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March 1, 1978
SUPERSEDING
Fed. Spec. TT-F-336D
October 19, 1967

FEDERAL SPECIFICATION

FILLER, WOOD, PASTE

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

1. SCOPE

1.1 Scope. This specification covers one type of wood filler paste suitable for filling pores of open grain woods.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specification:

TT-V-71 - Varnish, Interior, Floor and Trim.

Federal Standard:

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 prices 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 Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Philadelphia, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Houston, Denver, San Francisco, Los Angeles, and Seattle, WA.

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

Code of Federal Regulations:

49 CFR 178 - Department of Transportation (DOT) Shipping Container Specifications.

(Application for copies should be addressed to the Superintendent of

Documents, Government Printing Office, Washington, DC 20402. Orders should cite the latest edition and supplements thereto.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

D 185 - Coarse Particles in Pigments, Pastes, and Paints.
D 364 - Industrial Grade Xylene.
D 1153 - Methyl Isobutyl Ketone.
D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
D 3272 - Vacuum Distillation of Solvents from Solvent Base Paints for Analysis.
G 23 - Light- and Water-Exposure Apparatus (Carbon-Arc Type) for Exposure of Nonmetallic Materials.

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

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

3. REQUIREMENTS

3.1 Solvent. The solvent, when tested as specified in 4.4.2, shall conform to the following requirements by volume:

(a) The total of solvents with olefinic or cycloolefinic unsaturation shall not exceed 5 percent.
(b) The total of aromatic compounds with 8 or more carbon atoms in the molecule, except ethylbenzene, methyl benzoate, and phenyl acetate, shall not exceed 8 percent.
(c) The total of ethylbenzene, toluene, and branched-chain ketones shall not exceed 20 percent.
(d) A solvent which may be classified into more than one of the above groups shall be considered a member of the group having the lowest allowable concentration.
(e) The total of (a), (b), and (c) shall not exceed 25 percent.
(f) Benzene shall not exceed 0.5 percent.
(g) Halogenated solvents shall not be present.

3.2 Vehicle. The,vehicle shall consist of drying oils, resin solutions, or both, together with solvent as specified in 3.1, plasticizer, dispersing agents, wetting agents, etc., as necessary to meet the requirements of this specification.

3.3 Qualitative requirements.

3.3.1 Condition in container. When tested as specified in table III, the filler as received shall be free from lumps, abnormal thickening, curdling, or livering, and shall show no hard settling or caking that cannot be readily reincorporated to a smooth homogeneous state.

3.3.2 Dilution stability. When tested as specified in 4.4.3, the filler shall mix readily to a smooth homogeneous condition in the solvent mixture and shall remain stable and uniform showing no precipitation, curdling, or separation.

3.3.3 Working properties. When tested as specified in 4.4.4, the filler shall fill the pores of the test panel to create a surface with absorption equal to the test panel. The filler shall set or become flat to permit padding within 30 minutes after application at room temperature and shall cut off well when wiped. It shall not streak or adversely affect the stain, and shall not shrink to the extent that graining is noticeable in subsequent finishing operations. The filler shall not loosen or gray in the pores and shall not discolor or cloud the surface after drying.

3.3.4 Accelerated weathering. When tested as specified in 4.4.5, the hardened filler shall show no fading, darkening, or change in color.

3.3.5 Color. Unless otherwise specified, the color of the filler shall be light, commercially designated as natural, and characteristic of the pigments used. If a definite color is required, such as walnut or mahogany, it shall be so specified (see 6.2).

3.4 Quantitative requirements. When tested as specified in table III, the filler shall meet the requirements specified in table I.

TABLE I. Quantitative requirements

Characteristics	Requirements	
	Min.	Max.
Total nonvolatile matter, percent by weight of filler	75	----
Pigment, percent by weight of nonvolatile matter	78	85
Insoluble matter, percent by weight of pigment	90	----
Coarse particles and skins, percent by weight of filler	--	3.0
Water content, percent by weight of filler	--	3.0
Drying time (hours):		
Air dry (dry hard)	--	18
Force dry (dry hard)	--	1

3.5 Quantities. The filler shall be furnished in 1/2-pint, 1-quart and 1-gallon quantities.

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 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.

4.2 Inspection of preparation for delivery. An inspection shall be made to determine whether the packaging, packing, and marking comply with the requirements of Section 5. The sample unit shall be one shipping container fully prepared for delivery and selected at random. Sampling shall be in accordance with MIL-STD-105. The lot size shall be the number of shipping containers in the end item inspection. The packaging and packing shall be examined for the defects specified in table II. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

TABLE II. Classification of preparation for delivery defects

Examine	Defects
Markings	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Material	Any component missing or damaged or wrong type.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, loose strapping, inadequate stapling,

or distortion of container.

4.3 Testing of the end item. The methods of testing specified in 4.4 shall be followed. Sampling shall be in accordance with MIL-STD-105. The lot shall be expressed in units of gallons. The sample unit for testing shall be one quart. The filler shall be marked and forwarded to the testing laboratory. The inspection level shall be S-2 and the AQL shall be 1.5 defects per hundred units. Unless otherwise specified, all test specimens shall be prepared and tested at a temperature of 23 +/- 1 deg. C (74 deg. +/- 2 deg. F) and a relative humidity of 50 +/- 5 percent.

4.4 Test methods. All tests shall be conducted in accordance with the methods specified in table III to determine compliance with the requirements of section 3.

TABLE III. Test methods

Test	Methods		
	ASTM Standard	Fed. Test Method Std. No. 141	Paragraph reference
Solvent analysis	D 3272	7356, 5132	4.4.2
Condition in container	------	3011	-----
Dilution stability	------	----------	4.4.3
Working properties	------	----------	4.4.4
Accelerated weathering	G 23	----------	4.4.5
Color	D 1729	----------	4.4.6
Total nonvolatile matter	------	----------	4.4.7
Pigment in nonvolatile	------	----------	4.4.8
Insoluble matter	------	----------	4.4.9
Coarse particles and skins	D 185	----------	4.4.10
Water content	------	4081	-----
Drying time	------	----------	4.4.11

4.4.1 Preparation of test panels. All test panels required for testing shall be prepared as specified herein. Sand open grained oak or mahogany wood furniture panels, 30 by 18 cm, with 5/0 sandpaper. Apply a non-grain-raising, light-fast, solvent-type stain, and dry for at least 30 minutes. Apply a shellac-type wash coat, and dry for not less than 30 minutes. Band again with 5/0 sandpaper. Mix the filler thoroughly and apply to the panels with a bristle brush. Brush the filler well into the wood. When the coat flattens or becomes dull (usually 15 minutes), wipe off all excess filler (across the grain), working it into the pores of the wood with a ball of cheesecloth or by any other suitable means. Let the panels dry for 18 hours.

4.4.2 Solvent analysis. The solvent from approximately 200 g of the filler shall be extracted in accordance with ASTM method D 3272. The solvent composition shall then be determined in accordance with 4.4.2.1, method 7356 of Fed. Test Method Std. No. 141, 4.4.2.2, and 4.4.2.3 to determine compliance with the requirement of 3.1.

4.4.2.1 Aromatic and oxygenated solvents. The 1.8 m column shall be installed and the operating conditions described in method 7356 shall be followed. About 3 microliters of the isolated distillate shall be injected and the chromatogram scanned. The aliphatic solvents will emerge within 1 minute and the complete chromatogram should develop in about 5 minutes. From the position of the peaks observed on the chromatogram, an internal standard that will be free of interference shall be selected, such as cyclopentanol or

cyclohexanol. Six-tenths of a milliliter of internal standard shall be added to 3 milliliters of the distillate. The sample shall be analyzed according in the above procedure. Peaks emerging after 1 minute are aromatic solvents along with any oxygenated solvents that may be present. The percent of aromatic and oxygenated solvents shall be calculated as follows:

$$\text{Percent aromatic and oxygenated solvents, v/v} = \frac{A \times B}{C \times D}$$

Where: A = percent of internal standard added (in this case, 20).
B = area of aromatic and oxygenated solvents.
C = calibration factor for the internal standard. This factor is dependent on the internal standard used and on the performance of the chromatograph, and should be determined daily.
D = area of the internal standard (in this case cyclopentanol or cyclohexanol).

4.4.2.2 Halogenated compounds. The presence of halogenated compounds shall be determined in accordance with method 5132 of Fed. Test Method Std. No. 141.

4.4.2.3 Benzene. When the solvent is tested in accordance with 4.4.2.1, the benzene peak shall be examined to determine compliance with the requirement of 3.1.

4.4.3 Dilution stability. Prepare a 1:1 mixture of xylene conforming to ASTM D 364 and methyl isobutyl ketone conforming to ASTM D 1153. Add 63 ml of the solvent mixture to 100 g of filler. Stir the mixture thoroughly, let stand for 2 hours, and then examine to determine compliance with the requirement of 3.3.2.

4.4.4 Working properties. Thin 100 g of a representative sample of the filler with 63 ml of the solvent mixture specified in 4.4.3. Apply the thinned filler to a panel, and allow to dry for at least 30 minutes. Brush coat the panel with a coat of interior varnish conforming to TT-V-71. Allow the varnish to dry for 18 hours. Examine the filler during and after application and the varnished surface after drying to determine compliance with the requirement of 3.3.3.

4.4.5 Accelerated weathering. Prepare a panel as specified in 4.4.1. Mask half of the panel, and test in accordance with ASTM method G 23 using a type E, single open-flame sunshine carbon-arc lamp apparatus for 24 hours without the use of water sprays. On completion of the test, compare the filled pores in the masked portion and the exposed portion to determine compliance with the requirement of 3.3.4.

4.4.6 Color. The test panel prepared in 4.4.4 shall be illuminated and viewed as specified in ASTM D 1729 to determine compliance with the requirement of 3.3.5.

4.4.7 Total nonvolatile matter. Place a portion of the wood filler (3 to 5 g) within a weighed flat-bottomed dish 8 cm in diameter. Using a spatula, spread the filler over the bottom of the dish in a thin uniform layer. Weigh the dish and contents, and calculate the exact weight of the wood filler. Heat the dish and contents in an oven maintained at 105 deg. +/- 2 deg. C for 3 hours. Cool in a dessicator and weigh. From the weight of the dried wood filler, calculate the percentage of nonvolatile matter to determine compliance with the requirement of table I.

4.4.8 Pigment in nonvolatile. Weigh accurately about 15 g of the filler in a weighed centrifuge tube. Add 30 ml of extraction mixture (10 parts ethyl ether, 6 parts benzene, 4 parts methyl alcohol, and 1 part acetone). Mix thoroughly with a glass rod, wash the rod with more of the extraction mixture allowing the washings to pour into the centrifuge tube, and add enough of the mixture to make a total of 60 ml in the tube. Place the tube in the container of the centrifuge and counterbalance the opposite arm with a similar tube. Spin at a moderate speed until settled. Decant the supernatant liquid. Repeat the extraction three times with 40 ml of the extraction mixture. After drawing off the extraction mixture, set the tube on the top of a warm oven for 10 minutes, then in an oven at 105 to 110 deg. C for 2 hours. Cool in a desiccator and weigh. Calculate the percentage of pigment in nonvolatile matter based n the total nonvolatile matter determined in 4.4.7 to determine compliance with the requirement of table I. Grind the powder, place it in a stoppered bottle, and save for testing in 4.4.9.

4.4.9 Insoluble matter. Place 1 g of accurately-weighed pigment in a porcelain dish, moisten with a few drops of methyl alcohol, add 20 ml of

concentrated hydrochloric acid, cover, and heat on a steam bath for 15 minutes. Remove the cover, and evaporate to dryness. Add 25 ml of concentrated hydrochloric acid, cover, and heat on a steam bath for 10 minutes. Dilute with an equal volume of water. Filter and wash the residue until it is free from chloride. Ignite and weigh the residue. From the weight of the residue, calculate the percentage of insoluble matter based on pigment to determine compliance with the requirement of table I.

4.4.10 Coarse particles and skins. Use the procedure in ASTM D 185 for pastes in oil. The amount of filler to be tested shall contain approximately 10 g of pigment. Calculate the percentage of coarse particles and skins based on the percentage of pigment to determine compliance with the requirement of table I.

4.4.11 Drying time. Flow the filler, thinned as specified in 4.4.4, onto two clean glass panels. Place in a nearly vertical position in a well ventilated room but not in the direct rays of the sun. Examine one panel at the end of 18 hours. Force dry the other for 1 hour at 66 deg. C. The film shall be examined at points not less than 25 mm from the edge of the panel to determine compliance with the requirement of table I. The filler is considered to have dried when the pressure that can be exerted between the thumb and the finger does not move the film or leave a mark that remains visually noticeable after the spot is lightly polished with a moist cloth.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be Level A or Commercial, as specified (see 6.2).

5.1.1 Level A. The filler shall be furnished in 1/2-pint metal cans, 1-quart metal cans, or 1-gallon metal cans, as specified (see 6.2). The metal cans shall meet or exceed the requirements of DOT Specifications under 49 CFR 178.

5.1.2 Commercial. The filler shall be packaged in cans, in accordance with normal commercial practice. The complete package shall be designed to protect the item against damage during shipment, handling and storage.

5.2 Packing. Packing shall be Level A or Commercial, as specified (see 6.2).

5.2.1 Level A. Seventy-two 1/2-pint cans or twelve 1-quart cans or four 1-gallon cans of filler, packaged as specified in 5.1, shall be packed in fiberboard boxes made from weather-resistant fiberboard with a bursting test strength of not less than 275 lbs. per square inch. The box flaps shall be secured with water-resistant adhesive applied to not less than 75 percent of the surface area of contact between the flaps, or with 3 inch wide waterproof tape applied to the full length of the seams and extending over the ends not less than 3 inches. Alternatively, wirebound, cleated plywood, or nailed wood boxes shall be acceptable shipping containers when lined with a waterproof barrier material. The barrier material shall be sealed at the edges with waterproof tape or adhesive.

5.2.2 Commercial. The 1/2-pint, one quart, and one gallon filler, packaged as specified in 5.1, shall be packed in fiberboard boxes to insure safe delivery at destination, to provide for safe redistribution by the initial receiving activity, and shall be acceptable by common carrier under the National Motor Freight Classification or Uniform Freight Classification.

5.3 Unitization. When shipments to Government depots are full car or truckload, the shipping containers shall be unitized for shipment and handling in accordance with normal commercial practice. The unitized load shall not exceed 2,500 pounds in weight, 63 inches in height, 56 inches in length, and 45 inches in width.

5.4 Marking. Marking shall be as specified in the contract or order (see 6.2).

6. NOTES

6.1 Intended use. The product covered by this specification is intended for filling the pores of open-grained woods to permit application of a finish with minimum absorption. If fast drying is required, force dry at 66 deg. C

(150 deg. F) for 1 hour.

6.2 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

(a) Title, number, and date of this specification.
(b) Color required (see 3.3.5).
(c) Size of container required (see 5.1).
(d) Level of packaging and level of packing required (see 5.1 and 5.2).
(e) Marking required (see 5.4).

6.3 For the purpose of shelf life surveillance, the filler shall show no livering, curdling, hard-dry caking, or gummy sediment, and shall redisperse readily to a homogeneous state.

DOD has waived coordination on revisions and amendments to this Federal Specification until further notice.

Preparing activity:

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Order for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein. Price 60 cents each.