

TT-C-494B
8 March 1985
SUPERSEDING
TT-C-494A
24 October 1973

FEDERAL SPECIFICATION

COATING COMPOUND, BITUMINOUS, SOLVENT
TYPE, ACID RESISTANT

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration for the use of all Federal agencies

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a general purpose, acid-resistant black asphalt coating compound (see 6.1). It also provides for a formulation suitable for use under AIR POLLUTION REGULATIONS (see 6.3).

1.2 Classification.

1.2.1 Types. The coating compound shall be of the following types, as specified (see 6.2).

Type I - Low solids (for spray application).
Type II - Medium solids (for spray or brush application).
Type III - Heavy paste.

1.2.2 Compositions. The coating compound shall be of the following compositions as specified (see 6.2).

Composition G - General use.
Composition L - Limited use (see 6.3).

2. APPLICABLE SPECIFICATIONS AND STANDARDS

2.1 The following specifications and standards, of the issues in effect on date of invitation for bids, form a part of this specification to the extent specified herein:

Federal Specifications:

TT-N-95 - Naphtha; Aliphatic.
PPP-P-1892 - Paint, Varnish, Lacquer and Related Materials; Packaging, Packing and Marking of.

FSC 8030

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Federal Standards:

Fed. Test Method Std. No. 141 - Paint, Varnish, Lacquer and Related Materials; Methods of Inspection, Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards, and at the price indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Regional Offices in Boston, New York, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, and Seattle).

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications, Standards and Handbooks from established distribution points in their agencies.)

Military Specifications:

MIL-C-450 - Coating Compound Bituminous Solvent Type, Black (for Ammunition)

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

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or requests for proposal shall apply.

American Society for Testing and Materials (ASTM)

- ASTM D 217 - Cone Penetration of Lubricating Grease
- ASTM D 1000 - Testing Pressure-Sensitive Adhesive Coated Tapes used for Electrical Insulation
- ASTM D 1308 - Test Methods for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
- ASTM D 2369 - Test Methods for Volatile Content of Paints
- ASTM D 3272 - Vacuum Distillation of Solvents from Solvents from Solvent Base Paints for Analysis

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

3. REQUIREMENTS

3.1 Composition. The coating compound shall consist of one or more grades of natural or petroleum asphalt in a low boiling, fast evaporating aliphatic naphtha conforming to TT-N-95 and shall contain no drying oils, resins or pigments.

3.1.1 Composition L. The volatile content of composition L compounds shall conform to TT-N-95 and to the following requirements by volume when tested as in 4.3.3.

- (a) Aromatic compounds with eight or more carbon atoms except ethyl benzene: 8 percent maximum.
- (b) Ethyl benzene, toluene and branched ketones: 20 percent maximum.
- (c) Solvents with an olefinic or cyclo-olefinic type of unsaturation: negative test.
- (d) Total of a + b: 20 percent maximum.

3.2 Color. The color shall be black at a dry film thickness producing complete hiding and varying shades of brown in thinner films.

3.3 Quantitative requirements. The coating compound shall conform to the quantitative requirements of Table I when tested as in 4.4.

TABLE I. Quantitative requirements

Characteristics	Requirements	
	Minimum	Maximum
Total solids, percent by weight of coating compound		
Type I	36	40
Type II	45	55
Type III	79	85
Water, percent by weight of coating compound	--	0.5
Insoluble in CS ₂ , percent by weight of coating compound	--	0.5
Viscosity, No. 4 Ford cup, seconds		
Type I	15	28
Type II	110	190
Consistency, Type III, tenths of millimeter	150	250
Drying time		
Dust free		
Type I, minutes	--	5
Type II, minutes	--	5
Type III, hours	--	8
Free form after-tack, hours		
Type I	--	0.5
Type II	--	1
Type III	--	24

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3.4 Qualitative requirements.

3.4.1 Storage properties. When tested as in 4.3.7 the coating compound shall show no livering, thickening, or settling.

3.4.2 Dilution stability (Type II only). When tested as in 4.3.8 the coating compound shall remain stable and show no evidence of precipitation.

3.4.3 Brushing properties (Type II only). When tested as in 4.3.9 the coating compound shall be capable of being brushed out to a smooth film free from discontinuities or other defects.

3.4.4 Spraying properties, appearance when dry (Type I and II only).. When tested as in 4.3.10 the coating compound shall have satisfactory spraying properties in every respect. The dry film shall present a smooth, glossy appearance free from irregularities and rough particles.

3.4.5 Water resistance. When tested as in 4.3.11, a film of the coating compound shall withstand immersion in distilled water without blistering, whitening, softening, or no more than slight dulling.

3.4.6 Acid resistance. When tested as in 4.3.12, a film of coating compound shall withstand the action of sulfuric, nitric, and hydrochloric acids without disintegration, browning, or dulling. There shall be no etching of the metal underneath the coating compound.

3.4.7 Heat resistance. When tested as in 4.3.13, a film of coating compound shall not sag or flow.

3.4.8 Flexibility. When tested as in 4.3.14, a film of coating compound shall be tough and elastic and shall withstand bending without cracking or flaking.

4. SAMPLING, INSPECTION AND TEST PROCEDURES

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 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 that supplies and services conform to prescribed requirements.

4.2 Testing. Testing under this specification shall be for the acceptance of individual lots. The right is reserved to make any additional tests deemed necessary to determine that the coating compound meets the requirements of this specification.

4.3 Test methods.

4.3.1 Test conditions. The routine and referee testing and conditions shall be in accordance with section 7 of Fed. Test Method Std. No. 141 except as otherwise specified herein.

4.3.2 The following tests in Table II shall be conducted in accordance with Fed. Test Method Std. No. 141 and as hereinafter specified.

4.3.3 Solvent analysis for composition L.

4.3.3.1 Separation of volatile portion. Separate volatile portion in accordance with ASTM D 3272. Reserve collected distillate for the test for aromatic content, toluene, ethyl benzene, olefinic or cyclo-olefinic compounds, and ketones.

TABLE II. - Index

Item	Test Method		
	Applicable method in Fed. Std. No. 141	Paragraph of this specification giving further references	Paragraph of this specification giving requirements
Solvent separation	--	4.3.3.1	3.1.1
Aromatic hydrocarbons	7356	4.3.3.2	3.1.1
Olefinic and cyclo-olefinic compounds	7356	--	3.1.1
Ketones	5172	4.3.3.3	3.1.1
Total solids	--	--	Table I
Water	4081	--	Table I
Insoluble matter	--	4.3.4	Table I
Viscosity			
Ford cup	--	--	Table I
Consistency	--	4.3.5	Table I
Drying time	--	4.3.6	--
Dust-free	4061	4.3.6.1	Table I
Free for after-tack	4061	4.3.6.2	Table I
Storage properties	--	4.3.7	3.4.1
Dilution stability	4203	4.3.8	3.4.2
Brushing properties	--	4.3.9	3.4.3
Spraying properties	4331	4.3.10	3.4.4
Water resistance	--	4.3.11	3.4.5
Acid resistance	--	4.3.12	3.4.6
Heat resistance	6051	4.3.13	3.4.7
Flexibility	6221	4.3.14	3.4.8

4.3.3.2 Aromatic content. Determine total aromatic content of volatile portion in accordance with procedure A, Method 7356 of Fed. Test Method Std. No. 141. If the total aromatic content is between 8 and 20 percent determine percent of toluene and ethylbenzene in accordance with procedure B, Method 7356 of Fed. Test Method Std. No. 141.

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4.3.3.3 Determination of ketone content. Determine total ketone content according to paragraph 4.3 of method 5172 of Fed. Test Method Std. No. 141 calculate as methyl isobutyl ketone. Omit first five sentences of paragraph 4.3.1 of Fed Test Method Std No. 141 Method 5172, and substitute the following: Add 15 ml. of absolute alcohol to a 250 ml. glass stoppered Erlenmeyer flask and accurately pipette in 1.5 ml. of distillate followed by exactly 25 ml. of hydroxylamine hydrochloride reagent.

% ketone, v/v (computed as methyl isobutyl ketone) =

$$\frac{(V_{r1} - V_{r2}) \times N \times 0.10 \times 100}{1.5 \times 0.98 \times 0.82}$$

4.3.4 Insoluble matter (in CS<UT>). Weigh accurately about 2g. of the sample into a 150-ml. beaker. Evaporate the volatile solvent on a steam bath. Add 50 ml. of carbon disulfide and agitate until solids are broken up and all lumps disappear. Cover and set aside for 15 minutes. Filter through a tared Gooch crucible. Wash down the sides of the beaker and the Gooch crucible with a small portion of carbon disulfide until the filtrate is clear. Draw air through the Gooch crucible for about 10 minutes to remove the carbon disulfide. Dry the crucible and contents for about 20 minutes in an oven at 105 deg. to 110 deg. C (oF). Cool and weigh. Calculate the percentage of matter insoluble in carbon disulfide as follows:

$$\text{Percentage of insoluble matter} = \frac{A \times 100}{W}$$

where, A = weight of residue

W = weight of sample

4.3.5 Consistency (type III only). Determine the unworked penetration test value of type III coating compound using the penetrometer and the penetrometer cone (as described in ASTM Method D 217) with plunger assembly (total moving weight) weighing 150 g. Take precautions in carrying out the following procedure to eliminate, as far as possible, error due to the volatilization of solvent and inclusion of air bubbles. Fill a cylindrical container, at least 3 inches in diameter, with the sample to a depth of at least 3 inches. Bring the sample to 25 deg. C (77 deg. +/- 1 deg. F). and level the exposed surface. Level the penetrometer. Place the container on the penetrometer table so that the approximate center of the exposed surface lies beneath the tip of the cone. Adjust the height of the penetrometer table and plunger assembly until the tip of the cone just touches the surface of the sample. Release the plunger assembly and allow to remain free for 5 seconds. Calculate the penetration test value (depth of penetration expressed in tenths of millimeter). Raise the plunger assembly, level the exposed surface of the sample and repeat the test as directed above. Report the average of 10 tests if the mean deviation of the first 5 values exceeds 3 percent.

4.3.6 Drying time. Determine drying time under referee conditions as in method 4061 of Fed. Test Method Std. No. 141 using the film applicator Specified in Table III

4.3.6.1 Dust-free. Determine dust free time as in paragraph 4.2.3 Method 4061 of Fed. Test Method Std. No. 141 and observe for compliance with Table I.

4.3.6.2 Free from after-tack. Determine free from after-tack time as in paragraph 4.2.5 Method 4061 of Fed. Test Method Std. No. 141 and observe for compliance with Table I.

4.3.7 Storage properties. Put approximately 4 ounces of the coating compound as packaged into an 8 ounce bottle. Stopper and allow to stand 24 hours at room temperature. Observe for compliance with 3.4.1.

TABLE III. Film applicator

Type	Film applicator, inch	Gap clearance, inch
I	0.0030	0.0060
II	0.0020	0.0040
III	To produce a 0.015 inch wet film	

4.3.8 Dilution stability (Type II only). Reduce on part of the coating compound with one part of thinner conforming to TT-N-95 and observe for compliance with 3.4.2. Thinner used for composition L should meet the requirements of 3.1.1.

4.3.9 Brushing properties (Type II only). Using a 1-1/2 inch brush, apply the coating compound quickly on a 4 by 12 inch steel panel and observe for compliance with 3.4.3.

4.3.10 Spraying properties, appearance when dry (Types I and II only). Spray the Type I coating compound as packaged. Reduce two volumes of the Type II coating compound with a maximum of one volume of thinner conforming to TT-N-95 and spray. Thinner used for composition L should meet the requirements of 3.1.1. Observe for compliance with 3.4.4.

4.3.11 Water resistance. Using a film applicator that will deposit a dry film thickness between 0.0009 and 0.0011 inch, draw down a 2 inch wide film of the coating compound on a 3 by 5 inch steel panel that has been cleaned with the aliphatic naphtha-ethylene glycol monoethyl ether mixture as in method 2011 of Fed. Test Method Std. No. 141. Air dry for 24 hours at 23 deg. +/- 1 deg. C. (73.4 deg. F), coat all exposed metal surfaces with wax or other suitable coating and immerse for 18 hours in distilled water at 23 deg. +/- 1 deg. C. (73.4 deg. F) as in method ASTM D 1308. At the end of the test period, remove the panel and inspect for compliance with 3.4.5.

4.3.12 Acid resistance. Prepare 4 steel panels as in 4.3.11 and apply sulfuric acid (sp. gr. 1.30), nitric acid (sp. gr. 1.22), and hydrochloric acid (sp. gr. 1.09) to the panels. Place 3 or 4 drops of acid on the test

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coating and cover with a watchglass approximately 1.5 inches in diameter. The watchglass shall be at least 1/4 inch from the coating edge. At the end of 6 hours rinse the acid from the panel and inspect for compliance with 3.4.6. Remove the coating compound from the panel and check for etching of the metal.

4.3.13 Heat resistance. Mask off half of a 3- by 5-inch steel panel and spray the coating compound on the uncovered portion to a dry film thickness between 0.0009 and 0.0011 inch (Type II and Type III compounds should be thinned with low boiling, fast evaporating petroleum naphtha to a suitable spraying viscosity). Air dry for 24 hours at 23 deg. +/- 1 deg. C. (73.4 deg. F), remove the masking and heat the panel in an oven at approximately 100 deg. C. (212 deg. F) in a vertical position. The coated end of the panel shall be uppermost with the dividing line horizontal. At the end of one hour remove from the oven and examine for compliance with 3.4.7

4.3.14 Flexibility. Determine flexibility as in method 6221 of Fed. Test Method Std. No. 141. Using a film applicator that will deposit a dry film thickness of 0.0009 to 0.0011 inch, draw down a 2 inch wide film of coating compound on a flat tin plate panel cleaned with the aliphatic naphtha-ethylene glycol monoethyl ether mixture as in method 2012 of Fed. Test Method Std. No. 141. Air dry for 24 hours under referee conditions, bend over a 1/8 inch mandrel and examine for compliance with 3.4.8.

5. PREPARATION FOR DELIVERY

5.1 The coating compound shall be delivered in 1 quart or 1 gallon multiple friction top containers, in 5 gallon lug cover steel pails or in 55 gallon steel drums as specified (see 6.2). The compound shall be packaged level A or C; packed level A, B, or C, as specified (see 6.2) and marked in accordance with PPP-P-1892.

6. NOTES

6.1 Intended use. This asphalt coating is intended for use as a general purpose acid resistant black on such items as battery racks. IT IS NOT INTENDED for coating the interior of ammunition items where it could come in direct contact with explosives. Military Specification MIL-C-450 should be specified for ammunition uses.

6.2 Ordering data. Purchasers should exercise any desired options offered herein and procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Type and composition (see 1.2).
- (c) Administrative provisions for inspection records (see 4.1)
- (d) Level of packaging and level of packing (see section 5).
- (e) The coating compound should be purchased by volume, the unit being one U.S. liquid gallon of 231 cubic inches at 20 deg. C. (68 deg. F).

6.3 Composition L compound should be specified for use in areas with regulations controlling the emission of solvents into the atmosphere.

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Custodians:

Army - MR
Navy - SH
Air Force - 99
Civil - GSA

Preparing activity:

Army - MR
Project No. 8030-0470

Review Activities:

Army - YD, ME
Air Force - 84, 20

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NOTICE OF
VALIDATION

NOT MEASUREMENT SENSITIVE

TT-C-494B
NOTICE 1
20 March 1991

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COATING COMPOUND, BITUMINOUS, SOLVENT
TYPE, ACID RESISTANT

TT-C-494B, dated 8 March 1985, has been reviewed and determined to be valid for use in acquisition.

Custodians:

Army - MR
Navy - SH
Air Force - 99
Civil - GSA

Preparing activity:

Army - MR
Project No. 8030-0470

Review Activities:

Army - ME
Navy - YD
Air Force - 84, 11

AMSC N/A

FSC 8030

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