INCH-POUND

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FEDERAL SPECIFICATION

PLASTIC FILM, FLEXIBLE, VINYL CHLORIDE

This specification is 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 two types of flexible vinyl plastic film.

1.2 Classification.

1.2.1 Types and classes. Vinyl plastic film shall be of the following types and classes as specified (see 6.2):

Type I - For use in a temperature range of 0°F to 130°F (-17.8°C to 54.4°C)
  Class 1 - Colorless
  Class 2 - Colored

Type II - For use in a temperature range of -40°F to 130°F (-40°C to 54.4°C)
  Class 1 - Colorless
  Class 2 - Colored

2. APPLICABLE DOCUMENTS

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: U.S. Army Natick Research, Development and Engineering Center, Natick, MA 01760-5019, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

Federal Specifications:

PPP-B-576	-	Boxes, Wood Cleated, Panelboard
PPP-B-601	-	Boxes, Wood, Cleated-Plywood
PPP-B-621	-	Boxes, Wood, Nailed and Lock-Corner

Federal Standards:

FED-STD-123	-	Marking for Shipment (Civil Agencies)
FED-STD-191	-	Textile Test Methods

(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 Commercial Item Descriptions. 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 and Commercial Item Descriptions required by activities outside the Federal Government for bidding purposes are available without charge from the General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; 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.)

Military Standards:

MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	-	Marking for Shipment and Storage
MIL-STD-147	-	Palletized Unit Loads

(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 documents form a part of this document to the extent specified herein. Unless a specific issue is identified, the issue in effect on the date of invitation for bid or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 882	-	Tensile Properties of Thin Plastic Sheeting
ASTM D 1004	-	Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1203	-	Volatile Loss from Plastics Using Activated Carbon Methods
ASTM D 1922	-	Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method
ASTM D 3951	-	Packaging, Commercial

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Standard sample. When specified, the finished item shall be equal to or better than the standard sample with respect to all characteristics for which the standard is referenced (see 3.6, 3.7, 6.2, and 6.4).

3.2 Material. The vinyl film covered by this specification shall be suitably formulated from chlorine-bearing vinyl resin. Only phosphate, or phthalate, or both phosphate and phthalate plasticizers shall be used (see 6.3). The use of water-soluble compounding ingredients is prohibited. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

3.3 Physical requirements.

3.3.1 Type I. The film shall meet the physical requirements of table I when tested as specified in 4.2.3.

3.3.2 Type II. The film shall meet the physical requirements of table II when tested as specified in 4.2.3.

TABLE I. Physical requirements of type I film

Thickness, inch	Requirements							
	0.0025 ± 0.0002	0.0040 ± 0.0004	0.0060 ± 0.0006	0.0080 ± 0.0008	0.010 ± 0.0010	0 0120 ± 0 0012	0.0160 ± 0 0016	0.020 ± 0.002
Tensile strength, each direction, psi. minimum	2000	2300	2300	2300	2300	2300	2300	2200
Ultimate elongation machine direction, percent, minimum	50	150	150	200	200	200	200	200
Ultimate elongation trans-direction, percent, minimum	175	200	200	200	250	250	250	250
Tear resistance, Graves, pounds, each direction, minimum	--	--	--	--	3.0	4 0	5.7	7 5
Tear resistance, Elmendorf, each direction, grams, minimum	160	240	480	800	--	--	--	--
Pinholes per square yard, maximum	3 2/	2 2/	2 2/	2 2/	None	None	None	None
Stiffness Clark at 34°F (1°C -1°C), minimum	4.5	8	9.5	11	13	15	18.5	22
Extraction in soapy water, percent, maximum	5 0	4.0	3.0	2.0	2 0	2.0	2.0	2 0

TABLE I. Physical requirements of type I film (cont'd)

	Requirements							
Thickness, inch	0.0025 ± 0.0002	0.0040 ± 0.0004	0.0060 ± 0.0006	0.0080 ± 0.0008	0.010 ± 0.0010	0.0120 ± 0.0012	0.0160 ± 0.0016	0.020 ± 0.002
Blocking at 158°F, (70°C) scale rating, maximum	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2	No. 2
Volatility, percent, maximum	8	8	4.5	4	3	3	2.5	2
Resistance to weathering	No appreciable stiffening, cracking, crazing, discoloration, tackiness, or exudation of plasticizer from the film. 1/							
Cold crack at 0°F ± 2°F (-17.8°C ± 1°C)	No evidence of cracking.							
Lacquer lifting	No appreciable lifting, tackiness, swelling in the area of contact, or exudation of plasticizer from the film. 1/							
Cracking (class 2 only), dry and wet	"Good"							
Dimensional stability	Not more than 7 percent change in machine or transverse direction							

1/ Appreciable means a change that is immediately noticeable in comparing the tested specimen with the original.

2/ When film is used for air-retention or inflatable items, no pinholes will be permitted.

TABLE II. Physical requirements of type II film

Thickness, inch	Requirements							
	0.0025 ± 0 0002	0.0040 ± 0.0004	0 0060 ± 0 0006	0 0080 ± 0.0008	0 010 ± 0 0010	0 0120 ± 0 0012	0 0160 ± 0 0016	0.020 ± 0 002
Tensile strength, each direction, psi, minimum	1600	1600	1600	1600	1600	1600	1600	1600
Ultimate elongation machine direction, percent, minimum	50	200	225	225	225	225	225	225
Ultimate elongation trans-direction percent, minimum	175	250	250	250	250	250	250	250
Tear resistance, Graves, pounds, each direction, minimum	--	--	--	--	2 2	2 2	3 0	3 0
Tear resistance, Elmendorf, each direction, grams, minimum	160	240	480	800	--	--	--	--
Pinholes per square yard, maximum	3 2/	2 2/	2 2/	2 2/	None	None	None	None
Stiffness, Clark, at 20°F ± 2°F, (29°C ± 1°C), maximum	8	10.5	12 5	15	16	17 5	20 5	23 5
Extraction in soapy water, percent, maximum	6 0	6.0	4	3 5	3.0	2 5	2.5	2 5

TABLE II. Physical requirements of type II film (cont'd)

	Requirements							
Thickness, inch	0.0025 ± 0.0002	0.0040 ± 0.0004	0.0060 ± 0.0006	0.0080 ± 0.0008	0.010 ± 0.0010	0.0120 ± 0.0012	0.0160 ± 0.0016	0.020 ± 0.002
Blocking at 158°F, (70°C) scale rating, maximum	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3	No. 3
Volatility, percent, maximum	10	8	7	6	4	4	3	3
Resistance to weathering	No appreciable stiffening, cracking, crazing, discoloration, tackiness, or exudation of plasticizer from the film 1/							
Cold crack at -40°F ± 2°F (-40°C ± 1°C)	No evidence of cracking.							
Lacquer lifting	No appreciable lifting, tackiness, swelling in the area of contact, or exudation of plasticizer from the film. 1/							
Cracking (class 2 only), dry and wet	"Good"							
Dimensional stability	Not more than 7 percent change in machine or transverse direction.							

1/ Appreciable means a change that is immediately noticeable in comparing the tested specimen with the original

2/ When film is used for air retention or inflatable items, no pinholes will be permitted

3.4 Bondability. The film shall be capable of being bonded to itself by commercially common heat or electronic sealing devices and methods. The strength of such bonds in either the machine or transverse direction of the film shall be not less than 65 percent of the breaking strength of the film. Bonded samples shall be tested as specified in 4.2.3 not less than 14 days after the date of bonding.

3.5 Dimensions.

3.5.1 Rolls. The width shall be as specified in the contract or order (see 6.2). A plus tolerance of 1/2 inch with no minus tolerance will be permissible. The width shall be measured on the manufacturer's rolls. The film shall be furnished in continuous lengths of not less than 50 yards.

3.5.2 Flat cuts. Width and length or other applicable dimensions of cuts, including tolerances, shall be as specified in the contract or order (see 6.2).

3.6 Color.

3.6.1 Type I and type II, class 1. The film shall be uniformly colorless and clear. Slight pigmentation will be permissible to neutralize any natural yellow tint (see 3.1 and 6.4).

3.6.2 Type I and type II, class 2. The film shall be pigmented to produce the color specified in the contract or order. The color shall be uniform (see 3.1 and 6.4).

3.7 Finish. The film shall have a smooth, dull-matte finish on both sides unless otherwise specified in the contract or order (see 3.1 and 6.4).

3.8 Odor. The film shall be free from objectionable odors. Determination of odor shall be made on samples freely exposed to circulating air at 75°F ± 5°F (24°C ± 3°C) for not less than 24 hours.

3.9 Workmanship. The film shall be clean, well-finished, and free from dirt, oil, foreign matter, rough or sharp edges, scratches, scuffs, cracks, creases, blisters, bubbles, pimples, undispersed resin, pits, tears, cuts, and holes (other than allowable pinholes).

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 (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase 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. The Government reserves the right to perform

any of the inspections set forth in this specification where such inspections are deemed necessary to ensure that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize the submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Certificates of compliance. A certificate of compliance shall be furnished by the supplier to the contracting officer stating that the film supplied complies with the requirements specified in paragraph 3.2. Where certificates of compliance are submitted, the Government reserves the right to check such test items to determine the validity of the certification.

4.2 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.2.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.2.2 Examination of the end item. For the examinations required in 4.2.2.2 through 4.2.2.4, the rolls, packages of sheets, or flat cuts shall be selected from the rolls or packages of sheets or flat cuts selected from the examination in 4.2.2.1.

4.2.2.1 End item visual examination. The end item shall be examined for the defects listed in table III. The lot shall be expressed in units of rolls, packages of sheets, or flat cuts of plastic film. The sample unit shall be eight consecutive yards full-roll width for the examination for defects within rolls. The sample unit shall not be taken from the first or last convolutions of the roll. The sample unit shall be five sheets randomly selected from a package for the examination for defects in sheets (flat cuts). No more than three sample units shall be examined from any one roll or one package of sheets, as applicable. Both sides of the material shall be examined. Defects of each type other than workmanship (serviceability) type shall be scored only once within each sample unit for rolls and for flat cuts. Defects of the workmanship serviceability type shall be scored once for each yard or sheet in which they appear. The inspection level shall be I and the finding of any defect shall be cause for rejection of the lot.

TABLE III. End item visual defects.

Examine	Defect
Class	Other than specified
Color	
(a) Class 1	Lack of clarity Other than colorless Nonuniformity NOTE: Slight pigmentation will be permitted to neutralize any natural yellow tint.
(b) Class 2	Other than specified Variation of shade and color from that of standard sample Nonuniformity
Finish	Not a smooth, dull matte finish on both sides Variation of finish from that of standard sample
Workmanship	
Appearance	Any dirt, oil, spot, stain, discoloration, and foreign matter affecting appearance
Serviceability	Any deep gouge or scratch Any holes (other than allowable pinholes) Any rough or sharp edges Any cuts, blisters, bubbles, tears, cuts, scuffs, cracks, or creases Any area having a number or type of pimples or pits, undispersed resin, which does not compare favorably with the standard sample Any chipping

4.2.2.2 End item dimensional examination. The end item shall be examined for the defects listed below. The sample unit shall be one complete roll or one full size sheet, as applicable (see 4.2.2). The inspection level shall be S-2 and the finding of any defect shall be cause for rejection of the lot.

Examine	Defect
Size of sheets	Any variation other than tolerances specified in contract or order

Width of roll	Any width less than specified Any width exceeding that specified by more than 1/2 inch
Length of roll	Not as specified
Thickness	Any thickness deviation greater than the applicable tolerances specified in tables I and II

4.2.2 3 End item packaging examination of rolls and sheets. The end item shall be examined for the defects listed below. The sample unit shall be one complete roll or one full size sheet, as applicable (see 4.2.2). The inspection level shall be S-2 and the finding of any defect shall be cause for rejection of the lot.

Examine	Defect
Unrolling of rolls	Not suitably restrained from unwinding Material blocks to the extent that unrolling causes damage or tearing, rendering material unserviceable Any piece less than 50 yards Tube diameter less than 3 inches
Separation of sheets	Flat-cut sheets not slip sheeted Sheets block to the extent that separation causes damage or tearing, rendering material unserviceable

4.2.2.4 End item average content examination. The sample unit shall be one complete roll or one package of sheets, as applicable (see 4.2.2). The inspection level shall be S-2. Any average length per roll or average count per package for sheets (flat cuts) less than specified or indicated shall be cause for rejection of the lot.

4.2.3 End item testing. The end item shall be tested for the characteristics listed in table IV. The lot size shall be expressed in units of sheets, when sheets are specified, or in units of linear yards when rolls are specified. The sample unit shall be 21 square feet of plastic film. The sample size shall be as shown below. The lot shall be unacceptable if one or more sample units fail to meet any test requirements specified.

Lot size	Sample size
800 or less	2
801 to 22,000	3
22,001 and over	5

TABLE IV End item tests

Characteristic	Specification reference		Requirements applicable to		Number determinations	Results reported as	
	Requirement	Test method	Individual loaded unit	lot aver	Per sample unit	Pass or fail 1/	Numerically to nearest 2/
Thickness	Table I & II	4 3 2	-	X	Average of 5		0 0001
Bondability (Types I and II)	3 4	3 4 and 4 3 3	X	-	Average of 5	-	percent
Breaking strength							
Machine direction		4 3.3	X	-	Average of 5	-	pound
Transverse direction		4 3 3	X	-	Average of 5	-	percent
Physical properties	Table I or II (as applicable)						
Tensile strength	Table I or II						
Machine direction	(as applicable)	4 3 3	X	-	Average of 5	-	psi
Transverse direction		4 3 3	X	-	Average of 5	-	psi
Elongation	Table I or II						
Machine direction	(as applicable)	4 3 3	X	-	Average of 5	-	percent
Transverse direction		4.3.3	X	-	Average of 5	-	percent
Tear resistance, Graves (as applicable)	Table I or II (as applicable)						
Machine direction		4.3.4	X	-	Average of 5	-	0 1 pound
Transverse direction		4 3 4	X	-	Average of 5	-	0 1 pound
Tear resistance, Elmendorf (as applicable)	Table I or II (as applicable)						
Machine direction		4 3 5	X	-	Average of 5	-	gram
Transverse direction		4 3 5	X	-	Average of 5	-	gram

TABLE IV. Qualification tests (cont'd)

Characteristic	Specification reference		Requirements applicable to		Number determinations	Results reported as	
	Requirement	Test method	Individual loaded unit	lot aver	Per sample unit	Pass or fail 1/	Numerically to nearest 2/
Physical properties (cont'd)							
Pinholes and cracks	Table I or II (as applicable)	4.3.6	X	-	3	X	--
Stiffness machine direction only	Table I or II (as applicable)	4.3.7	X	-	Average of 5	-	0.1 cm
Extraction (in soapy water)	Table I or II (as applicable)	4.3.8	X	-	Average of 3	-	0.1 percent
Blocking (at 158°F)	Table I or II (as applicable)	4.3.9	X	-	3	X	Scale number
Volatility	Table I or II (as applicable)	4.3.10	X	-	Average of 2	-	0.1 percent
Resistance to weathering	Table I or II (as applicable)	4.3.11	X	-	2	X	--
Cold crack							
at 0°F ± 2°F		4.3.12	X	-	3	X	--
at -40°F ± 2°F		4.3.12	X	-	3	X	--
Lacquer lifting	Table I or II (as applicable)	4.3.13	X	-	2	X	--
Crocking (class 2 only)	Table I or II (as applicable)						
Dry		4.3.14	X	-	3	X	--
Wet		4.3.14	X	-	3	X	--

TABLE IV End item tests (cont'd)

Characteristic	Specification reference		Requirements applicable to		Number determinations	Results reported as	
	Requirement	Test method	Individual loaded unit	lot aver	Per sample unit	Pass or fail 1/	Numerically to nearest 2/
Physical properties (cont'd)							
Dimensional stability Machine direction	Table I or II (as applicable)	4 3 15	X	-	Average of 2	-	0 1 percent
Transverse direction		4 3 15	x	-	Average of 2	-	0 1 percent

1/ If failure is indicated, report description of failure

2/ Test report shall include all values on which results are based

4.2.4 Packaging examination. The fully packaged end items shall be examined for the defects listed below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-2 and the finding of any defect shall be cause for rejection of the lot.

Examine	Defect
Marking (exterior and interior	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified
Workmanship	Inadequate application of components, such as: incomplete sealing or closure of flap, improper taping, loose strapping, or inadequate stapling Bulged or distorted container
Content	Number per container is more or less than required

4.2.5 Palletization examination. The fully packaged and palletized end items shall be examined for the defects listed below. The lot size shall be expressed in units of palletized unit loads. The sample unit shall be one palletized unit load, fully packaged. The inspection level shall be S-1 and the finding of any defect shall be cause for rejection of the lot.

Examine	Defect
Finished dimensions	Length, width, or height exceeds specified maximum requirement
Palletization	Pallet pattern not as specified Load not bonded as specified
Weight	Exceeds maximum load limits
Marking	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application

4.3 Methods of inspection.

4.3.1 Standard conditioning. Unless otherwise specified herein or applicable test method, samples for test shall be conditioned at a temperature of 73.4°F ± 2°F (23°C ± 1°C) and a relative humidity of 50 ± 4 percent for a period of not less than 16 hours.

4.3.2 Thickness. The gauge used for the measurement of thickness shall be a dead weight type equipped with a dial graduated to read directly to 0.0001 inch. The presser foot shall be circular with a diameter of 0.25 ± 0.01 inch. The presser foot and moving parts connected therewith shall be weighed

so as to apply a total load of 3 ± 0.1 ounce to the specimen. The presser foot and anvil surface shall be plane to within 0.0001 inch and parallel to each other within 0.0001 inch. Measurements shall be taken across the full width of the roll or sheet. No individual measurement shall be less than the nominal thickness and the tolerance. The average of all measurements on the unit shall not be greater than the nominal thickness and the tolerance.

4.3.3 Tensile strength, ultimate elongation, and bonding strength. Tensile strength, ultimate elongation, and bonding strength shall be determined as specified in ASTM D 882. The test specimens shall be 1 inch wide. For breaking (bonding) strength of bonded seam, the seam shall be at the center of the specimen and perpendicular to the center line. The specimen shall be prepared for peel stress (bonding strength) by placing one strip of film (centered) on top of another and sealing one end, leaving the free ends to be gripped in the jaws of the testing machine.

4.3.4 Tear resistance, Graves. Tear resistance shall be determined as specified in ASTM D 1004, using the pendulum-type or constant rate of jaw separation testing machine. A jaw separation of 2 inches shall be used. Tear shall be reported as pounds per single thickness of film torn.

4.3.5 Tear resistance, Elmendorf. Elmendorf tear resistance shall be determined as specified in ASTM D 1922.

4.3.6 Pinholes and cracks. Examination for pinholes shall be made by testing the film under air pressure. Three specimens measuring 13 inches in diameter shall be individually tested on the test jig shown in figure 1. The film specimen shall be placed on the holder and the plate collar shall be bolted thereon. Care shall be taken to insure a leak-tight fit. The specimen shall be inflated by air to a height of 3 ± 1/4 inch (dome shaped) and water poured on top of the specimen to completely cover the specimen by at least 1/2 inch of water. The air pressure shall be maintained for five minutes and the specimen examined for leakage evidenced by a steady stream of air bubbles coming through the film.

4.3.7 Stiffness, Clark. Stiffness shall be determined as specified in method 5204 of FED-STD-191 after a conditioning period of not less than a half hour at the specified temperatures. Samples shall be cut in the machine direction only. All tests shall be conducted in a still atmosphere.

4.3.8 Extraction in soapy water. The extraction test shall be performed by immersing a weighed sample of film, 4 inches square, in 400 cc of a 1 percent soap solution for 24 hours at 122°F ± 2°F (50°C ± 1°C) and determining weight loss. The sample shall have been previously conditioned for three hours at 122°F ± 2°F (50°C ± 1°C) cooled to room temperature in a desiccator, weighed immediately upon removal, and then placed in the test solution. Individual samples shall be tested in covered, one-pint glass containers. The samples must be held in such a manner that the entire surface is exposed to the test solution. Upon removal after the

test period, the sample shall be gently wiped with a soft cloth or tissue paper. It shall then be reconditioned and weighed in the same manner as was done initially. The soap used shall be a neutral toilet soap. All weighings shall be made to the nearest 0.0005 gram.

4.3.9 Blocking. Blocking shall be determined as specified in method 5872 of FED-STD-191 except that the test shall be performed at 158°F ± 2°F (70°C ± 1°C) for a period of 48 hours.

4.3.10 Volatility. The volatility tests shall be performed according to method A of ASTM D 1203 (see 6.5)

4.3.11 Resistance to weathering. A sample of film shall be exposed as specified in method 5671 of FED-STD-191 for a period of 100 hours.

4.3.12 Cold crack. The cold-crack tests shall be performed at the required temperatures as specified in method 5874 of FED-STD-191 after a conditioning period of not less than one hour at the test temperatures. After the test, the samples shall be examined visually at room temperature for cracking as specified in 4.3.6.

4.3.13 Lacquer lifting. The lacquer-lifting test shall be conducted by placing a 3 inch by 5 inch sample of the vinyl film over a lacquered panel of equal or larger dimensions. The film shall be covered with a flat glass plate which is then weighed with a 2 pound weight. The film shall remain exposed for 14 days. The film sample and panel shall then be examined for conformance with the requirements specified in table I or II, as applicable.

4.3.13.1 Preparation of test panels. The lacquered panels shall be prepared by applying two medium coats of the following lacquer to thin carbon sheet steel, the surface of which is smooth and properly prepared to insure freedom from grease and foreign material.

Lacquer	Parts by weight
Nitrocellulose, 1/2 sec.	16.0
Dibutyl phthalate	4.0
Ethyl alcohol	10.6
Toluene	40.0
Butyl acetate	16.0
Ethyl acetate	8.6
Butyl alcohol	4.8

The panels shall be air dried for a minimum of two days prior to use.

4.3.14 Crocking. Crocking, both dry and wet, shall be determined as specified in method 5651 of FED-STD-191.

4.3.15 Dimensional stability. Dimensional stability shall be determined by exposing a 10-inch-square sample of film to 212°F ± 2°F (100°C ± 1°C) for 30 minutes ± one minute in a circulating air oven. The sample shall be cut from the center of the film sheet with a template accurate to ± 0.02 inches in all directions. The sample shall be placed between sheets of heavy wrapping paper, 15 inches square, lightly dusted with talc. The paper sheets shall be clipped or stapled together, care being taken not to hold or restrict the test sample. The sandwich shall then be placed horizontally in an oven. After the oven exposure, the sample shall be cooled to room temperature and measured to the nearest 0.01 inch along both central axes.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Rolls. Plastic shall be rolled on a convolute or spiral-wound chipboard or plastic tube. Each roll shall be wrapped with 30 pound minimum basis weight kraft paper conforming to A-A-203, or plastic film 0.002 inch minimum thickness. The roll shall be wrapped so that the wrap completely encircles the roll at least once with a minimum overlap of 3 inches, and the width of the wrap shall be sufficient to fold over and protect the ends of the roll. The wrapping shall be secured with tape.

5.1.1.2 Flat cuts. Five hundred sheets, of one type, thickness and size, shall be stacked on a fiberboard pad. The bundle shall be wrapped in 30 pound minimum basis weight kraft paper conforming to A-A-203, or plastic film 0.002 inch minimum thickness. Wrapping shall be secured with tape.

5.1.2 Commercial. The plastic shall be preserved in accordance with ASTM D 3951.

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

5.2.1 Level A. Plastic, preserved as specified, shall be packed in a wood-cleated plywood box conforming to overseas type, grade A, type 3 load of PPP-B-601, wood-cleated fiberboard box conforming to type III, class 2, style A, type II load of PPP-B-576, or a wood-cleated veneer box conforming to type I, class 2, style A, type II load of PPP-B-576. Boxes shall be closed and strapped.

5.2.2 Level B. Plastic, preserved as specified, shall be packed in a wood-cleated plywood box conforming to domestic type, grade a of PPP-B-601, wood-cleated fiberboard box conforming to type III, class 1, style A, type II load of PPP-B-576, or a wood-cleated veneer box conforming to type I, class 1, style A, type II load of PPP-B-576. Boxes shall be closed and strapped.

5.2.3 Commercial. Plastic, preserved as specified, shall be packed in accordance with ASTM D 3951.

5.3 Palletization. Plastic, packed as specified, shall be palletized on a 4-way entry pallet in accordance with MIL-STD-147. Each prepared load shall be bonded with straps in accordance with bonding means C and D or film bonding means F or G.

5.4 Marking. Marking of unit packs, shipping containers and unit loads shall be in accordance with MIL-STD-129 or FED-STD-123.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The flexible plastic vinyl film covered by this specification is intended for use in general application in waterproof covers, containers, equipage, and packaging materials.

6.1.1 Vinyl plastic film. Because the properties of vinyl plastic film vary greatly with formulation and method of manufacture, a specification which covers the many special types of film obtainable would be very lengthy and would include many requirements of limited application. It is the intent of this specification to include only requirements generally applicable to vinyl plastic film. Specific requirements not included herein should be incorporated in the end item specification.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Type and class required (see 1.2).
c. Color, if class 2 required (see 3.6).
d. Whether rolls or flat cuts are required (see 3.5.1 and 3.5.2).
   (1) Rolls: Thickness and width required (see 3.5.1).
   (2) Flat cuts: Thickness, applicable dimensions, and tolerances (see 3.5.2).
e. Finish, if other than a smooth dull matte finish (see 3.7).
f. Levels of preservation and packing (see 5.1 and 5.2).
g. Whether standard sample is required (see 3.1 and 6.4).

6.3 Compounding limitation. The compounding limitations are intended to insure adequate resistance of the film to mildew and bacterial degradation.

6.4 Access to standard sample. For access to standard sample for color and finish, address the procuring office issuing the invitation for bids.

6.5 Activated carbon. The specified activated carbon is available from Union Carbide Corporation, 270 Park Avenue, New York, NY 10017 (see 4.4.1).

6.6 Subject term (key word) listing.

Moisture barrier
Waterproof covering

MILITARY INTERESTS:

Custodians:

Army - GL

Review activities:

Army - MD, AR, MI
Navy - SA

User activities:

Navy - OS

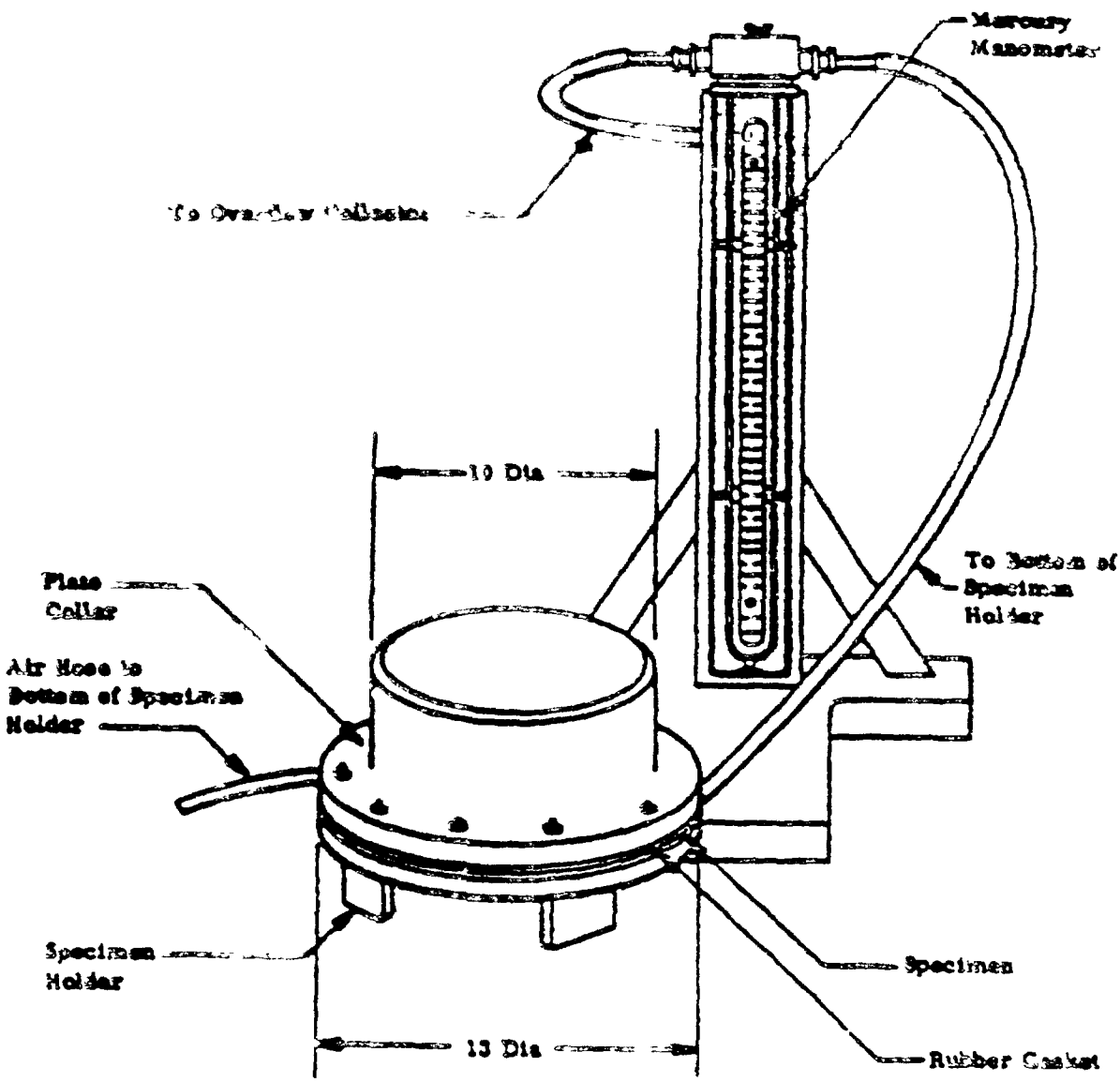
Civil Agency Coordinating Activities:

GSA - FSS
USDA - APS

Preparing activity:

Army - GL

Project 8135-0661



DIMENSIONS IN INCHES

FIGURE 1. Air leakage test jig

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I. RECOMMEND A CHANGE:	1. DOCUMENT NUMBER: P-375D	2. DOCUMENT DATE (YYMMDD): 1994 March 31

3. DOCUMENT TITLE: PLASTIC FILM, FLEXIBLE, VINYL CHLORIDE

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)
	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code) (1) Commercial	(2) AUTOVON/DSN
U.S. Army Natick RD&E Center	508-651-4532	256-4532
c. ADDRESS (Include Zip Code) Commander, U.S. Army Natick RD&E Center ATTN: SATNC-IR Natick, MA 01760-5019	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	

DD Form 1426, OCT 89 NATICK OP2 (IIII, 91) Previous editions are obsolete