L-P-508H
April 19, 1977
SUPERSEDING
Fed. Spec. L-P-508G
November 14, 1975

FEDERAL SPECIFICATION

PLASTIC SHEET, LAMINATED, DECORATIVE AND NONDECORATIVE

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 plastic laminates for surfacing applications requiring good appearance and functional performance under daily services such as in (1) counters and table tops, both residential and commercial, (2) sink tops and kitchen work surfaces, (3) furniture and cabinets, (4) wall paneling and partitions and (5) doors.

1.2 Classification.

1.2.1 Styles, types, and classes. Plastic sheet laminates covered by this specification shall be of the styles, types, and classes shown in table I, as specified (see 6.2 and 6.4).

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TABLE I. Styles, types, and classes of plastic sheet, laminated

Style	Type	Class[1], [2],
D - Decorative	I - General purpose (includes material for both horizontal and vertical applications - (see 6.1.1)	1 2
	II - Post forming	1 2
	III - Hardboard core	- -
ND - Nondecorative	IV - Backing sheet	- -

[1] Class 1 represents a minimum wear value of 400 cycles.
[2] Class 2 represents a minimum wear value of 200 cycles.

1.2.2 Finishes. Style D plastic sheet shall be of the following finishes as specified (see 6.2):

Finish A - Satin.
Finish B - Furniture
Finish C - Gloss.
Finish D - Other.

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.

Federal specifications:

UU-P-268 - Paper, Kraft, Wrapping.
PPP-B-585 - Boxes, Wood, Wirebound.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-D-723 - Drums, Fiber.
PPP-T-45 - Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing.

Federal standard:

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).

(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, D. C. 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, Washington, DC, Atlanta, Chicago, Kansas City, MO., Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, Washington.

(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.)

Military specification:

MIL-P-116 - Preservation-Packaging, Methods of.

Military standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military 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.)

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.

National Electrical Manufacturers Association (NEMA):

NEMA Standards Publication No. LD 3-1975 - High Pressure Decorative Laminates.

(Copies may be obtained from the National Electrical Manufacturers Association, 2101 L Street, NW, Suite 300, Washington, DC 20037.)

National Motor Freight Traffic Association, Incorporated 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, Illinois 60606.)

3. REQUIREMENTS

3.1 Material. The plastic laminate shall consist of layers of fibrous sheet material which have been impregnated with thermosetting resins and have been consolidated under heat and pressure to form a hard solid product.

3.1.1 Hardboard core. The hardboard core (exclusive of finished top and bottom surfacing) shall consist of wood fibers or particles consolidated under heat and pressure and bonded by natural or synthetic resin.

3.2 Properties and performance (applicable to style D only). All style D plastic laminates shall conform to the property and performance characteristics specified in table II, when tested as specified in the applicable procedure of 4.3.3.

TABLE II. Properties and performance characteristics of style D laminates

Type of sheet	NEMA[1] reference to performance properties chart
Type I - General purpose	LD 3-1975
Type II - Post forming	LD 3-1975
Type III - Hardboard core	[2]

[1] NEMA Standards Publication No. LD 3-1975.
[2] Requirements shall be equal to that specified for general purpose, GP 38, in LD 3-1975 plus the requirement for water swell. When subjected to testing for water swell (see 4.3.5), type III material shall show a gain of not more than 25 percent in either weight or thickness. Also, the laminate shall show no crazing, chalking or delamination.

3.3 Properties and performance (applicable to type IV, style ND, only). All type IV (style ND) backing sheet shall conform to the requirement for immersion in boiling water (see 3.3.1).

3.3.1 Immersion in boiling water. Sheets with a thickness of 0.030 inch and greater shall gain not more than 15 percent in either weight or thickness. Sheets with a thickness less than 0.030 inches shall gain not more than 20 percent in either weight or thickness. Testing shall be in accordance with 4.3.4.

3.4 Sanded surface. Laminate shall be sanded on one side to permit good bonding.

3.5 Length and width of sheet (applicable to style D and Style ND). The sheet shall be furnished in the sizes shown in table III, as specified (see 6.2)

TABLE III. Sheet sizes

Style and type	Nominal width, inches	Nominal length	
		Inches	Feet
Flat or cut sheets: Styles D and ND; Types I, II, III, and IV	24	36, 40, 60, 72 84, 96, 120, or 144	
	25.5	120, or 144	
	30	30, 36, 42, 84 96, 120, or 144	
	42	60, 84, 96, 120, or 144	
	48	60, 96, 120, or 144	
	51	120, or 144	
	60	84, 96, 120, or 144	
Roll sheet: Styles D and ND; Types I, II, and IV	30, 36, 48, or even increments thereof	[1]	Continuous rolls[2] up to 150 feet
Sheets: Style D; Type III	48 or even increments thereof	[1]	8, 10, 12, or 16

[1] Cut-to-size sheets are available.
[2] Some manufacturers have continuous rolls available.

3.5.1 Squareness. The length and width of the sheet shall be such that a rectangle of the size specified can be obtained.

3.6 Thickness (applicable to style D and style ND). The sheet shall be furnished in the thicknesses shown in table IV, as specified (see 6.2).

TABLE IV. Thickness of sheet[1] and thickness tolerance

Style	Type	Nominal thickness, inches	Tolerance, inches (plus or minus)
D	I	0.028	0.004
		0.031	0.004
		0.035	0.004
		0.038	0.005
		0.050	0.005
		3/32 (0.094)	0.007
		1/8 (0.125)	0.008
		5/32 (0.156)	0.009
		3/16 (0.188)	0.010
		7/32 (0.219)	0.011
		1/4 (0.250)	0.012
D	II	0.030	0.005
		0.042	0.005
D	III	1/8 (0.125)	[2]
		5/32 (0.156)	
		3/16 (0.188)	
		7/32 (0.219)	
		1/4 (0.250)	
		5/16 (0.313)	
ND	IV	0.020	0.005
		0.030	0.004
		0.050	0.005
		0.062	0.005

[1] See 6.3 for style D 1/16 (0.062) inch type I and 0.051 inch thick type II sheet.
[2] When type III is ordered, tolerances shall be negotiated between the procuring agency and the supplier (see 6.2).

3.7 Color and pattern (applicable only to style D sheet). The color and pattern of the sheet shall be as specified by the procuring agency (see 6.2).

3.8 Workmanship (applicable to style D and style ND). The sheet shall be uniform in quality and shall be free from blisters, wrinkles, holes, cracks, scratches, separation of layers, and other imperfections which may affect its serviceability.

3.9 Marking individual sheets. The applicable NSN shall be legibly marked on one side of each sheet in at least one place within 12 inches of a narrow edge and in numbers of not less than 1/2 inch height. Where the marking material may adversely affect the surface of the sheet, the NSN shall be placed on each sheet by means of a pressure sensitive adhesive backed label.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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. 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.

4.2 Sampling for inspection. Sampling for inspection shall be performed in accordance with the provisions in MIL-STD-105, except where otherwise indicated. For the purpose of sampling, an inspection lot for examination and test shall consist of all material of the same size, thickness, style, type, class, and finish offered for shipment at one time.

4.2.1 Inspection of materials and components. In accordance with 4.1, the supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with the requirements of this specification and, to the extent specified, of all referenced subsidiary specifications and standards. In the event of conflict, this specification shall govern.

4.2.2 Inspection of the sheet.

4.2.2.1 Examination of the sheet. Examination of the sheet shall be made in accordance with the classification of defects, inspection levels, and acceptable quality levels (AQLs) specified herein. The lot size for the purpose of determining the sample size in accordance with MIL-STD-105, shall be expressed in units of rolls or flat sheets for the examination in 4.2.2.1.1, and 4.2.2.1.2 and in units of shipping containers for the examination in 4.2.2.1.3.

4.2.2.1.1 Examination of sheet for defects in appearance, construction, and workmanship. The sample unit for the examination specified in table V shall be one flat sheet or one linear yard full width of roll. Not more than five sample units shall be taken from any one roll.

TABLE V. Examination of sheet for defects in appearance, construction, and workmanship

Examine	Defect
Form and finish	Not as specified.
Sanded surface	Not as specified.
Appearance	Exceeds number of defects specified (see NEMA LD 3-3.11).
Color and pattern	Not as specified.
Construction and workmanship	Any wrinkles, holes, cracks, scratches, blisters, separation of layers, or other imperfections affecting serviceability. Edges untrimmed.

4.2.2.1.2 Examination of sheet for dimensions. The sample unit for the examination specified in table VI shall be one flat sheet or one roll, as applicable.

TABLE VI. Examination of sheet for dimensions

Examine	Defect
Thickness	Not as specified. Varies by more than tolerance specified.
Width	Not as specified. Varies by more thin tolerance specified.
Length	Not as specified. Varies by more than tolerance specified.

4.2.2.1.3 Examination of preparation for delivery. An examination in accordance with table VII shall be made to determine that packaging, packing, and markings comply with the requirements of section 5. The sample unit for this examination shall be one shipping container, fully packed, selected just prior to the closing operation. Shipping containers fully prepared for delivery shall be examined for closure defects.

TABLE VII. Examination of preparation for delivery

Examine	Defect
Packaging	Not level specified; not in accordance with contract requirements. Rolls not unit packed as specified. Unit packing material not as specified; closures not accomplished by specified or required methods or materials.
Packing	Not level specified; not in accordance with requirements. Any nonconforming component, component missing, damaged, or otherwise defective affecting serviceability. Container not as specified, closures not accomplished by specified or required methods or materials. Inadequate application of components, such as: Incomplete closures of case liners, container flaps, loose or inadequate strapping, bulged or distorted containers.
Count	Less than specified or indicated quantity of sheets or rolls per shipping container.
Weight	Gross or net weight specified not in accordance with contract requirements.
Markings	Interior or exterior markings (as applicable) omitted, illegible, incorrect, incomplete, of improper size, location, sequence or method of application, or not in accordance with contract requirements.

4.2.2.1.4 Inspection levels and AQLs for examinations. The inspection levels for determining the sample size and the AQLs expressed in defects per 100 units, shall be as follows:

Examination paragraph	Inspection level	AQL
4.2.2.1.1	I	1.5
4.2.2.1.2	S-2	2.5
4.2.2.1.3	S-2	2.5

4.2.2.2 Classification of tests. All tests under this specification shall be classified as lot acceptance tests. Lot acceptance tests shall be made on each lot of material and, in conjunction with the above examination shall be basis of acceptance or rejection of the lot.

4.2.3 Testing. The sheet shall be tested for the characteristics listed in table II and 3.3, as applicable, in accordance with the test methods specified herein for each lot submitted for inspection. The lot size for the purpose of determining sample size for testing shall be expressed in units of packages of sheets or rolls, as applicable. The sample unit shall consist of one flat sheet or one linear yard full width or roll, as applicable. The inspection level shall be S-1 with an acceptance number of 0. When the test method requires testing more than one specimen, the results for each test shall be the average results of the specimens.

4.3 Test methods.

4.3.1 Test specimen preparation. Test specimens shall be cut from sheet in accordance with NEMA Standards Publication No. LD 3-1975, and dimensions shall conform to that specified in the applicable test procedure.

4.3.2 Test specimen conditioning. Unless otherwise specified, test specimens shall be conditioned in accordance with NEMA Standards Publication No. LD 3-1975.

4.3.3 Testing of properties and performance characteristics. Testing for all properties and performance characteristics specified in table II shall be in accordance with the applicable NEMA methods referenced in table VIII.

TABLE VIII. Test methods for laminates

Property	NEMA test method
Resistance of surface to wear	LD 3-3.01
Resistance to impact	LD 3-3.03
Dimensional change	LD 3-3.04
Resistance of surface to boiling water	LD 3-3.05
Resistance of surface to high temperature	LD 3-3.06
Resistance of surface to cigarette burns (radiant heat resistance)[1]	LD 3-3.07
Conductive heat resistance	LD 3-3.08
Resistance of surface to stains	LD 3-3.09
Color fastness of surface to light	LD 3-3.10
Surface finish	LD 3-3.13
Formability (bend test)	LD 3-3.14

[1] Title changed to radiant heat resistance.

4.3.4 Immersion in boiling water (applicable only to type IV, style ND). Three test specimens, each 3 +/- 1/32 by 1 +/- 1/32 inch by the nominal thickness of the material to be used with the back sanded, shall be tested. Test specimens shall be in the form of bars with smooth edges which are free from cracks. Cut edges shall be made smooth by finishing with number 0 or finer sandpaper or emery cloth. Any sawing, machining, and sandpapering operations shall be slow enough so that the material will not be heated appreciably. Prior to testing, all specimens shall be conditioned in an air circulating oven at 50 deg. +/- 3 deg. C (122 deg. +/- 5 deg. F) for 24 +/- 1 hours, cooled in a desiccator and then weighed. Thickness shall be determined at the center to the nearest 0.001 inch with a machinist's micrometer, and a suitable reference point shall be marked on the specimen so that a subsequent measurement can be made at the same point. The conditioned test specimens shall be immersed completely in boiling distilled water and removed after a minimum period of 2 hours. After wiping off all surface water, each specimen shall be weighed and thickness measured to the nearest 0.001 inch at the reference point. The increase in weight shall be calculated to the nearest 0.1 percent as follows.

$$\frac{\text{Wet weight - conditioned weight}}{\text{Conditioned weight}} \text{ X } 100$$

The increase in thickness shall be calculated to the nearest 0.1 percent as follows:

$$\frac{\text{Wet thickness - conditioned thickness}}{\text{Conditioned thickness}} \text{ X } 100$$

4.3.5 Water swell (applicable only to type III). Specimens shall be prepared and conditioned in the same manner as specified in 4.3.4. Specimen size shall be as specified in 4.3.4 also. Prior to conditioning, a 1/8 inch diameter hole shall be carefully drilled in the center of the face of each specimen. Any raised material around the holes shall be removed by spinning a countersink lightly with the fingers. For drilling, the specimens shall be clamped in a stack using one more than required in the test. The drill should go completely through the stack and the bottom specimen shall be discarded. The conditioned specimens shall be immersed completely in a water bath at 50 deg. +/- 3 deg. (122 deg. +/- 5 deg. F) for a minimum of 18 hours. After wiping off all surface water, each specimen shall be weighed and thickness measured over the hole to the nearest 0.001 inch with a machinist's micrometer. The increase in weight and thickness shall be determined in the same manner as specified in 4.3.4.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A, B or C, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Sheet. Unless otherwise specified in the contract or order (see 6.2), sheet shell be packaged in quantities specified by the procuring agency or in accordance with method III of MIL-P-116. Shapes of only one set of nominal dimensions shall be placed in one package.

5.1.1.2 Rolls. Sheeting shall be supplied in rolls formed by coiling on reels. The reels shall have a substantial core of not less than 7 inches inside diameter and shall be suitably restrained from winding. Unless otherwise specified by the procuring agency, the rolls shall not exceed 150 pounds in weight and shall be suitably interleaved to protect the surface from scratching. Each roll shall be wrapped with at least one layer of kraft wrapping paper, conforming to UU-P-268, and tightly sealed with tape conforming to type III, grade B of PPP-T-45.

5.1.2 Level B. Packaging shall be the same as for level A (see 5.1.1).

5.1.3 Level C. Sheet shall be packaged to provide a sufficient level of protection to prevent deterioration during shipment and to ensure safe delivery at destination.

5.2 Packing. Packing shall be level A, B or C, as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 Sheet. Sheet packaged as specified in 5.1.1 shall be packed in containers conforming to any of the following specifications, at the option of the supplier:

Specification	Type or class
PPP-B-585	Class 3
PPP-B-601	Overseas type
PPP-B-621	Class 2

Boxes shall be closed, strapped, or banded in accordance with the applicable box specification or appendix thereto. The gross weight of the shipping container shall be as specified in the applicable container specification.

5.2.1.2 Rolls. Packaged rolls of sheeting shall be packed in fiber drums or boxes conforming to type II or III, grade A of PPP-D-723 or class weather resistant grade V2s of PPP-B-636. Drum closure shall be in accordance with the drum specification, and fiberboard shipping containers shall be closed in accordance with method III, waterproofed in accordance with method V and reinforced as specified in the appendix of the fiberboard specification.

5.2.2 Level B.

5.2.2.1 Sheet. Packages of sheets shall be packed in domestic class or type shipping containers conforming to PPP-B-585, PPP-B-601, PPP-B-621, or PPP-B-636. All containers shall be closed in accordance with the applicable container specification or appendix thereto. The gross weight of the shipping container shall be as specified in the applicable container specification.

5.2.2.2 Rolls. Packaged rolls of sheeting shall be packed in fiber drums or boxes conforming to type I, grade A of PPP-D-723 or class domestic of PPP-B-636. Drum closures shall be in accordance with the drum specification, and fiberboard shipping containers shall be closed in accordance with method II as specified in the appendix of the fiberboard container specification.

5.2.3 Level C. The sheet including rolls of sheeting shall be packed in a manner to ensure acceptance and delivery by the carrier for the mode of transportation employed. Containers shall comply with the requirements of the Unif<UT> Freight Classification Rules or National Motor Freight Classification Rules, as applicable.

5.3 Marking.

5.3.1 Civil agencies. Unit packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.3.2 Military requirements. In addition to any special marking required by the contract or order, unit packages and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use.

6.1.1 Type I, general purpose. General purpose type laminate is designed for both horizontal and vertical applications where good appearance, durability, resistance to stains, and resistance to heat up to 135 deg. C (275 deg. F) are required. Sanding the backs of the sheets will permit bonding with adhesives to some suitable base material for mechanical support, such as plywood.

6.1.2 Type II, post forming. Post forming type laminate is similar to general purpose type laminate, but it can be thermoformed under controlled temperature and pressure in accordance with the laminate manufacturer's recommendations.

6.1.3 Type III, hardboard core. Hardboard core type laminate has a surface similar to that of the general purpose type laminate molded to a hardboard core which is generally self-supporting. The hardboard core consists of wood fibers or particles consolidated under heat and pressure and bonded by natural or synthetic resins.

6.1.4 Type IV, nondecorative backing sheet. Nondecorative backing sheet is designed for use on reverse side of assemblies to control moisture absorption, thereby reducing tendency to warp.

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. Style, type, and class required (see 1.2.1).
c. Finish required for style D sheets (see 1.2.2).
d. Thickness tolerances, as negotiated (see table IV), for type III material.
e. Size and thickness of sheet (see 3.5 and 3.6); length, width, and thickness tolerances required.
f. Colors and patterns for style D sheets (see 3.7).
g. Selection of applicable degrees of packaging and packing required (see 5.1 and 5.2).
h. Special markings required (see 5.3.1 and 5.3.2).

6.3 Non-standard sheet. Style D sheet 1/16 (0.062) inch and 0.051 inch nominal thickness are no longer available as standard commercial items. The sheets may be available at premium prices.

6.4 Cross-reference for classification of materials. Table IX shows the classification of material covered by this specification and the corresponding classification of material specified in L-P-508F.

TABLE IX. Classification in this document and corresponding classification in L-P-508F

L-P-508G and L-P-508H	L-P-508F
Type I	Type I
Class 1	Class 1
Class 2	Class 2
None	Type II
Type II	Type III
Class 1	Class 1
Class 2	Class 2
Type III	Type IV
Type IV	Type V

MILITARY CUSTODIAN:

Army - MR

Preparing activity:

Army - MR

Review activities:

Army - GL, MI
Navy - YD
DSA - GS

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-FSS
GSA-PCD
Interior-BPA

Orders for this publication are to be placed with General Services Ak 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 15 cents each.

NOTICE OF VALIDATION

INCH-POUND

L-P-508H
NOTICE 1
10 April 1991

FEDERAL SPECIFICATION

PLASTIC SHEET, LAMINATED, DECORATIVE AND NONDECORATIVE

L-P-508H, dated 19 April 1977, has been reviewed and determined to be valid for use in acquisition.

Custodians:
Army - MR

Preparing activity:
Army - MR

Civil Agency Coordinating Activities:
GSA - FSS, PCD
Interior - BPA

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AMSC N/A

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