

MIL-W-13518C

11 July 1967

SUPERSEDING

MIL-S-13518B

8 April 1957

MILITARY SPECIFICATION

WOOD PRESERVATIVE: TETRACHLOROPHENOL

AND PENTACHLOROPHENOL,

SURFACE SEALING COMPOUND

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

1. SCOPE

1.1 Scope. This specification covers preservatives for treating wood and plywood.

1.2 Classification. The preservatives shall be of the following types and classes, as specified (see 6.2):

- Type I - Tetrachlorophenol
- Type II - Pentachlorophenol
- Class 1 - Linseed Oil
- Class 2 - Alkyd-Resin

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

- | | |
|----------|--------------------------------------------------------------------------------------|
| TT-D-651 | - Drier, Paint, Liquid. |
| TT-E-522 | - Enamel, Phenolic, Lusterless, Outside. |
| TT-L-215 | - Linseed Oil, Raw, (for use in Organic Coatings). |
| TT-P-143 | - Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing and Marking of. |
| TT-P-636 | - Primer Coating, Alkyd, Wood and Ferrous Metal. |
| TT-R-266 | - Resin, Alkyd; Solutions. |
| TT-T-291 | - Thinner; Paint, Volatile Spirits (Petroleum-Spirits). |

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STANDARDS

Federal

FED. TEST METHOD - Paint, Varnish, Lacquer, and Related Materials;
STD. No. 141 Methods of Inspection, Sampling, and Testing.

Military

MIL-STD-105 - Sampling Procedures and Tables for Inspection
by Attributes.

(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.)

3. REQUIREMENTS

3.1 Description. The preservatives shall be homogeneous, ready-for-use solutions as specified herein.

3.2 Material. Material shall be as specified herein.

3.2.1 Solvent. Solvent shall be as specified in TT-T-291, grade 1.

3.2.2 Drier. Drier shall be as specified in TT-D-651, type I.

3.3 Stability. The preservatives shall show no evidence of curdling or livering. Any settling or separation of ingredients after 30 days storage in a 3/4 filled and sealed container shall be readily dispersed by manual mixing at 77° F.

3.4 Skinning. The preservatives shall show no evidence of skinning after storage for 24 hours in a half filled container.

3.5 Flash point. The preservatives flash point shall be a minimum of 100° F.

3.6 Surface deposits. Treated surfaces, when dry, shall be free of blooming, waxy, greasy, and oily deposits.

3.7 Color. The color of the preservatives shall be not darker than Gardner Color Standard No. 18.

3.8 Marking. Each container of the preservative shall be marked with the following information by stencil, lithograph, or securely affixed label:

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"WARNING"

Fire hazard. The solvent used in the preservatives may have a flash point as low as 100° F. (37.8° C.) and care should be taken to prevent fire. No smoking, welding, or other source of fire should be permitted near the treating operation, or near treated material until after 24 hours of drying under conditions of adequate ventilation to insure removal of flammable vapors. Treating should be done out of doors or in a thoroughly ventilated room. Adequate precautions from fire should be taken in storing the preservatives.

Irritating effect. Some of the ingredients used in preservatives which contain fungicides are irritating to the skin; workmen differ greatly in their sensitivity to them. Adequate ventilation and other protective measures should be provided. The use of protective ointments and of protective clothing is recommended. If applied by spraying, goggles and respirators should be worn. Workmen should avoid the use of clothing soiled with preservatives and should wash with soap and water after contact with solution.

Application. The preservatives should be thoroughly agitated before using. The preservatives should be applied subsequent to all cutting, fitting, and boring out. When cutting after treatment is necessary, the cut surface should be retreated. The preservatives should be applied prior to assembling, except that in the case where the preservatives are likely to affect the strength of glued joints, the preservatives should be applied after assembly.

3.9 Type I, tetrachlorophenol. The fungicide used in type I preservative shall be tetrachlorophenol.

3.10 Type II, pentachlorophenol. The fungicide used in type II preservative shall be pentachlorophenol.

3.11 Class 1, linseed oil. Linseed oil shall be as specified in TT-L-215.

3.11.1 Composition. The composition of the preservative shall be as specified in table I.

Table I. Composition Class 1

Component	Percent by weight	
	Min	Max
Linseed Oil	20.0	23.0
Fungicide 1/	5.0	6.0

1/ Fungicide shall be tetrachlorophenol or pentachlorophenol.

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Table I. Composition Class 1 (Cond't)

Component	Percent by weight	
	Min	Max
Ash content	-	0.50
Moisture content	-	0.30
Solvent and drier	Remainder	

3.11.2 Rosin. There shall be no rosin or rosin derivatives included in the preservative.

3.11.3 Viscosity. The viscosity as determined with Gardner-Holdt tubes shall be a minimum of A5 (0.005 stokes) and a maximum of A (0.50 stokes).

3.11.4 Weight. The weight, per gallon, shall be a minimum of 6.75 pounds and a maximum of 7.60 pounds.

3.11.5 Drying time. The preservative when applied to wood shall dry sufficiently tack free within 15 minutes to permit stacking and binding of the items without adhesion to each other.

3.11.6 Accelerated weathering. Preservative treated test panels shall be free of blisters and shall show only slight fading and chalking of the paint film when tested as specified in 4.4.2.2.2.

3.12 Class 2, alkyd-resin. Alkyd-resin solids shall be of alkyd-resin as specified in TT-R-266, type I, class optional.

3.12.1 Composition. The composition of the preservative shall be as specified in table II.

Table II. Composition Class 2

Component	Percent by weight	
	Min	Max
Alkyd resin solid	12	-
Fungicide ^{1/}	5	6
Solvent and drier	Remainder	

^{1/}Fungicide shall be tetrachlorophenol or pentachlorophenol.

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3.12.2 Drying time and paintability. Preservative treated test panels, when tested as specified in 4.4.2.3.2 shall show no tackiness, excess loss of gloss, soaking in, or other film defects.

3.13 Workmanship. There shall be no lumps and other foreign matter included in the preservatives.

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.

4.1.1 Material inspection. The supplier is responsible for insuring that materials are manufactured, examined and tested in accordance with referenced specifications and standards.

4.2 Classification of inspection. Inspection shall be classified as follows:

- (a) Quality conformance inspection (see 4.3).
- (b) Inspection of preparation for delivery (see 4.5).

4.3 Quality conformance inspection.

4.3.1 Unit of product. The unit of product shall be a U. S. gallon of 231 cubic inches at 60° F.

4.3.2 Lot. A lot shall consist of all the preservative manufactured as one batch and offered for delivery at one time.

4.3.3 Sampling. Sampling for examination and tests shall be in accordance with MIL-STD-105.

4.3.4 Examination. Samples selected in accordance with 4.3.3 shall be examined as specified in 4.4.1. AQL shall be 2.5 percent defective.

4.3.5 Tests. Samples selected in accordance with 4.3.3 shall be tested as specified in 4.4.2 through 4.4.2.3. Failure of any test shall be cause for rejection of the lot.

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4.4 Inspection procedure.

4.4.1 Examination. The preservatives shall be examined for the following defects:

- 101. Surface deposits.
- 102. Marking missing or not as specified.
- 103. Weight not as specified.
- 104. Workmanship not as specified.

4.4.2 Tests. Except as otherwise specified herein, tests shall be performed in accordance with FED. TEST METHOD STD. No. 141 as specified in table III. Nonconformance to the applicable requirements listed in table III shall constitute failure of the test.

Table III. Test Methods

Test	Method	Requirement
Stability and skinning	3011.1	3.3, 3.4
Flash point	4291	3.5
Color	4248	3.7
Linseed Oil	4044	Table I
Ash content	5263	Table I
Moisture content	4081	Table I
Rosin content	5031	3.11.2
Viscosity	4271	3.11.3
Tack free drying time	4061.1	3.11.5
Alkyd resin solid	4044 and 7025	Table II

4.4.2.1 Fungicide content. Approximately 1-1/2 grams of sample and 100 ml of anhydrous butyl alcohol ^{1/} shall be placed in a 500 ml flask fitted with a ground glass joint. Approximately 5 grams of pure metallic sodium shall be cut into pea-size chunks and added to the contents of the flask. The flask shall then be attached to a reflux condenser fitted with a ground glass joint and the contents refluxed on a hot plate for 3 hours. When sodium is

^{1/}The butyl alcohol is used in preference to isopropyl alcohol because of its higher boiling point, which is necessary to insure completeness of reaction.

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needed, small additions may be added through the condenser. A blank shall be included with each series of samples. After 3 hours, 50 ml of a 95 percent ethanol solution shall be added cautiously, in small increments, to the flask through the condenser^{2/}. When the sodium metal has been decomposed, 100 ml of distilled water shall be added cautiously down the condenser and the contents transferred quantitatively to a 600 ml beaker. Ten ml of 30 percent hydrogen peroxide shall be added to the contents of the beaker and the contents boiled on a hot plate until the hydrogen peroxide has been decomposed^{3/}. After the hydrogen peroxide has been decomposed, the contents of the beaker shall be cooled and then neutralized to the phenolphthalein end point with concentrated nitric acid. An excess of one ml of the acid shall be added. The solution shall be cooled and titrated with 0.01N silver nitrate to an electrometric end point or by any other practical method of determining concentration of chloride ion. Tetrachlorophenol (percent by weight) =

$$\frac{5.797 (A-B) C}{D} \text{ or pentachlorophenol (percent by weight) = } \frac{5.327 (A-B) C}{D} \text{ where:}$$

- A = ml of silver nitrate added
- B = ml of silver nitrate for blank
- C = normality of silver nitrate
- D = weight of sample

^{2/}The addition of the 95 percent ethanol is a convenient and safe way of decomposing metallic sodium.

^{3/}The hydrogen peroxide is used to oxidize any sulfide which may be present to sulfate.

Nonconformance to the fungicide requirements of tables I and II shall constitute failure of this test.

4.4.2.2 Class 1, linseed oil.

4.4.2.2.1 Test panels. Test panels for class 1 preservative shall be interior-type Douglas fir plywood. Six 3-by 5-inch panels shall be immersed in the preservative for 3 minutes and air dried for 24 hours at 77° F. plus or minus 5° F. and 50 percent relative humidity.

4.4.2.2.2 Accelerated weathering and paintability test. If the test panels show no evidence of surface deposits, the panels shall be sprayed with one coat of olive drab enamel conforming to TT-E-522, air dried for 72 hours, and conditioned for 10 days at 80° F. and 60 percent relative humidity. After conditioning is completed, 3 test panels shall be immersed in distilled water at 70° F. plus or minus 10° F. for 20 days. The other 3 panels shall be subjected to 900 hours accelerated weathering in accordance with Fed. Test Method Std. No. 141, method 6151. Nonconformance to 3.11.6 shall constitute failure of this test.

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4.4.2.3 Class 2, alkyd-resin.

4.4.2.3.1 Test panels. Test panels for class 2 preservative shall be Ponderosa pine. The panels shall be cut from sapwood sections 6 feet or longer, four sides surfaced, kiln-dried, straight grain, and of even texture. The panels shall be 5/8-inch thick, 4 inches wide and 8 inches long, with the flat grain running in the 4-by 8-inch face. The longitudinal grain or annual rings shall follow and be parallel to the long axis of each piece. The test panel and control shall be taken adjacent to each other, end-to-end, and from the same board.

4.4.2.3.2 Drying time, surface deposit and paintability test. The test panels shall be placed in a conditioning chamber for 10 days at a temperature of 80° F. and a relative humidity of 60 percent. A saturated solution of sodium bromide may be used to obtain this humidity. The test panels shall be submerged for 3 minutes with the 4-inch dimension vertical and the upper edge not more than 3 inches below the surface of the preservative at 80° F. After immersion of the panels in preservative, they shall be air dried for one hour, examined for surface defects, and coated with primer conforming to TT-P-636. A metal panel shall be prepared with the same primer at the same time for comparison. The panels shall be examined and compared periodically with metal panel for 18 hours. Nonconformance to 3.12.2 shall constitute failure of this test.

4.5 Inspection of preparation for delivery.

4.5.1 Quality conformance inspection of pack. The packaging, packing and marking shall be examined in accordance with the sampling, inspection and test procedures of TT-P-143.

5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking. The wood preservative shall be packaged, packed and marked in accordance with TT-P-143 with the following exceptions. Wood cleated fiberboard, wood cleated veneer, paper overlaid or fiber boxes are not acceptable for level A packing. Packaging shall be level A or C and packing shall be level A, B, or C as specified (see 6.2). The wood preservative shall be furnished in the size of the container specified (see 6.2).

6. NOTES

6.1 Intended use.

6.1.1 Type I, tetrachlorophenol. Tetrachlorophenol is intended for use on wood surfaces where painting is anticipated.

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6.1.2 Type II, pentachlorophenol. Pentachlorophenol is intended for use on rough wooden surfaces that are not to be painted. It is not intended to be used for the preservation of vessel hulls and should not be used on wooden handles or other wooden items which come in contact with the skin of the user. Paint may be applied to this preservative if desired.

6.1.3 Class 1, linseed oil. Class 1 preservative is intended to be used on close grain, dense surfaces and plywood where good penetration is required.

6.1.4 Class 2, alkyd-resin. Class 2 preservative is intended to be used on open or porose grain surfaces that permit easy penetration and require some sealing of the pores.

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type and class of preservative required (1.2).
- (c) Level of packaging and level of packing required (5.1).
- (d) Quantity and size of container required (5.1).

6.3 Classification change.

New designation	Old designation
MIL-W-13518C	MIL-S-13518B
Type I Tetrachlorophenol	None
Class 1 Linseed oil	None
Class 2 Alkyd-resin	None
Type II Pentachlorophenol	None
Class 1 Linseed oil	Type I Linseed oil type
Class 2 Alkyd-resin	Type II Alkyd-resin type

Custodians:

Army - ME
Air Force - 84

Preparing activity:

Army - ME
Code "C"

Review activities:

Army - CE, MR, MU
Air Force - 84

Project No. 8030-0303

Other:

NSA

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

DOCUMENT NUMBER		2. DOCUMENT TITLE	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one) <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify) _____	
b. ADDRESS (Street, City, State, ZIP Code)			
5. PROBLEM AREAS			
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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	
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