin base.

1.2 Classification. - The varnish shall be of  
either of the two following types, as specified in 6.2:

Type A - Without naphthenate driers

Type B - With naphthenate driers

#### 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 this specification to the extent specified  
herein.

FSC 8010
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## SPECIFICATIONS

### FEDERAL

TT-D-643	Drier, Paint, Naphthenate, Liquid, Concentrated
TT-P-143	Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing and Marking of
TT-T-775	Tung Oil, Raw (China Wood) (For Use in Organic Coating)
TT-X-916	Xylene (For Use in Organic Coatings)

### MILITARY

MIL-R-15184	Resin, Para-Phenyl, Phenol- Formaldehyde
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## STANDARDS

### FEDERAL

FED. T. M. STD 141	Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing
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### MILITARY

MIL-STD-755	Labels Containing Symbols for Packages and Containers for Hazardous Industrial Chemicals and Materials
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(Copies of specifications and standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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## 3. REQUIREMENTS

3.1 Materials. - The varnish shall be formulated from the following materials which shall conform to their related specifications:

Resin, para-phenyl, phenol-formaldehyde of  
MIL-R-15184  
Tung oil of TT-T-775  
Solvent (Xylene of TT-X-916 or a mixture of xylene  
with not more than 40 percent petroleum spirits)  
Lead and cobalt naphthenate driers of TT-D-643

3.2 Formulations. - The Type A and B varnishes shall be formulated using the quantities of materials specified in Table I. The compounding of each type shall be in accordance with 6.3 and material verification shall be in accordance with Table III of 4.3.

Table I. - Compounding formulations for Types A and B varnishes.

Material	Formulation value	
	Type A	Type B
Resin, pounds	100	100
Tung oil, gallons	12.5	12.5
Solvent, gallons	25	25
Naphthenates: (1)	-	-
Lead, gms (2)	None	20
Cobalt, gms (2)	None	2.5

- Note: (1) The naphthenates shall not be added until the other materials are completely compounded in accordance with 6.3.
- (2) The naphthenate values are expressed in terms of their metallic content; however, either one of the following analytical values may be used:
- Lead 0.05% and Cobalt 0.006% of the Tung oil
  - Lead 0.025% and Cobalt 0.003% of the total non-volatiles

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3.3 Quantitative requirements. - The varnish shall conform to the quantitative requirements specified in Table II when tested in accordance with Table III of 4.3.

Table II. - Quantitative requirements.

Requirement	Value	
	Type A	Type B
Viscosity, poises (Between C and D on Gardner-Holdt scale)	0.85, minimum to 1.00, maximum	0.85, minimum to 1.00, maximum
Weight, % by weight of non- volatiles	50, minimum	50, minimum
Color, Gardner scale	12, maximum	12, maximum
Drying time:		
Set-to-touch, hours	6, maximum	2, maximum
Dry hard, hours	8, maximum	8, maximum

3.4 Qualitative requirements. - The varnish shall conform to the following qualitative requirements when tested in accordance with Table III of 4.3.

3.4.1 Condition in container. - When first opened, the varnish in the containers shall be clean, homogeneous, and free from a skin, grit, seeds, and sediment.

3.4.2 Skinning. - The varnish shall show no skinning after 48 hours in a tightly closed, half-filled container.

3.4.3 Storage stability. - Varnish shall be clear, homogeneous, free from particles (grit, seeds, and sediment) and shall meet all other requirements of this specification for a period of one year after manufacture when tested in accordance with 4.3.

3.5 Preservation and packaging. - The preservation and packaging of the varnish shall be in accordance with Section 5 when inspected in accordance with Table III of 4.3.

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#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any inspections set forth in the specification or drawings 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. TEST METHOD STD 141. Forms submitted in accordance with Method 1031 shall cover complete tests other than the one year storage stability test. The storage stability requirement shall apply for one year after manufacture regardless of other testing or prior acceptance of the material.

4.3 Test procedures. - Requirements of this specification shall be verified in accordance with the test procedures of Table III. The numerically-designated test methods are those of FED. TEST METHOD STD 141; the paragraph-designated test method is a paragraph in this specification.

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Table III. - Test procedures.

Requirement	Test Method	Requirement Reference
Materials	1031	Table I
Viscosity	4271	Table II
Weight	4041.1	Table II
Color	4248	Table II
Drying time	4061	Table II
Condition in container	3011	para 3.4.1
Skinning	3021	para 3.4.2
Storage stability	para 4.3.1	para 3.4.3
Preservation and packaging	1031	para 3.5 and Section 5

4.3.1 Storage stability. - The Government, at its option and at any time not to exceed one year after manufacture, may test the varnish stored in its original containers for conformance with 3.4.3. Any action by the Government to disqualify varnish after prior acceptance shall be based on the examination of varnish stored in its original containers. For the purpose of developing a quality history of the supplier's varnish, the Government shall allow, in accordance with Method 3022 of FED. TEST METHOD STD. 141, a full one-quart can of varnish to stand undisturbed for a period not to exceed 12 months and then shall examine for compliance with 3.4.3.

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## 5. PREPARATION FOR DELIVERY

5.1 Packaging and packing. - The varnish shall be packaged and packed in accordance with TT-P-143. The level of packaging shall be A or C, and the level of packing shall be A, B, or C as specified (see 6.2). The size and type of the container shall be as specified (see 6.2).

5.2 Marking. - In addition to any special marking requirements specified in the contract or order, the containers shall be marked in accordance with TT-P-143 and contain an appropriate warning label. The warning label shall be of appropriate size and similar to Class 2 of MIL-STD-755 or shall be lithographed or stenciled with a reasonable likeness thereof. Under "contains" insert "Xylene and Solvents".

## 6. NOTES

6.1 Intended use. - The varnish covered by this specification is intended for use in the sealing and moisture-proofing of surfaces of small explosive devices. When fully cured, it provides a hard, abrasive resistant, moisture-proof coating.

6.2 Ordering data. - Procurement documents should specify the following:

- (a) Title, number, and date of this specification
- (b) Type of varnish required (see 1.2)
- (c) Type and capacity of unit containers required (see 5.1)
- (d) Applicable level of packaging and packing required (see 5.1)
- (e) Special marking requirements (see 5.2)

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6.3                    Method of compounding. - Heat the resin and oil to 450°F within 30 to 40 minutes. Hold the temperature at 450°F for approximately 25 minutes to obtain proper bodying. Cool to 350°F to 375°F and thin with the required solvent. When Type B varnish is specified, add the naphthenate driers after thinning.

6.4                    Specification information. - This specification is under the technical cognizance of the Naval Ordnance Laboratory, Silver Spring, Maryland, which prepared it for the Naval Ordnance Systems Command.

Custodians:  
Navy - OS

Preparing activity:  
Navy - OS  
(The NOL for OS)

Review activities:

Navy - OS (ORD-084)  
Navy - AS (AIR-5051)

(Project No. 8010-N077)



<b>SPECIFICATION ANALYSIS SHEET</b>		Form Approved Budget Bureau No. 22-R255
<b>INSTRUCTIONS:</b> This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.		
<b>SPECIFICATION</b> MIL-V-16399A(OS) Varnish, Moisture Proof		
<b>ORGANIZATION</b>		
<b>CITY AND STATE</b>	<b>CONTRACT NUMBER</b>	
<b>MATERIAL PROCURED UNDER A</b> <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
<b>1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?</b> <b>A. GIVE PARAGRAPH NUMBER AND WORDING.</b>		
<b>B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES</b>		
<b>2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID</b>		
<b>3. IS THE SPECIFICATION RESTRICTIVE?</b> <input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?)		
<b>4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)</b>		
<b>SUBMITTED BY (Printed or typed name and activity - Optional)</b>		<b>DATE</b>

DD FORM 1426  
1 JAN 66

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

S/N-O 102-014-1801

C-25254

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Naval Ordnance Station  
Indian Head, Md. 20640

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