INCH-POUND

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MILITARY SPECIFICATION

BARRIER MATERIAL, GREASEPROOFED, WATERPROOFED, FLEXIBLE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers flexible, greaseproofed, waterproofed barrier material used for protection of military supplies and equipment during transportation and storage under all climatic conditions (see 6.1).

1.2 Classification. The barrier material shall be of the following types, grades, and classes, as specified (see 6.2).

Type I - Heavy duty.

Grade A - Greaseproofed, waterproofed, and noncorrosive.

Class 1 - Heat sealable, nonstretchable.
Class 2 - Nonheat sealable, stretchable.

Grade C - Greaseproofed, waterproofed, noncorrosive, moldable, and self-adhering.

Class 1 - Self-adhering coating applied on nongreaseproof side only.
Class 2 - Self-adhering coating applied on both sides.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 8135

Type II - Medium duty.

Grade A - Greaseproofed, waterproofed, and noncorrosive.

Class 1 - Heat sealable, nonstretchable.
Class 2 - Nonheat sealable, stretchable.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

* 2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

P-C-451	-	Coated Abrasive Cloth, Aluminum Oxide or Silicon Carbide
QQ-S-698	-	Steel Sheet and Strip, Low Carbon
RR-S-366	-	Sieve, Test
TT-T-291	-	Thinner, Paint, Mineral Spirits, Regular and Odorless
UU-P-268	-	Paper, Kraft, Wrapping
PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-D-723	-	Drums, Fiber
PPP-T-45	-	Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing
PPP-T-60	-	Tape: Packaging, Waterproof
PPP-T-76	-	Tape, Packaging, Paper (For Carton Sealing)

MILITARY

MIL-P-116	-	Preservation, Methods Of
MIL-D-3716	-	Desiccants, Activated for Dynamic Dehumidification
MIL-S-4461	-	Sealing Machines, Heat; Hot Jaw and Continuous
MIL-L-21260	-	Lubricating Oil, Internal Combustion Engine, Preservative and Break-In
MIL-L-35078	-	Loads, Unit: Preparation of Semiperishable Subsistence Items; Clothing, Personal Equipment and Equipage; General Specification For

STANDARDS

FEDERAL

FED-STD-101 - Test Procedures for Packaging Materials

MILITARY

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

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

* 2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 13 - Specification for Spirits of Turpentine
D 3951 - Standard Practice for Commercial Packaging

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

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY (TAPPI)

T 403 - Bursting Strength of Paper
T 404 - Tensile Breaking Strength and Elongation of Paper and Paperboard (Using Pendulum Type Tester)
T 414 - Internal Tearing Resistance of Paper

(Application for copies should be addressed to the Technical Association of the Pulp and Paper Industry, Technology Park/Atlanta, P.O. Box 105113, Atlanta, GA 30348.)

UNITED STATES PHARMACOPEIAL CONVENTION, INC. (USP)

The United States Pharmacopeial National Formulary

(Application for copies should be addressed to the United States Pharmacopeial Convention, Inc., 12601 Twinbrook Parkway, Rockville, MD 20852.)

(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 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Material. Flexible, greaseproofed, waterproofed barrier materials shall be made from such material and by such processes as to ensure compliance with all the requirements of this specification. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

3.3 Construction. The barrier material shall be constructed of one or more components or plies. Grade A, class 1 barrier material shall be capable of being fabricated into bags, sleeves, and pouches. An adherent coating shall be applied uniformly to the entire surface area of grade C, class 1 barrier material on the "backing" (nongreaseproof) side of the material only. The uncoated (smooth) side of grade C, class 1 material shall be designated as the "face." Both sides of grade C, class 2 material shall be uniformly coated with an adherent coating. Roll edges shall be evenly cut without selvage, and each component shall cover the entire material area.

3.4 Form. The barrier material shall be furnished in rolls. Unless otherwise specified (see 6.2), rolls shall be not less than 100 yards (+1/2, -0 yards) in length or multiples thereof and 36 inches ± 1/8 inch in width. Rolls shall be uniformly and smoothly wound on nonreturnable fiber cores having a minimum inside diameter of 3 inches with a plus 1/16 inch tolerance. The core length shall be not less than the specified roll width nor greater by more than 1/2 inch. No roll shall contain more than two splices (three pieces). Splices shall be even, neat, cover the entire width of the roll, and shall not separate during unwinding of the roll. Splices shall be indicated on both sides of the roll. Rolls shall be restrained from unwinding.

3.5 Resistance to curl (grade A only). The barrier material shall not curl in excess of 5 percent, nor curl back upon itself (see figure 1) when tested as specified in 4.5.1.

3.6 Resistance to heat and humidity. The barrier material shall show no dimensional change (lateral or longitudinal) in excess of 2 percent and shall show no coating loss, rupture, delamination, ply separation, or cracking when tested as specified in 4.5.2.

3.7 Low temperature flexibility. The barrier material shall show no delamination, cracking, or separation of plies when tested as specified in 4.5.3.

3.8 Greaseproofness. The barrier material, when tested as specified in 4.5.4, shall resist the penetration of grease for a minimum of 24 hours and shall show no delamination, embrittlement, or disintegration.

3.9 Waterproofness. The barrier material, when tested as specified in 4.5.5, shall resist the penetration of water for a minimum of 72 hours.

3.10 Strength properties. The barrier material, as received, shall possess the minimum average physical strength values in table I when tested as specified in 4.5.6, 4.5.7, and 4.5.9, as applicable.

TABLE I. Minimum average strength characteristics

Type	Grade	Class	Bursting strength (psi)	Tearing resistance, (grams), each principal direction	Tensile breaking strength (lb/in. width), each principal direction
I	A	1	45	150	25
I	A	2	45	150	23
I	C	1	45	500	20
I	C	2	45	500	20
II	A	1	30	100	17
II	A	2	25	100	15

3.10.1 Stretch (grade A, class 2 only). Grade A, class 2 barrier material shall have a minimum average stretch of 15 percent in at least one principal direction when tested as specified in 4.5.8.

3.11 Resistance to blocking. The barrier material shall show no delamination or rupture when tested as specified in 4.5.10. Grade C materials may adhere but shall separate without delamination or rupture.

3.12 Contact corrosion. Steel test panels shall not corrode when subjected to contact with the barrier material as specified in 4.5.11.

3.13 Seam strength (grade A, class 1 only). The barrier material shall be capable of being heat-sealed in accordance with a commercial practice on commercially available heat-sealing equipment to provide a seam capable of withstanding a static load of 2-1/2 pounds for 5 minutes at 73 ± 3.5°F, and of 10 ounces for 1 hour at 158° ± 3°F without seam separation, delamination, or loss of heat-seal coating when tested as specified in 4.5.12.

3.14 Water-resistance of sealed bag (grade A, class 1 only). The barrier material when fabricated into bags as specified in 4.5.13.2 shall show no water penetration through the material or seam in 72 hours when tested as specified in 4.5.13.

3.15 Oil resistance of sealed bag (grade A, class 1 only). The barrier material when fabricated into bags as specified in 4.5.13.2 shall show no oil penetration through material or seams in 7 hours when tested as specified in 4.5.14.

* 3.16 Bending resistance. The bending resistance of the barrier material shall be not greater than the applicable value in table II when tested as specified in 4.5.15.

TABLE II. Bending resistance requirements

Type	Grade	Class	Bending resistance, maximum average (pounds)
I	A	1	14
I	A	2	7
I	C	1	14
I	C	2	14
II	A	1	10
II	A	2	5

3.17 Adhesion (grade C only). When tested as specified in 4.5.16, the grade C, class 1 barrier material shall have an average adhesion of not less than 9 pounds. The grade C, class 2 barrier material shall have an adhesion value of not less than 9 pounds on the greaseproof side (side with heavier coating), and not less than 5 pounds on the opposite side.

3.18 Identification.

3.18.1 Grade A barrier material. Grade A barrier material shall be marked as follows:

Specification number
Grade, type, and class
Manufacturer's name
Manufacturer's designation (trade name)
Month and year of manufacture
Recommended heat seal procedure (grade A, class 1 only)
for use on:
(a) Jaw-type sealer (temperature, pressure, and dwell)
(b) Band-type sealer (temperature, pressure, and speed)
(c) Rotary-type sealer (preheat, pressure, and speed)

"USE WITH THIS SIDE OUT"

The letters and figures of marking shall be a minimum of 1/8 inch high, permanent, legible, and waterproof. The markings shall appear on the nongreaseproof side of the material. The complete markings shall be continuous in length with a maximum of 12 inches between groups of markings and shall appear at least once in each 12 inches of width. The color of the markings shall be red.

3.18.2 Grade C barrier material. Grade C barrier material shall be identified by means of a tag or sheet of paper printed with the following information:

Specification number
Grade and class
Manufacturer's name
Manufacturer's designation (trade name)
Month and year of manufacture, and for class 1 material
"USE WITH SMOOTH FACE IN"

One such tag or sheet shall be furnished for each roll. The tag or sheet shall be secured to the core of the roll.

3.19 Workmanship. The end item shall conform to the quality of product established by this specification and the occurrence of defects shall not exceed the applicable acceptable quality levels.

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 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 submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

* 4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point, or at all points in the manufacturing process necessary to assure compliance with all dimensional requirements.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.3).
b. Quality conformance inspection (see 4.4).

* 4.3 First article inspection. When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.2 through 4.4.5 and tested as specified in 4.4.6.

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

4.4.1 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.

4.4.2 End item visual examination. The end items shall be examined for the defects listed in table III. The lot size shall be expressed in units of yards. The sample unit shall be 1 yard. No more than five sample units shall be taken from any roll. Defects of each type shall be scored only once within a sample unit. No sample unit shall be taken from the first or last convolution of the roll. Both sides of the material shall be examined. The inspection level shall be I and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total combined defects.

TABLE III. End item visual defects

Examine	Defects	Classification Major	Minor
Form	Incorrect type, grade, or class of material	101	
Workmanship	Not clean; presence of any foreign matter, dirt, sand, grit, or oil spots	102	
	Delamination or embrittlement	103	
	Any hole (including pinhole), tear, cut, wrinkle, sharp crease, crack, blister, puncture, chaff spot, or scuff mark		201
Construction	Not uniform	104	
	Any layer or section missing	105	
	Any selvage	106	
Coating (Grade C only)	Adherent coating missing, not uniformly applied	107	
	Adherent coating applied to both sides (class 1 only)	108	
	Adherent coating not applied to both sides (class 2 only)	109	
	Blistered or flaked coating	110	

TABLE III. End item visual defects (cont'd)

Examine	Defects	Classification Major	Classification Minor
Identification marking	Illegible, incorrect, incomplete, or omitted		202
Grade A material	Does not appear on backing surface of material; not continuous lengthwise	111	
	Does not conform to legend in 3.18.1; not distinct red color	112	
Grade C material	Sheet or tag not adequately secured to core; omitted		203
	Does not conform to legend in 3.18.2	113	

4.4.3 End item dimensional examination. The end items shall be examined for conformance to the dimensions specified in table IV. Any dimension not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of rolls. The sample unit shall be one roll. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5 for major defects and 10.0 for total combined defects.

TABLE IV. End item dimensional defects

Examine	Defects	Classification Major	Classification Minor
Roll			
Width	Varies by more than ±1/8 inch from width specified	101	
Core	Length less than specified width of roll material or greater by more than 1/2 inch		201
	Inside diameter less than 3 inches or more than 3-1/6 inches	102	

TABLE IV. End item dimensional defects (cont'd)

Examine	Defects	Classification Major	Classification Minor
Identification marking	Lettering less than 1/8 inch in height	103	
(Grade A only)	More than 12 inches distance between lengthwise or widthwise group of markings	104	

4.4.4 Roll construction examination. The end items shall be examined for defects in roll construction as listed in table V. The lot size shall be expressed in units of rolls. The sample unit shall be one roll. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 4.0 for major defects and 10.0 for total defects.

TABLE V. Roll construction defects

Examine	Defects	Classification Major	Classification Minor
Assembly of roll	Material not wound uniformly and smoothly on roll causing soft or uneven edges or telescoping of roll	101	
	Edges not clean cut; ragged, nicked, or crushed edges	102	
	Not wound on a fiber core; core broken, crushed, collapsed, or mutilated	103	
	Not suitably restrained to prevent unwinding		201
Unwinding or roll (examine both sides)	When unwound material sticks together to the extent that unrolling causes tearing or injury to any surface	104	
	Material not wound evenly causing wrinkles, sharp creases, or folds within the roll	105	
	Roll not continuous		202
	More than 2 splices (3 pieces) in roll		203

TABLE V. Roll construction defects (cont'd)

Examine	Defects	Classification Major	Classification Minor
Unwinding or roll (examine both sides)-cont'd	Splice(s) not evenly and neatly made; does not cover entire width of material; comes apart during unwinding	106	
	Splice not indicated on both sides of roll		204

4.4.5 Length examination. The end items shall be examined for length per roll. The length of a roll shall be determined by holding a counter against the face of the roll at a point where the material is not under tension while unwinding the roll. The lot size shall be expressed in units of rolls. The sample unit shall be one roll. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 6.5.

* 4.4.6 End item testing. The end items shall be tested for the applicable characteristics in table VI for each lot of the same type, grade, and class of material presented for testing. When TAPPI Test Methods are specified, the sample size, number of determinations, and reporting of results shall be as specified herein. The lot size shall be expressed in units of rolls. The sample unit shall be one piece of material the full width of the roll and of sufficient length to make a sample 12 feet square. The inspection level shall be S-1. Any sample unit or lot average test failure, as applicable (see "Requirements applicable to" column in table VI shall be cause for rejection of the lot).

TABLE VI. End Item Testing

Characteristic	Requirements applicable to: Requirement para.	Sample unit	Lot aver.	Test method	No. of deter.	Results reported as: Pass or fail 1/	Numerically to nearest 2/
Curling resistance (grade A only)	3.5			4.5.1			
Machine direction		--	X		5	--	1 percent
Cross direction		--	X		5	--	1 percent
Resistance to heat and humidity	3.6			4.5.2			
Machine direction		X	--		5	X	--
Cross direction		X	--		5	X	--
Low temperature flexibility 3/	3.7			4.5.3			
Machine direction		X	--		15	X	--
Cross direction		X	--		15	X	--
Greaseproofness	3.8			4.5.4			
As received material		X	--	4.5.4.2.1	20	X	--
After aging		X	--	4.5.4.2.2	20	X	--
Waterproofness	3.9			4.5.5			
As received material		X	--	4.5.5.2.1	10	X	--
After aging		X	--	4.5.5.2.2	10	X	--
Bursting strength	Table I	--	X	4.5.6	10 (5 each side)	--	1 psi
Tensile breaking strength	Table I			4.5.7			
Machine direction		--	X		10	--	0.1 pound /inch width
Cross direction		--	X		10	--	0.1 pound /inch width

TABLE VI. End Item Testing (Cont'd)

Characteristic	Requirements applicable to: Requirement para.	Sample unit	Lot aver.	Test method	No. of deter.	Results reported as: Pass or fail 1/	Numerically to nearest 2/
Stretch (grade A, class 2 only)	3.10.1			4.5.8			
Machine direction		--	X		10	--	1 percent
Cross direction		--	X		10	--	1 percent
Tearing resistance	Table I			4.5.9			
Machine direction		--	X		10		
Face to back		X	--		2	X	--
					2	X	--
Contact corrosion	3.12	X	--	4.5.11	2	X	--
Seam strength (grade A, class 1 only)	3.13			4.5.12			
Sealed as received				4.5.12.2			
2.5 pounds/5 minutes/23°C		X	--		2	X	--
10 ounces/1 hour/70°C		X	--		2	X	--
Sealed then aged				4.5.12.3			
2.5 pounds/5 minutes/23°C		X	--		2	X	--
10 ounces/1 hour/70C		X	--		2	X	--
Water resistance of sealed bag 3/	3.14	X	--	4.5.13	5	X	--
Oil resistance of sealed bag 3/	3.15	X	--	4.5.14	5	X	--
Bending resistance 3/	3.16	X	--	4.5.15	10	X	--

TABLE VI. End Item Testing (Cont'd)

Characteristic	Requirements applicable to: Requirement para.	Sample unit	Lot aver.	Test method	No. of deter.	Results reported as: Pass or fail 1/	Numerically to nearest 2/
Adhesion (grade C, class 1 only)	3.17			4.5.16			
Back to panel		--	X		5	--	1 pound
Adhesion (grade C, class 2 only)	3.17			4.5.16			
Back to panel		--	X		5	--	1 pound
Face to panel		--	X		5	--	1 pound

1/ Where results are reported as "pass" or "fail," all determinations must "pass" for the material to be considered satisfactory. If failure is indicated, report description of failure.

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

3/ Test report must be furnished with first article. A certificate of conformance may be furnished for end item testing.

* 4.4.7 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 AQL, expressed in terms of defects per hundred units, shall be 2.5.

Examine	Defect
Marking	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

* 4.4.8 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 AQL, expressed in terms of defects per hundred units, shall be 6.5.

Examine	Defect
Finished dimensions	Length, width, or height exceeds specified maximum requirement
Palletization	Pallet pattern not as specified Interlocking of loads 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

4.5 Methods of inspection.

4.5.1 Resistance to curl (grade A only). Cut five 12-by 36-inch ± 1/32 inch specimens from each principal direction. Fasten the 12-inch end of each specimen in suitable clamps so that the barrier material is fastened or secured to at least two points adjacent to the 12-inch edge of the specimen in such a manner that the barrier material shall be straight between the clamps (see figure 2). Suspend each test assembly so that it is free to rotate and the 12-inch edge of the barrier material is parallel to and no less than 36 inches above a horizontal platform. Care shall be taken that each suspended specimen is free from wrinkles. Condition the suspended specimens for not less than 24 hours at 73° ± 3.5°F and 50 ± 2 percent relative humidity. Measure the vertical distance from the upper 12-inch edge to the lowest portion of the specimen (see figure 2) to the nearest 1/32 inch. Observe if any specimen curls back upon itself, in either principal direction, to such an extent that the opposite faces of the specimen touch either when suspended as described above or when lying "flat" on a horizontal surface following conditioning (see figure 1). Calculate the percentage curl:

$$\text{Curl, percent} = \frac{A-B}{A} \times 100$$

where:

A = Actual specimen length (in 36-inch direction) in inches in the "flat" state.

B = Vertical distance in inches from the upper 12-inch edge to the lowest portion of the suspended specimen.

4.5.2 Resistance to heat and humidity. Cut, measure, and clamp the required number of specimens as specified in 4.5.1. Suspend the clamped specimens and condition in a drying oven at a temperature of 158° ± 2°F for 116 hours. At the end of the conditioning period, remove the specimens from the oven and place them in a humidity cabinet maintained at 158° ± 2°F and 60 ± 5 percent relative humidity for an additional 116 hours. The air in the oven must circulate sufficiently to maintain the atmosphere surrounding each specimen at a uniform temperature and humidity without causing the samples to "whip" against each other or against the oven sides. Remove the specimens from the humidity cabinet and condition for 24 hours at 73° ± 3.5°F and 50 ± 2 percent relative humidity. Measure the specimens and calculate the percentage change in each dimension. Observe the specimens for any loss of coating, delamination, rupture, separation of plies, or cracking. Retain these specimens for the tests of 4.5.4, 4.5.5, and 4.5.12. For purpose of this test, delamination shall be defined as either ply separation at any one given point extending in more than 1/2 inch from the edge with an edge length separation greater than 1 inch or a ply separation which produces a discernible swelling or bubbling of one material away from the other in portions of the specimen other than at the edges.

4.5.3 Low temperature flexibility. Cut fifteen 4 by 12 inch ± 1/16 inch specimens from each principal direction, place the specimens in suitable clamps (see figure 3), and condition for not less than 1 hour at -25° ± 2°F for grade A and 20° ± 2°F for grade C material. The specimens shall be arranged in the the cabinet to allow circulation of air against all surfaces of the specimens. After conditioning, attach each specimen to suitable clamps and draw lengthwise at the conditioning temperature over a 1/4 inch diameter stainless steel mandrel fixed in a suitable apparatus (see figure 3) so that the specimen is subjected to approximately 180° bend. The apparatus shall have been placed in the low temperature cabinet for at least 1/2 hour prior to the flexing operation. The tensioning force shall be 5 pounds ± 1/2 pound and shall be applied by a weight or other suitable means. The flexing operation shall take no more than 2 to 3 seconds for a complete draw over the mandrel. Each specimen shall be drawn over the mandrel four times and then turned over so that the opposite face is against the mandrel and the drawing process repeated. Observe the specimens for delamination, rupture, or ply separation. Cut each specimen into 4 by 4 inch ± 1/16 inch pieces and retain the center one for the tests specified in 4.5.4.2.3 and 4.5.5.2.3.

4.5.4 Greaseproofness.

* 4.5.4.1 Preparation of reagent. To 100 milliliters of pure gum spirits of turpentine conforming to ASTM D 13, add 5 grams of anhydrous calcium chloride and 1 gram of an oil soluble red dye. Agitate the mixture to ensure solution of the dye and let stand for at least 10 hours at 73° ± 3.5°F in a clean glass stoppered bottle. Filter through dry filter paper and retain the filtrate in a clean, dry, glass bottle. To each 100 grams of the filtrate, add 25 grams of Oleic acid, USP. Agitate until the turpentine-grease is thoroughly dissolved. Store the reagent in a dry glass bottle having a tightly fitting glass stopper.

4.5.4.2 Procedure.

* 4.5.4.2.1 As received material. Cut twenty 4 by 4 inch ± 1/16 inch specimens and condition for not less than 16 hours at 73° ± 3.5°F and 50 ± 2 percent relative humidity. Crease each specimen by placing the diagonally opposite corners together with the greaseproof side in. Place the specimens in this condition on a flat, smooth glass surface and gently place a flat-bottomed, 5-pound weight 4 inches in diameter on the specimen so that it is centered over the fold. Allow the weight to remain for 30 seconds, remove the weight, open the specimen, and refold by placing the diagonally opposite corners so that the fold formed is at right angles to the first one and the reverse side of the specimen is folded in. Apply weight as described above. Place each specimen greaseproof side up, on a piece of white Whatman No. 2 filter paper (see 6.6) at least 1/2 inch greater in length and width than the specimen being tested. Filter paper shall be placed on a clean flat glass, or acrylic plastic surface. Place a metal ring, weighing 1/4 to 1/2 pound and

having dimensions of 5-3/4 inches ± 1/16 inch outside diameter and 3-3/4 inches ± 1/16 inch inside diameter on the test specimen so that the intersection of the crease lines lies in the center of the ring and all corners and edges of the specimen are held in intimate contact with the backing sheet. Place 5 grams of Ottawa Sand Standard, screened to pass through a No. 20 U.S. Standard sieve and to be retained on a U.S. Standard No. 30 sieve, on the intersection of the creases. Sieves shall conform to RR-S-366. By means of a pipette, add 1.5 milliliters (mL) of the prepared test reagent to the sand. On each specimen, place a 50 to 55 gram weight, centered over the sand, to hold the specimen in contact with the white backing paper. At the end of 2 hours, and every hour thereafter for 3 hours, add 0.5 mL of test reagent to the sand to replace that lost by evaporation. This test shall be conducted at a temperature of 73° ± 3.5°F and 50 ± 2 percent relative humidity. Twenty-four hours after first adding the reagent and the weight, lift the specimen and examine the white backing paper at the point of contact. Any staining or grease spots on the white backing paper or delamination, embrittlement, or disintegration of the barrier material shall constitute failure. Staining on the back of the specimen by the grease reagent or dye without transfer to the white backing shall not be cause for rejection.

* 4.5.4.2.2 After aging. Cut twenty 4 by 4 inch ± 1/16 inch specimens, at random, from material conditioned as specified in 4.5.2 for first article and test as specified in 4.5.4.2.1, except that the 16-hour conditioning may be omitted.

4.5.4.2.3 After low temperature flexing. Select twenty 4 by 4 inch specimens as specified in 4.5.3, that satisfactorily passed the low temperature flexing. Condition the specimens for 24 hours at 73° ± 3.5°F and 50 ± 2 percent relative humidity and test as specified in 4.5.4.2.1, except that specimens shall not be creased.

4.5.5 Waterproofness.

4.5.5.1 Preparation of reagent. Add a gram of solid Aerosol OT (see 6.6) to 500 mL of distilled water. Allow the reagent to stand for 24 hours, then stir to ensure complete solution.

4.5.5.2 Procedure.

4.5.5.2.1 As received material. Cut ten 4 by 4 inch ± 1/16 inch specimens and condition as in 4.5.4.2.1. Crease each specimen and apply weights in the same manner as specified in 4.5.4.2.1. After creasing, dip the edge of each specimen in a melted wax mixture of 60 parts of amorphous wax and 40 parts of paraffin wax or in melted Multiwax D445 (see 6.6) to form an approximate 1/2-inch border of wax along each of the four edges. Place each of the prepared specimens with the greaseproof side up on a flat sheet of aluminum foil approximately 0.0015 inch thick and large enough to hold the specimens. Place a dry fine-texture cellulose sponge on the center of each specimen. The approximate dimensions of the sponge shall be 2-1/4 inches by 2 inches by

1/4 inch thick. Add 10-mL portion of the reagent to each sponge. Cover each sponge with a glass or metal cover weighing approximately 200 grams and fitted with an electrode of such length that the electrode touches the sponge (see example in figure 4) and having the following approximate dimensions: outside diameter 3-3/16 inches, inside diameter 3-1/16 inches, height 1-5/16 inches. At the end of 24 and 48 hours, remove the cover, add an additional 5 mL of the reagent to each sponge, and replace the cover. At the end of 72 hours, test each specimen for water penetration by clamping one of the lead wires from a DC microammeter to the aluminum foil and touching each protruding electrode in turn with the other lead wire (see example in figure 4). The microammeter shall have a range of 0 to 50 microamperes and shall have a variable resistor connected to a 67-1/2 volt battery. Any deflection of the microammeter needle shall indicate failure (water penetration). The resistance shall be adjusted so that when the two leads touch, 90 to 100 percent full-scale deflection of the microammeter is obtained. This test shall be conducted at a temperature of 73° ± 3.5°F and 50 ± 2 percent relative humidity.

* 4.5.5.2.2 After aging. Cut ten 4 by 4 inch ± 1/16 inch specimens at random from material conditioned as specified in 4.5.2 for first article and test as specified in 4.5.5.2.1.

4.5.5.2.3 After low temperature flexing. Cut ten 4 by 4 inch ± 1/16 inch specimens, at random, from the specimens which satisfactorily passed the low temperature flexing as specified in 4.5.3. Condition the specimens for 24 hours at 73° ± 3.5°F and 50 ± 2 percent relative humidity and test as specified in 4.5.5.2.1, except that the specimens shall not be creased.

4.5.6 Bursting strength. Bursting strength shall be determined in accordance with TAPPI Method T 403.

4.5.7 Tensile breaking strength. Tensile breaking strength shall be determined in accordance with TAPPI Method T 404.

4.5.8 Stretch (grade A, class 2 only). Stretch shall be determined simultaneously with tensile breaking strength. Stretch is equivalent to elongation as measured by TAPPI Method T 404.

4.5.9 Tearing resistance. Tearing resistance shall be determined in accordance with TAPPI Method T 414, except that ten specimens shall be tested in each principal direction: half of the specimens with one face toward the knife and the other half with the opposite face toward the knife.

4.5.10 Resistance to blocking. Cut twenty 4 by 4 inch ± 1/32 inch specimens from the samples to be tested. Prepare five assemblies by placing one specimen face to face with another. Make additional assemblies by placing one specimen face to back with another. Lay these assemblies on a smooth flat glass or acrylic plastic surface and place a 2-inch square felt pad 1/4 inch thick in the center of each assembly, and apply a static load of 3 pounds per square inch evenly distributed on the entire area of the felt pad. Place the complete assemblies in an air circulating oven maintained at 158° ± 2°F for

grade A materials, and 118° ± 2°F for grade C materials. Heat the completed assemblies in the oven for 2 hours. At the end of the specified time, remove the assemblies from the oven, remove the weights, and cool at 73° ± 3.5°F and 50 ± 2 percent relative humidity for 15 minutes and rapidly pull the two sheets of each assembly apart by hand. Examine the material for delamination or rupture.

4.5.11 Contact corrosion.

4.5.11.1 Apparatus and material.

a. Test panels - 2 by 4 inch steel panels conforming to condition (e) of QQ-S-698. Panel edges shall be rounded slightly to eliminate sharpness.
b. Mounting bars - 3 by 1 by 1 inch bars made from series 300 stainless steel. The edges of the bars shall be slightly rounded.
c. Glass microslides - 1 by 3 inches.
d. Tape - pressure-sensitive adhesive conforming to PPP-T-60, 1/2 + 1/32 inch wide.
e. Circulating air temperature cabinets or ovens - controllable at temperatures of 149° ± 3.5°F and 122° ± 3.5°F.
f. Desiccator with perforated plate.
g. Desiccator - Scheibler or Fruehling and Schultz type or equal, 250 mm size, with perforated plate with handle.
h. Miscellaneous:
   (1) Cloth, abrasive, aluminum oxide, 240 grit, conforming to P-C-451.
   (2) Mineral spirits, grade 1, of TT-T-291.
   (3) Methanol (95 percent).
   (4) Methanol (absolute).
   (5) Surgical gauze.
   (6) Glycerin-water solution, specific gravity 1.170 to 1.175 at 23°C, solution to contain 0.1 percent copper sulfate as fungicide.
   (7) Silica gel conforming to MIL-D-3716.
   (8) Surface roughness standard block (12 micro inch surface finish) or a standard profilometer.

4.5.11.2 Preparation of test panels. The test panels shall be polished to eliminate pitting and other surface irregularities. Finish polishing shall be done by hand using an abrasive cloth in the lengthwise direction of the panels so that a surface finish duplicating the roughness standard block is obtained in each panel. Panels shall then be wiped clean, using surgical gauze, and the surface finish carefully checked. Panels shall be scrubbed while immersed in warm (approximately 149°F) mineral spirits using a surgical gauze swab; then immersed successively in clean hot mineral spirits, boiling 95 percent methanol, and boiling absolute methanol. Panels shall be dried using a clean

piece of surgical gauze and immediately placed within a desiccator on a clean perforated plate above activated silica gel. Care shall be taken that the steel panel surfaces do not become contaminated at any time by finger contact. Panels shall be used for testing within 24 hours after being cleaned and sealed within the desiccator. If stored for a longer period, the surface treatment shall be repeated, beginning with the hand polishing operation.

4.5.11.3 Assembly. Each 3 by 2 inch test specimen shall be placed grease-proofed side down on a clean, dry, flat surface. A glass microslide with a mounting bar superimposed and coinciding shall be placed upon each specimen so that the longitudinal center line of the bar coincides with that of the specimen. Each side of the specimen extending from under the mounting bar and glass slide shall be folded back against the sides of the bar and secured with tape. The test panels shall be removed one at a time from the desiccator, a mounted specimen shall be placed crosswise upon each panel, and the position of the specimen shall be marked with a lead pencil.

4.5.11.4 Exposure. The assemblies shall be preheated on the 250 mm desiccator plate for 1/2 hour within a circulating air cabinet or oven maintained at 149° ± 3.5°F. The plate and contents shall then be transferred to the desiccator containing an approximate 5-mm depth of the glycerin-water solution. The desiccator shall then be sealed and placed within an air circulating cabinet or oven maintained at 122° ± 3.5°F for 20 hours. When that time period has elapsed, the assemblies shall be removed from the oven, the desiccator opened, and the test panels examined for corrosion.

4.5.11.5 Interpretation of pass or fail.

a. Any traces of corrosion in the test area of any specimen shall constitute failure to pass the requirements and shall be cause for rejection of the lot of the barrier material.

b. Any trace of corrosion in the control areas shall invalidate the test (may be caused by contamination of the test panels or specimens or by excessive condensation in transfer from the temperature cabinets). The test shall be repeated using a new set of assemblies.

4.5.12 Seam strength (grade A, class 1 only).

4.5.12.1 Sealing equipment and instructions. All seals for test purposes shall be a minimum of 1 inch wide and shall be effected on a jaw-type heat sealer conforming to MIL-S-4461, types I or II, having one heated jaw and one resilient unheated jaw, utilizing the sealing conditions recommended by the manufacturer (see 6.6). The upper sealing condition limits on this type of sealer, which are considered reasonable for production line sealing operations with respect to commonly available sealing equipment and commercially practical fabrication time, are a temperature setting of 525°F, a 3-second

dwell time, and a pressure of 60 pounds per square inch. In the securing of the 1-inch seam strength specimens (see 4.5.12.2), care should be taken that the specimens are not removed from points in the sealed sample where seal overlapping has occurred or which were within 1 inch of either end of the sealer jaw during the sealing operation.

4.5.12.2 As received material. Cut two 5 by 6 inch specimens from the samples to be tested. Fold the specimens heat-seal face to heat-seal face to provide specimens 2-1/2 by 6 inches. Seal the edge opposite the fold according to recommended procedures and cut off the folded edge. From each test specimen, cut six 1-inch wide pieces perpendicular to the seam and discard the two outer ones. Condition the specimens for 1 hour at 73° ± 3.5°F and 50 ± 2 percent relative humidity. Unfold the specimens and clamp one end of each so that the outer end of the specimen hangs freely. Gently, so as not to impact, load the seal by attaching a 10-ounce weight to the free end of half of the specimens and place them with weights attached in an oven maintained at 158° ± 2°F for 1 hour. Gently attach a 2-1/2 pound weight to the remaining specimens and suspend them at 73° ± 3.5°F for 5 minutes. At the end of the stipulated time, remove all specimens from the oven, if applicable, detach the weights and examine for seam separation, delamination, or loss of heat-sealing coating. Partial seam separation during the first 2 minutes of the 2-1/2 pound, 5-minute test shall not be cause for rejection, provided no further separation occurs during the balance of the 5-minute test period and provided complete seam separation does not occur at any time.

* 4.5.12.3 Sealed before aging. Prepare and seal specimens as in 4.5.12.2. The sealed specimens shall be aged as specified in 4.5.2 for first article and for end item tests, conditioned and tested as specified in 4.5.12.2.

* 4.5.12.4 Sealed after aging. From material aged as specified in 4.5.2 for first article and for end item tests, prepare, condition, and test specimens as specified in 4.5.12.2.

4.5.13 Water resistance of sealed bag (grade A, class 1 only).

4.5.13.1 Preparation of reagent. To each 98-mL portion of distilled water, add 1 gram of Aerosol OT (see 6.6) and 1 gram of water soluble green dye. Allow the mixture to stand with occasional shaking for 4 hours.

4.5.13.2 Procedure. Cut ten 6 by 8 inch ± 1/32 inch specimens from the barrier material samples to be tested. Form pouches by placing specimens heat-seal face to heat-seal face and sealing in accordance with recommended procedure along one 6-inch edge and both 8-inch edges. The seals shall be uniform, at least 1/2 inch in width, continuous, and without pipes or channels. The bags shall be comfortably filled (but not to the extent of placing a strain on the material or seams) with shredded white No. 2 Whatman filter paper or approved equal and sealed. The sealed pouches shall then be

immersed for 72 hours under a 1-inch head of water maintained at a temperature of 73° ± 3.5°F, to which has been added the reagent specified in 4.5.13.1 in the proportions of 1 part (by volume) of reagent to 4 parts (by volume) of water. At the end of 72 hours, remove the pouches from the water, allow them to drain, cut open one edge, and examine the shredded paper for staining. Staining of the shredded paper shall constitute a failure.

4.5.14 Oil resistance of sealed bag (grade A, class 1 only). Cut ten 6 by 8 inch ± 1/32 inch specimens from the samples to be tested. Form pouches by placing specimens heat-seal face to heat-seal face and sealing in accordance with recommended procedure, along one 6-inch edge and both 8-inch edges. The seal shall be uniform, continuous, 1/2 inch in width, and without pipes or channels. Insert into each of the pouches, 80 ± 5 mL of oil conforming to MIL-L-21260, type I, grade 30 (preservative P-10 of MIL-P-116 having an aniline point of 23° ± 10°F). The oil shall have been distinctly dyed with 10 grams of oil soluble red dye per quart of oil. Seal the pouches, taking care to keep enclosed air to a minimum and place each one between 2 pieces of white No. 2 Whatman filter paper at least 1/2 inch greater in length and width than the pouch being tested. Place on each assembly a piece of glass of the same size as the pouch and place a 2-pound weight on top of the piece of glass. Place each weighed assembly into an individual metal pan or tray and place in an air circulating oven maintained at 158° ± 2°F for 7 hours. At the end of this time, remove the weighted assemblies from the oven and examine for oil or dye on the filter paper. Staining of the material by the oil on the outside of the pouch without transfer to the filter paper shall not constitute failure.

* 4.5.15 Bending resistance. The bending resistance of the barrier material shall be determined in accordance with Method 2035 specified in FED-STD-101.

4.5.16 Adhesion (grade C only). Cut five 3 by 6 inch specimens from each principal direction and condition for at least 16 hours at 73° ± 3.5°F and 50 ± 2 percent relative humidity. Place a specimen on a clean 4 by 4 inch aluminum panel 1/, with the coated side facing the panel so that 3 inches of the 6-inch edge of the specimen is in contact with the panel (leaving 3 inches of this edge free) and so that the area of the specimen in contact with the panel is equidistant from each side (see figure 5). Cover the specimen with a sheet of plastic film (polyethylene of 0.004 inch thickness has been found to be satisfactory). Attach the specimen to the panel by passing a 3-1/2 inch wide soft, rubber-covered roller weighing 16 pounds and having a diameter of 5 inches over the areas in contact, five times in each direction, at the rate of 3 inches per second. Repeat the above procedure until all assemblies are prepared. Clamp the uncovered end of the panel in the upper jaw of a tensile tester (TAPPI Method T 404) with the jaws set 5 inches apart. Clamp the free end of the specimen in the lower jaw and test in accordance with TAPPI Method T 404. Record the force in pounds required to disrupt the assembly. For class 1 material, report the average adhesion value in pounds. For class 2 material, repeat the testing using an equal number of assemblies prepared in

the same manner with the opposite side facing toward the panel. Average separately the values obtained with the greaseproof side facing toward the panel and with the greaseproof side facing away from the panel and report each adhesion value in pounds.

1/ Polished vertically with waterproof silicon carbide paper, Grit No. 400A, and cleaned by any of the cleaning processes described in MIL-P-116.

5. PACKAGING

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

* 5.1.1 Level A. Each roll of barrier material shall be packed in a snug-fitting fiber drum conforming to type III, grade D of PPP-D-723. Each fiber drum shall be closed with pressure-sensitive tape conforming to type IV of PPP-T-60 or PPP-T-76 in accordance with the applicable requirements of PPP-D-723. Alternatively, each roll of barrier material may be packed in a snug-fitting fiberboard shipping container conforming to style RSC, grade V2s of PPP-B-636. Each fiberboard shipping container shall be closed in accordance with method III, waterproofed in accordance with method V, and reinforced as specified in the appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.7. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). When unit loads are strapped, strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.1.2 Level B. Each roll of barrier material shall be packed in a snug-fitting fiber drum conforming to type I, grade D of PPP-D-723. Alternatively, each roll of barrier material may be packed in a snug-fitting fiberboard shipping container, or wrapped overall with heavy duty kraft wrapping paper or double thickness wrap of barrier material conforming to type I, grade A of this specification. The fiberboard shipping container shall conform to style RSC type CF (variety SW) or SF, class domestic, grade 200 of PPP-B-636. Each fiberboard container shall be closed in accordance with method II as specified in the appendix of PPP-B-636, except that the inspection shall be in accordance with 4.4.7. The heavy duty kraft paper shall have a minimum basis weight of 80 pounds per ream, conforming to grade A or B of UU-P-268. The wrapper shall be closed at the ends by means of inside and outside headers made of the same material as the wrapper. Seams and headers shall be securely sealed with an adhesive commercially used for this purpose, heat-sealed when applicable, or by minimum 2-inch width gummed paper tape conforming to type III, grade C of PPP-T-45. Wrapped rolls may have the cores plugged.

5.1.2.1 Weather-resistant containers. When specified (see 6.2), the shipping container shall be a type II, grade D fiber drum conforming to PPP-D-723 or a grade V3c, V3s or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with method III as specified in the appendix of PPP-B-636.

* 5.1.3 Commercial. Barrier material shall be packed in accordance with ASTM D 3951.

* 5.2 Palletization. When specified (see 6.2), rolls of barrier material, packed as specified in 5.1.2 or 5.1.3, shall be palletized on a 4-way entry pallet in accordance with load type XIII of MIL-STD-147. Barrier material shall be stacked vertically in a single layer with a wood cap over and under the load. A strap shall be positioned around the load outside of and at the vertical center of the barrier material packs and shall be the first strap applied to the load. Each prepared load shall be bonded with horizontal, primary, and secondary straps in accordance with bonding methods C and D, or shrink, or stretch warp in accordance with bonding methods F or G.

* 5.3 Marking. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable. Shelf life markings shall be applied (see 6.2).

* 5.3.1 Precautionary marking.

5.3.1.1 Storage and handling. The following precautionary marking shall appear on each shipping container in black letters not less than 3/4-inch in height:

"STAND ON END
KEEP COOL AND DRY"

* 5.3.1.2 Usage limitation. The following precautionary marking shall appear on each roll of barrier material.

"DO NOT USE IN DIRECT CONTACT WITH EDIBLE MATERIALS."

6. NOTES

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

6.1 Intended use.

6.1.1 Grade A material. Grade A, class 1 material is primarily used in the fabrication of greaseproofed, waterproofed packaging bags and also as an intimate wrap instead of grade A, class 2 material. Grade A, class 2 material is essentially used as an intimate wrap to maintain and protect coatings of oily or soft preservatives in contact with metal surfaces to which applied. It is also used where it is necessary to insulate the metal surfaces of packaged items from hygroscopic or corrosive elements of the pack; where contact of required outer wraps of other barrier materials would contaminate the metal surfaces of the packaged item; or where other more protective barrier materials are not required.

6.1.2 Grade C material. Grade C material is used primarily as an outer wrap of boxed or unboxed preserved material and usually sealed by a wax-dip coating over the closed wrap. Grade C, class 1 material only may be used as an intimate wrap for critical items, preserved with oily or soft preservatives since the surface of the wrap in contact with critical surfaces is non-corrosive and free of transferable material.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of this specification.
b. Type, grade, and class of barrier material required (see 1.2).
c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
d. When first article is required (see 3.1, 4.3, and 6.3).
e. Length and width of rolls required (see 3.4).
f. Levels of packing (see 5.1).
g. Type and class of unit load (see 5.1.1).
h. When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.1.2.1).
i. When palletization is required (see 5.2).
j. Shelf life (see 5.3).

* 6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Heat-sealing. Aging of barrier material affects heat-sealing procedures. If material has aged, the heat-sealing procedure should be amended by raising the temperature, pressure, and/or dwell to give an adequate seal.

6.5 Typical materials. While this specification does not stipulate the components or construction of greaseproof barrier materials, the following materials are given as typical of some that have complied with this specification:

a. Grade A

Class 1 - Coatings of polyethylene on natural kraft paper.
Class 2 - Laminations of aluminum foil, cellulose acetate, polyethylene, or polyester film to natural kraft paper.

b. Grade C - Laminations of plastic film (polyester, cellulose acetate) to a cotton scrim. Adhesion properties are imparted by coating or laminating with a wax or wax blend.

* 6.6 Sources. Materials used in tests may be obtained from the following sources:

Multiwax D445 may be obtained from Petroleum Specialties, Inc., 205 East 42nd Street, New York 17, NY.

Jaw type sealing machine may be obtained from Packaging Industries Incorporated, Montclair, NJ.

Whatman filter paper and Waring Blender may be obtained from chemical laboratory supply companies.

Aerosol OT is a product of American Cyanamid Co., Wayne, NJ.

* 6.7 Subject term (key word) listing.

Climatic storage
Equipment protection
Packaging
Protective material
Storage
Supplies protection
Transportation
Wrap

6.8 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, corrections, modifications, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodians:

Army - GL
Navy - SA
Air Force - 69

Review activities:

Army - AR, EA, MD, MI, SM, AT
Navy - AS, YD
Air Force - 84, 99

User activities:

Army - ME
Navy - MC, OS, SH

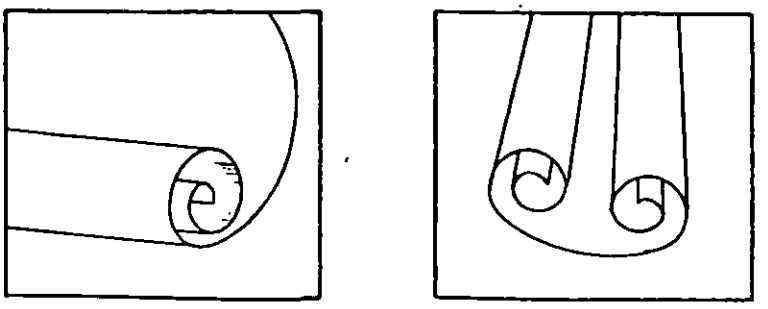
Civil agency coordinating activity:

GSA - FSS

Preparing activity:

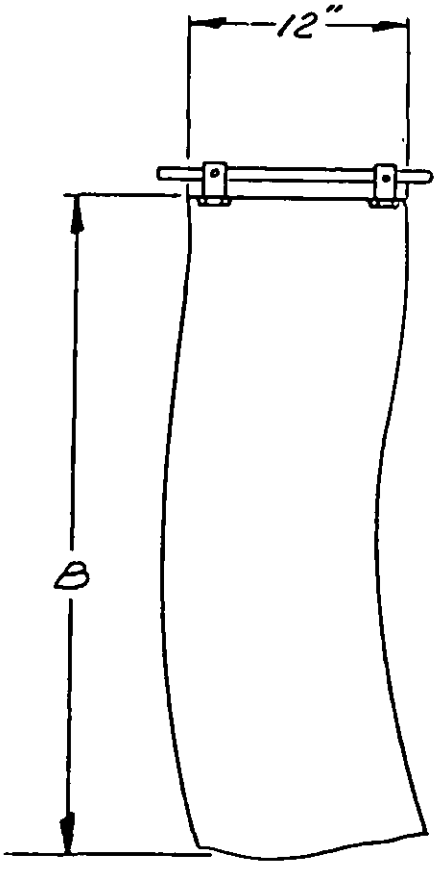
Army - GL

(Project 8135-0613)



EXAMPLE OF FAILURE

FIGURE 1. Resistance to curl.



(SEE 4.5.1)

FIGURE 2. Resistance to curl measurement.

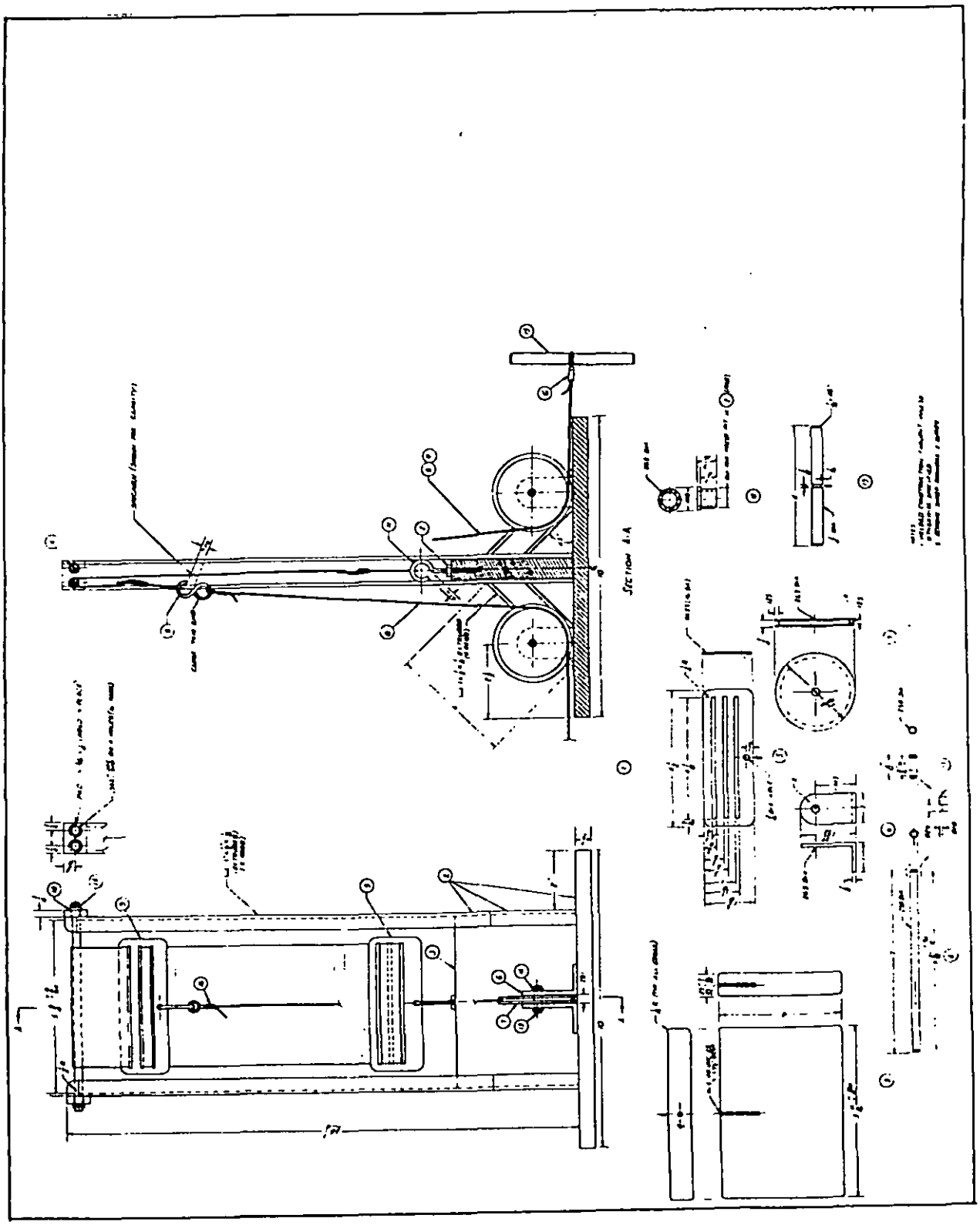


FIGURE 3. Low temperature flexibility apparatus.

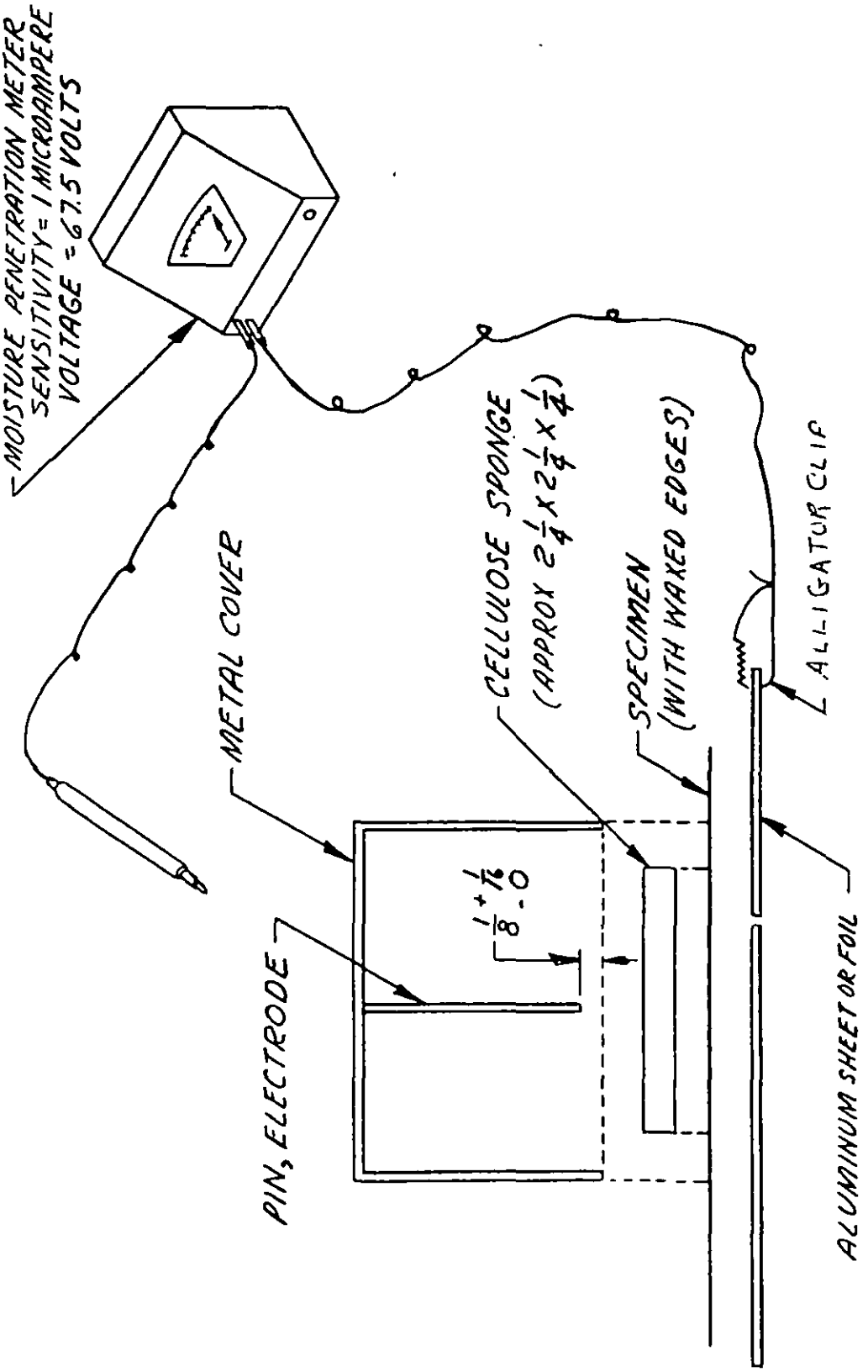


FIGURE 4. Pin-cover electrode waterproofness test assembly.

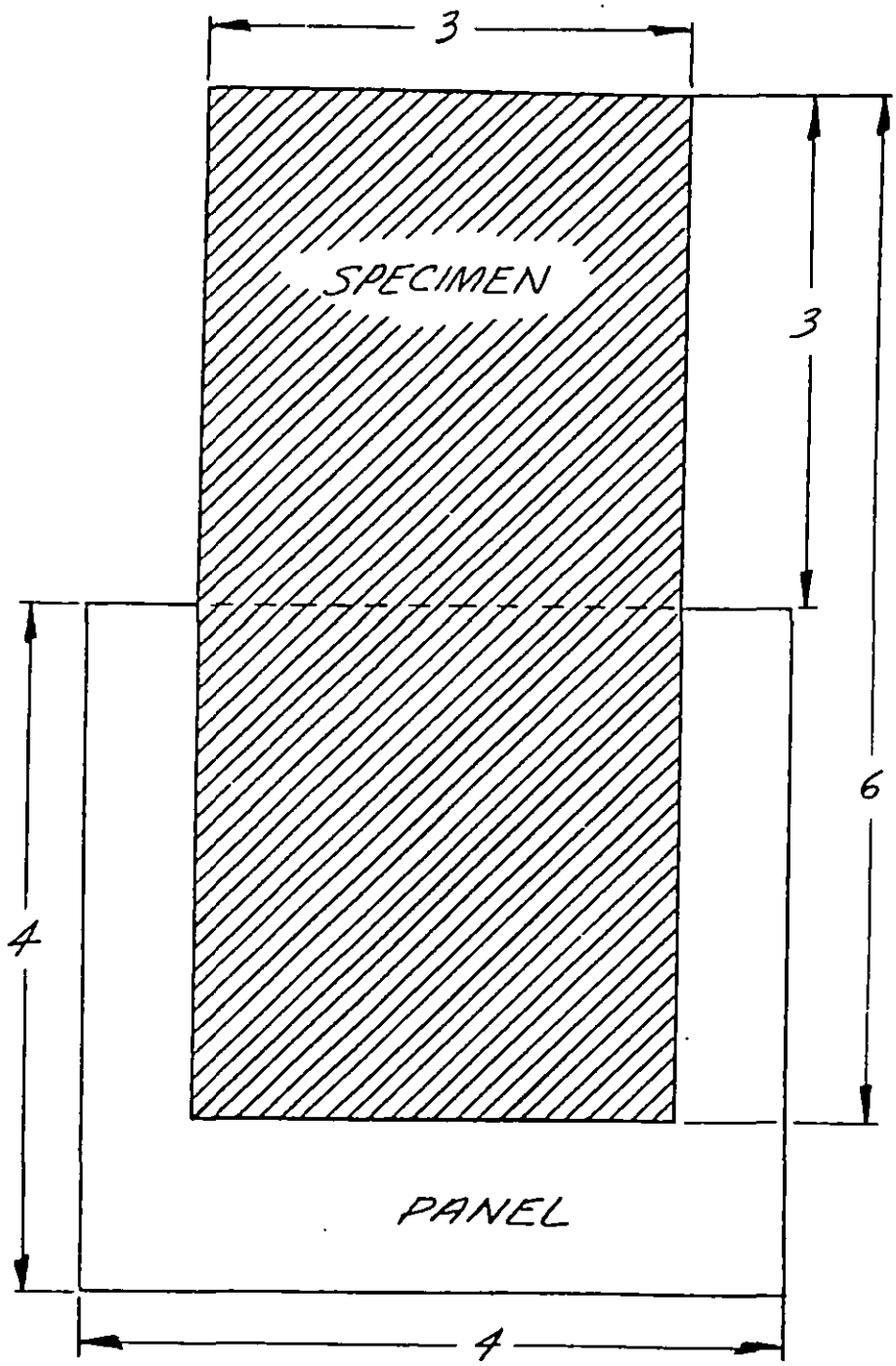


FIGURE 5. Self-adhesion assembly.

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NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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