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## FEDERAL SPECIFICATION

### COATING, POLYURETHANE, OIL-FREE, MOISTURE CURING

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 an oil-free, moisture curing polyurethane coating. This material is cured by chemical reaction with moisture from the air. The coating offers good resistance to abrasion, chemicals, and stains, and provides maximum washability and durability. It imparts a glossy, tile-like finish.

1.2 Classification. The coating shall be of the following types and classes:

Type I - Aliphatic:

Class A - Clear.

B - Pigmented.

Type II - Aromatic:

Class A - Clear.

B - Pigmented.

#### 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 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.)

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Military Standard:

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

(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 contracting officer.)

Code of Federal Regulations:

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

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 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 523 - Specular Gloss.
- D 1210 - Fineness of Dispersion of Pigment-Vehicle Systems.
- D 1544 - Color of Transparent Liquids (Gardner Color Scale).
- D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
- D 2196 - Rheological Properties of Non-Newtonian Materials.
- D 2572 - Isocyanate Groups in Urethane Materials or Prepolymers.
- D 2615 - Free Toluene Diisocyanate in Urethane Polymers by Distillations.
- D 2698 - Determination of the Pigment Content of Solvent Type Paints by High-Speed Centrifuging.
- D 3272 - Vacuum Distillation of Solvents from Solvent Base Paints for Analysis
- D 3278 - Flash Point of Liquids of Setaflash Closed Tester.
- D 3335 - Determination of Low Concentrations of Lead in Paint by Atomic Absorption Spectroscopy.
- D 3363 - Film Hardness by Pencil.
- E 97 - 45-deg, 0-deg. Directional Reflectance of Opaque Specimens by Filter Photometry.
- G 23 - Light and Water-Exposure Apparatus (Carbon-Arc Type), or Exposure of Nonmetallic Materials, Rec. Practice for Operating.

(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, NW, 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 Material. The end items shall contain not less than percent by weight of recovered materials. Recovered materials are defined as material which has been collected or recovered from solid waste.

3.1.1 Vehicle. The vehicle shall be an oil-free, moisture-curing polyurethane with necessary additives and thinner (see 3.1.2). An infrared spectrum shall be taken for the nonvolatile vehicle as specified in 4.3.1. The band positions, shapes, and relative intensities in each spectrum shall match the spectrum in Figure 1 for Type I and Figure 2 for Type II.

3.1.2 Solvent. The solvent, when tested as specified in 4.3.2, shall conform to the following requirements by volume:

(a) The total of solvents with olefinic or cyclo-olefinic unsaturation shall not exceed 5 percent.

(b) The total of aromatic compounds with 8 or more carbon atoms in the molecule, except ethylbenzene, methyl benzonate, 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 20 percent.

(f) Halogenated solvents shall not be present.

### 3.2 Qualitative requirements.

3.2.1 Color. The color of the pigmented coatings specified in the contract or purchase order (see 6.4) shall match that of the standard color chip in Fed. Std. No. 595 when tested as in 4.3.3.

3.2.2 Condition in container. The coating, when tested as in 4.3.4, shall show no skinning, livering, seeding, or lumps. Any settling or caking shall be easily redispersed to a homogeneous state.

3.2.3. Brushing properties. The coating, when tested as in 4.3.5, shall brush satisfactorily in all respects, and shall dry to a smooth, glossy, uniform film free from seeds, runs, and streaks. The dried film shall be free from brush marks.

3.2.4 Spraying properties. The coating, when tested as in 4.3.6, shall show no webbing, running, sagging, streaking, curtaining, fogging, or orange peel. The dried film shall show no seeding, dusting, floating, flashing mottling, or hazing.

3.2.5 Flexibility. A film of the coating, prepared and tested as in 4.3.7, shall withstand without cracking or flaking.

3.2.6 Knife test. A film of the coating, prepared and tested as in 4.3.8, shall adhere tightly to and shall not flake or crack from the metal. The film ribbon shall curl when cut from the metal, and the cut shall show beveled edges.

3.2.7 Recoating properties. When tested as in 4.3.9, recoating of a dried film shall produce no flashing, lifting, mottling, orange peeling, spotting, or wrinkling.

3.2.8 Anchorage (tape test). A film of the coating, when tested as in 4.3.10, shall show no removal or loosening of the film beyond 2 mm on either side of the score line.

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3.2.9 Resistance to chemicals. When tested as in 4.3.11.1, the coating shall show no softening, blistering, or discoloration.

3.2.10 Resistance to hydrocarbons. A film of the coating, when tested as in 4.3.11.2, shall show no blistering or wrinkling immediately upon removal from the test fluid. After 24 hours of air drying, the portion of the panel which was immersed shall be indistinguishable with regard to adhesion, color, gloss, and firmness from a panel prepared at the same time but not immersed.

3.2.11 Resistance to water. A film of the coating, prepared and tested as in 4.3.11.3, shall show no blistering or wrinkling immediately upon removal from the water. When examined 2 hours after removal, there shall be no softening, whitening, or dulling, and no difference between the immersed portion and the unimmersed portion with regard to adhesion, color, and gloss.

3.2.12 Resistance to accelerated weathering (class B only). When tested as in 4.3.11.4, the pigmented coatings, shall show no chalking, a loss of gloss of not more than 30 percent of the gloss measured prior to exposure, and a lightness index difference ([DELTA]L) of not more than six.

### 3.3 Quantitative requirements.

3.3.1 Quantitative requirements shall be as specified in Table I, 3.3.2, and Table II.

TABLE I. Requirements

Characteristics	Type I				Type II			
	Class A		Class B		Class A		Class B	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Color (class A only)	--	2.0	--	--	--	2.0	--	--
Pigment, percent by weight	--	--	16	--	--	--	16	--
Nonvolatile, percent by weight	35	--	45	--	35	--	45	--
Viscosity (Brookfield LVT # 2 Spindle at 30 r.p.m.), cP	50	200	100	600	50	200	50	600
Flash point, deg. C	27	--	27	--	27	--	27	--
Fineness of grind (class B only)	--	--	6	--	--	--	6	--
Directional reflectance (white only)	--	--	84	--	--	--	84	--
Hardness (pencil)	B	H	B	H	HB	H	HB	H
Abrasion resistance (wear index)	--	30	--	60	--	20	--	60
Impact resistance	60	--	40	--	60	--	40	--
Isocyanate, percent by weight of nonvolatile	--	--	--	--	3.5	8.2	3.5	8.2
Free toluene diisocyanate, percent by weight of coating	--	--	--	--	--	0.3	--	0.25
Drying time:								
Tack free (hours)	--	4	--	4	--	2	--	2
Dry through (hours)	--	12	--	12	--	4	--	6
Lead content, percent by weight of nonvolatile	--	0.06	--	0.06	--	0.06	--	0.06
Gloss (60 deg. Specular)	--	--	85	--	--	--	85	--

3.3.2 Hiding power (contrast ratio). When tested as specified in 4.3.16, a dry film of the white pigmented coating not more than 0.037 mm thick shall have a contrast ratio of 0.95 minimum. The minimum dry-film contrast ratio for tints at a maximum of 0.037 mm dry-film thickness shall be as specified in Table II.

TABLE II. Minimum dry film contrast ratios for tints

Apparent reflectivity of tints, percent	Contrast ratio
82 and above	0.95
76-81	.96
72-75	.97
66-71	.98
62-65	.99
61 and lower	1.00

3.4 Warning label: Each container shall be marked clearly as follows:

Type I - Cautionary Information - Please Read Carefully. Keep away from heat sparks and open flame. Vapor harmful. Positive fresh air ventilation necessary. Otherwise use air-supplied hood or chemical canister face mask. Harmful or fatal if swallowed. Do not induce vomiting, call physician immediately.

Keep away from vapors and mists which may be skin and respiratory sensitizing to some individuals. For eye contact, flush repeatedly with water and call physician. Keep out of reach of children.

Type II - Cautionary Information

Positive fresh air ventilation necessary, otherwise use air-supplied hood or chemical canister face mask.

Avoid prolonged breathing of vapors and mists which may cause severe coughing and asthma-like attacks or be strongly sensitizing to some individuals. Use particular care when spraying. In case of persistent coughing, call physician.

Keep away from heat, sparks and open flame. Avoid prolonged contact with skin. Wash thoroughly after using and before smoking or eating. If swallowed, do not induce vomiting, call physician immediately. Keep out of reach of children.

3.5 Manufacturer's instructions. Complete application instructions shall be marked clearly on each container. They shall include directions for surface preparation of wood, concrete, and metals.

#### 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.

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## 4.2 Sampling and Inspection.

4.2.1 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 lot. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

## 4.2.2 Testing of the end item.

4.2.2.1 Lot. The coating shall be assembled into lots as specified MIL-STD-105.

4.2.2.2 Sampling of the end item for tests. For the purposes of sampling, the lot shall be expressed in units of gallons. Samples from lots shall be taken in accordance with MIL-STD-105 using inspection level S-2 and an acceptable quality level (AQL) of 2.5 percent defective.

4.3 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. Unless otherwise specified, standard testing conditions are 23 deg. +/- 1 deg. C and a relative humidity of 50 +/- 5 percent. All test reports shall contain the individual values utilized in expressing the final result. All test results shall be compared with the corresponding requirements of section 3 and evaluated for compliance. Failure to pass any test, or noncompliance with any requirement, shall be cause for rejection of the sample.

TABLE III. Index

Characteristics	Requirement Reference	Applicable Test		Paragraph Reference
		Fed. Test Method No. 141	ASTM	
Vehicle	3.1.1	----	----	----
Solvent	3.1.2	7356	D 3272	4.3.2
Color (class B)	3.2.1		D 1729	4.3.3
Condition in container	3.2.2	3011	----	4.3.4
Brushing properties	3.2.3	4321	----	4.3.5
Spraying properties	3.2.4	4331	----	4.3.6
Flexibility	3.2.5	6221	----	4.3.7
Knife test	3.2.6	6304	----	4.3.8
Recoating	3.2.7	----	----	4.3.9
Anchorage	3.2.8	----	----	4.3.10
Resistance to chemicals	3.2.9	----	----	4.3.11.1
Resistance to hydrocarbon	3.2.10	----	----	4.3.11.2
Resistance to water	3.2.11	----	----	4.3.11.3
Resistance to accelerated weathering	3.2.12	----	----	4.3.11.4
Color (class A)	Table I	----	D 1544	----
Pigment percent by weight	Table I	----	D 2698	----
Nonvolatile vehicle percent by weight	Table I	----	D 2698	----
Viscosity	Table I	----	D 2196	----
Flash point	Table I	----	D 3278	----
Fineness of grind (class B)	Table I	----	D 1210	----

Directional reflectance	Table I	----	E 97	----
Hardness	Table I	----	D 3363	4.3.12
Abrasion resistance	Table I	6192	----	4.3.13
Impact resistance	Table I	6226	----	4.3.14
Isocyanate	Table I	----	D 2572	----
Free toluene diisocyanate	Table I	----	D 2615	----
Drying time	Table I	4061	----	4.3.15
Lead content	Table I	----	----	4.3.17
Gloss	Table I	----	D 523	4.3.18
Hiding power	Table II	----	E 97	4.3.16

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4.3.1 Vehicle IR spectrum. Test a film of the nonvolatile vehicle, oven dried for 1 hour at 105 deg. C, and an infrared spectrophotometer. In Class B coatings the nonvolatile vehicle shall be obtained as specified in ASTM method D 2698.

4.3.2 Solvent analysis. The solvent from 100 ml of the coating shall be extracted in accordance with ASTM method D 3272. The solvent composition shall then be determined in accordance with 4.3.2.1, method 7356 of Fed. Test Method Std. No. 141, and 4.3.2.2 to determine compliance with the requirements of 3.1.2.

4.3.2.1 Aromatic and oxygenated solvents. The 1.8m (6 ft) 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 to 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).

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

4.3.3 Color (class B only). Draw down a 150 [mu]m film of the pigmented coating on a white chart and allow to dry at room temperature for 48 hours. Determine the color in accordance with ASTM D 1729.

4.3.4 Condition in container. Determine the package condition of the material in accordance with method 3011 of Federal Test Methods Std. No. 141.

4.3.5 Brushing properties. Determine the brushing properties of the coating in accordance with method 4321 of Fed. Test Method Std. No. 141.

4.3.6 Spraying properties. Determine the spraying properties of the coating in accordance with method 4331 of Fed. Test Method Std. No. 141, using a spraying distance of 200 mm.

4.3.7 Flexibility. Apply a film of coating to produce a 0.025-mm dry film thickness on a solvent-cleaned steel panel. Allow the panel to dry for 14 days at standard conditions. Bend over a 3-mm mandreal and examine in accordance with method 6221 of Fed. Test Method Std. No. 141.

4.3.8 Knife test. Perform the knife test in accordance with method 6304

of Fed. Test Method Std. No. 141, using a flat portion of the panel used in the flexibility test.

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4.3.9 Recoating properties. Brush a coat of the coating on a clean glass panel to a dry film thickness of 0.037 mm, and allow to dry in a horizontal position for 24 hours at room temperature. Apply a second coat cross-wise to the first coat, then air-dry as before. After 24 hours of drying, evaluate for compliance with 3.2.8.

4.3.10 Anchorage (tape test). Spray a film of the coating to a dry film thickness of 0.025 mm on a primed aluminum panel. Allow to dry at room temperature for 48 hours, and bake at 100 deg. +/- 5 deg. C for 2 hours. Condition the panel under standard testing conditions for 1 hour, then score a line through to the metal across the width of the film using a sharp pointed knife. The film shall then be taped perpendicular to and across the scoreline with pressure sensitive tape having a minimum adhesion to steel of 25 oz/inch width. The tape shall be pressed with two passes of a 2 kg rubbercovered roller 89 mm diameter by 45 mm wide. The surface of the roller shall have a durometer hardness value of 70 to 80. The tape shall extend 25 mm on each side of the score line. Then grasp a free end of the tape and at rapid speed strip it from the film by pulling the tape back at an angle of 180 deg.. Observe the score live and evaluate.

4.3.11 Resistance tests (preparation of panels). Prepare four steel panels in accordance with method 2011 of Fed. Test Method Std. No. 141. Spray two equally-thick coats of the coating 4 hours apart, to give a dry film thickness of 0.076 mm, and allow to dry at standard conditions for 14 days. On two panels, the back and all sides shall also be coated.

4.3.11.1 Resistance to chemicals. On one of the test panels prepared in 4.3.11, place 1 ml of each of the following in separate puddles:

Hydrochloric acid, 10 percent v/v	Citric acid, 10 percent w/v
Sulfuric acid, 10 percent v/v	Ammonium hydroxide, 10 percent v/v
Phosphoric acid, 10 percent v/v	Sodium hydroxide, 10 percent w/v
Nitric acid, 2 percent v/v	Sodium chloride, 20 percent w/v
Acetic acid, 5 percent v/v	Sucrose, 10 percent w/v
	Tide, 1 percent w/v

Cover each spot with a watch glass, seal the watch glass in place with parafin wax, and allow to remain in place for 24 hours. Remove the watch glasses, rinse with clean water, wipe off excess water, and allow to dry at standard conditions for 2 hours.

4.3.11.2 Resistance to hydrocarbons. Use one of the panels prepared in 4.3.11, with the back and all edges coated. In accordance with method 6011 of Fed. Test Method Std. No. 141, immerse the coated panel for 2 hours in a mixture of 70 percent iso-octane and 30 percent toluene by volume. Remove the panel from the test fluid and examine.

4.3.11.3 Resistance to water. Use one of the panels prepared in 4.3.11 with the back and all edges coated. Immerse about half of the panel in distilled water for 18 hours. Remove the panel and evaluate. Condition the panel for 2 hours and evaluate. Then compare the immersed portion to the unimmersed portion and evaluate.

4.3.11.4 Weather resistance (accelerated). Use a panel prepared in 4.3.11. Measure the gloss and reflectance of the coated panel, and then subject it to accelerated weathering for 168 hours in accordance with ASTM G 23. An enclosed carbon-arc type weatherometer shall be used. Remove, examine for chalking and wash the exposed film under running water with a thoroughly degreased lambs wool pad. Wipe off water and let dry for 2 hours. Measure the gloss and reflectance; compute the percentage loss of gloss, and

determine the amount of color change expressed as lightness index difference ([DELTA]L) using method 6122 of Fed. Test Method Std. No. 141.

4.3.12 Pencil hardness. Apply the coating on a clean 5- by 150- by 300-mm aluminum panel to dry-film thickness of 0.037 mm. Allow the film to cure for 14 days at standard conditions. The panel shall be tested for gouge hardness as specified in ASTM D 3363.

4.3.13 Abrasion resistance. Determine the wear index of the coating in accordance with method 6192 of Fed. Test Method Std. No. 141. Draw down a film of the coating to a dry film thickness of 0.025 mm on a clean steel plate, and allow to dry at standard conditions for 14 days. Run the abrasion test using a Taber Abrader, Model 174, a CS-17 Calibrase Wheel, a 1000-g weight, and 1000 revolutions.

4.3.14 Impact resistance. Determine the impact resistance in accordance with method 6226 of Fed. Test Method Std. No. 141. Air dry the coated panel for 14 days instead of 72 hours. The panel shall be 30 gage cold rolled steel.

4.3.15 Dry time. The samples shall be prepared and tested as specified in method 4061 of Federal Test Method Std. 141, using a dry film thickness of .0318 mm and air drying.

4.3.16 Hiding power. Panels shall be prepared by applying sufficient coating to a sealed black and white chart to form a dry film thickness of 0.037 mm. The coating shall be allowed to cure for 14 days at standard conditions. The 45 deg. reflectance of the panel shall be measured as specified in ASTM E 97. The contrast ratio shall be calculated by dividing the reflectance value of the coated black panel by the reflectance of the coated white panel.

4.3.17 Lead content. The method described in 4.3.17.1 or the method described in 4.3.17.2, shall be used. The X-ray fluorescence spectrometry method described in 4.3.17.1 shall be the final determinant of compliance in all cases.

4.3.17.1 Analysis for lead by X-ray fluorescence spectrometry. Lead content shall be determined using an X-ray fluorescence spectrometer capable of determining lead content at a minimum level of 0.03 percent by weight. The molybdenum X-ray source shall be operated at a 60Kv and 45Ma; a lithium fluoride crystal cut along the 200 planes shall be used to disperse fluorescent X-rays, the detector collimeter shall be set at fine; and flow and scintillation counters shall be used as detectors. Pulse height selection shall be used in all measurements, and the counting time shall be 100 seconds. Place the sample disc in the sample holder, and measure the count rates of lead, lead background, and the molybdenum Rayleigh-scattered background from the X-ray tube at the following angles:

<u>Analytical Line</u>	<u>Angle</u>	<u>Intensity</u>
MO	20.33	$I_{\text{PbMo}}$
Background I	33.50	$I'$
Pb	33.93	$I_{\text{Pb}}$
Background II	34.50	$I''$

4.3.17.1.1 Calculation. Determine the ratio R of the lead and molybdenum lines as follows:



$$R = \frac{2I_{\text{Pb}} - I' - I''}{2I_{\text{Mo}}}$$

4.3.17.1.2 Procedure. Duplicate drawdowns of the well-mixed coating shall be made on the sealed portion of a standard paint penetration chart, using a mechanical applicator plate and a film applicator with a 150 [mu]m gap. The drawdowns shall be at least 250mm long, and shall be allowed to air-dry for 24 hours at standard conditions. Discs shall then be cut from each drawdown to fit the sample holder of an X-ray fluorescence spectrometer. Standard samples of the same type of coating containing known amounts of lead shall be prepared and measured in the same way, and the R values shall be plotted against the lead concentration to obtain a working curve. By use of the working curve, the value of R obtained for the test sample shall be converted to the lead concentration in percent by weight, and the result shall be evaluated for compliance with the requirement in Table I.

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4.3.17.2 Analysis for lead by atomic absorption spectrometry. ASTM Method D 3335 shall be used to determine the concentration of lead in percent by weight, and the result shall be evaluated for compliance with the requirement in Table I.

4.3.18 Gloss. The coating shall be tested as specified in ASTM D 523 using the following procedure:

- 1) Samples shall be prepared by applying sufficient coating to a clear glass panel to form a dry film thickness of .075 mm.
- 2) 60 deg. gloss shall be measured.

## 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 coating shall be furnished in one quart metal cans, one gallon metal cans, five gallon metal pails, or 55 gallon steel drums as specified (see 6.2). The metal cans, pails and drums shall meet the requirements of Department of Transportation (DOT) Specifications under 49 CFR 178.

5.1.2 Commercial. The coating shall be preserved and packaged 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. Twelve 1 quart cans or four 1 gallon cans of coating, 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 pounds 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 one quart and one gallon packaged coating 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 Special marking. See paragraphs 3.4 and 3.5.

## 6. NOTES

6.1 Intended use. The coatings covered by this specification are oil-free and moisture-curing, clear or pigmented. They are designed for use on floors, walls, machinery, equipment, and other surfaces where good abrasion resistance, color retention, gloss retention, graffiti resistance, and good resistance to acids, alkalis, solvents, strong cleaners and sanitizers, fuels, and chemicals is necessary. They are intended for application in two or more coats on concrete floors, brick and masonry surfaces (properly conditioned), metal (properly primed), and wood (properly prepared and sealed). Type I has outstanding ultra-violet resistance and is, therefore, suited for exterior application. The Type I, class A coating, however, does not perform well on oily or resinous wood (e.g. Teak or Douglas Fir), when subjected to outdoor exposure. Type II will yellow and chalk when exposed to sunlight and is therefore recommended only for interior use.

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6.1.1 Abrasive granules or chips can be incorporated in order to provide skid resistance under wet conditions, or for a decorative effect.

6.2 Coverage. As a guide to users, normal application methods will give a coverage of 250 to 400 square feet per gallon on a concrete surface of average porosity. On a nonabsorbent surface, a gallon of coating will produce a 0.003 inch thick wet film on at least 400 square feet for type I, class A, and type II, class A, and 500 square feet for type I, class B and type II, class B.

6.3 The films deposited from coatings in this specification are extremely strong and tough. In order to obtain their full service potential, they must be firmly anchored to the substrate. Careful attention must be given to cleaning and preparation of the substrate and to priming or condition where necessary. The manufacturer's instructions and the use of auxiliary materials where indicated should be explicitly carried out.

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

- (a) Title, number, and date of this specification.
- (b) Level of packaging and packing required (see (see 5.1 and 5.2)).
- (c) Type and class (see 1.2). If type I, class B, or type II, class B is required, specify color by reference to Fed. Std. No. 595.

MILITARY INTEREST:

Preparing activity

The DOD has waive coordination  
of this document until further notice.

GSA-FSS

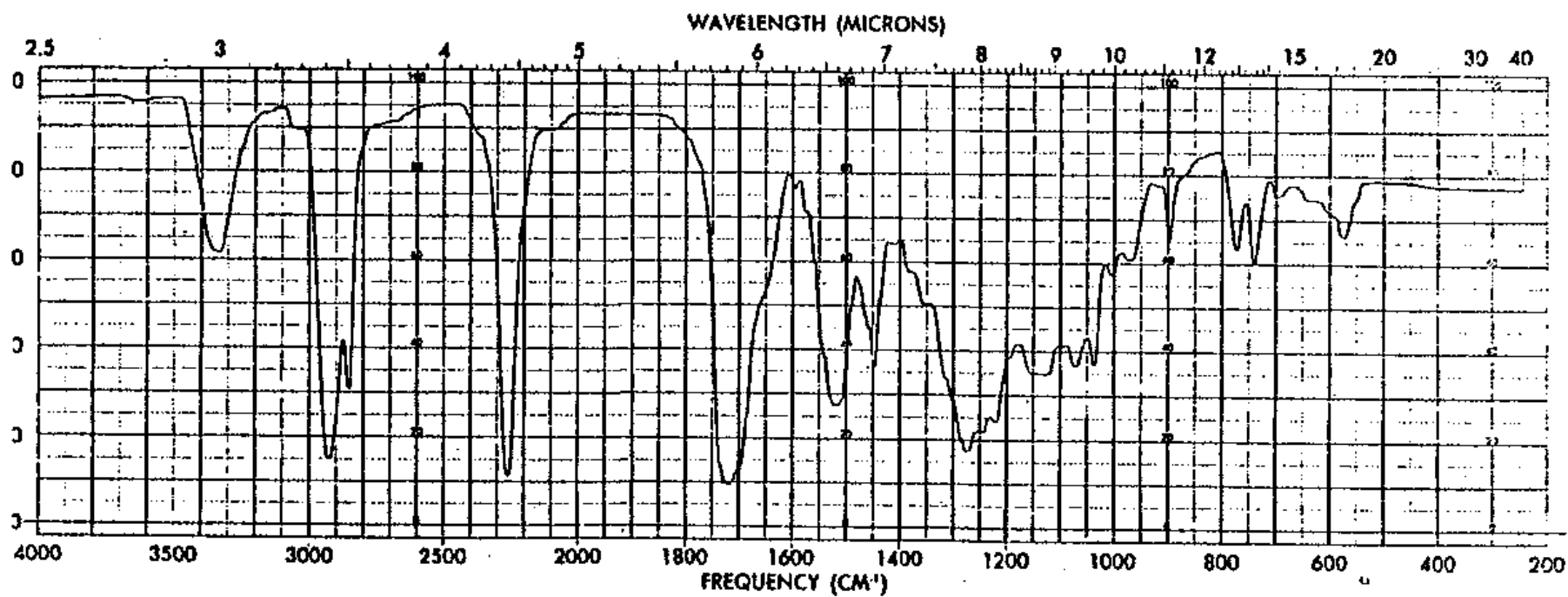


Figure 1 (Type I)

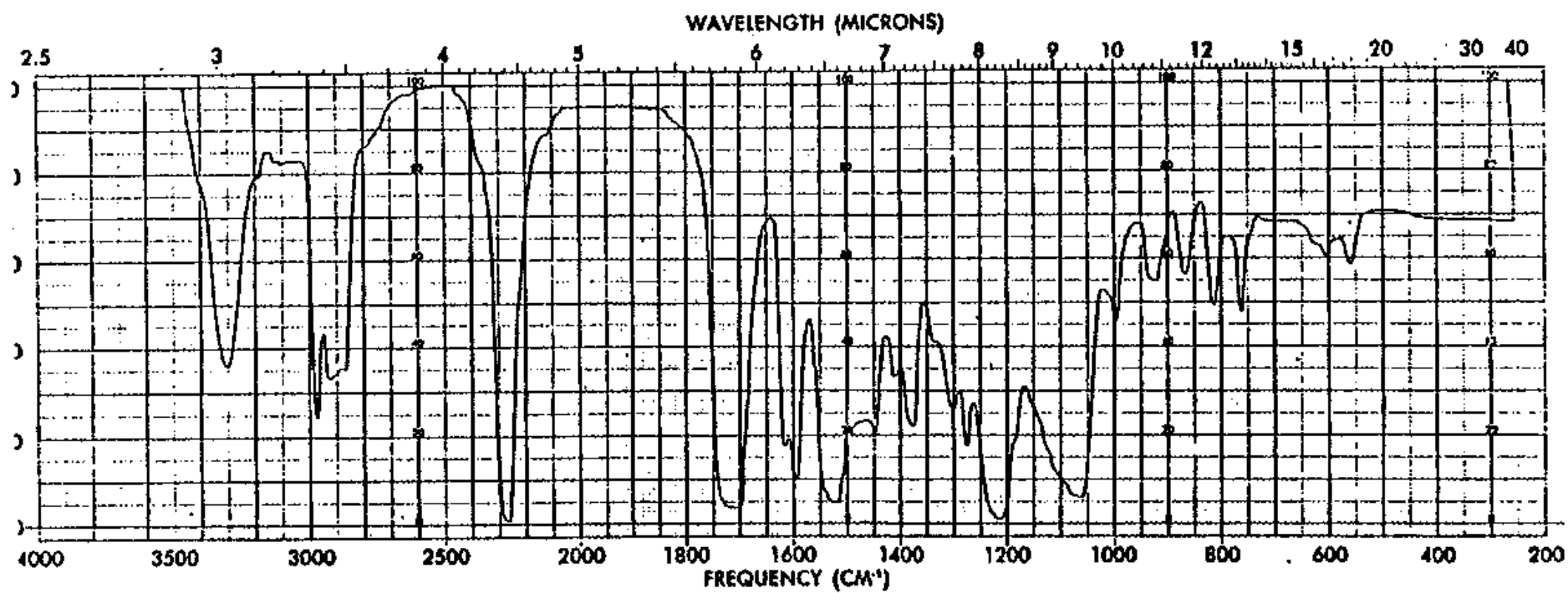


Figure 2 (Type 2).

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Orders 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 90 cents each.