

FEDERAL SPECIFICATION

TAPE: PACKAGING, WATERPROOF

This specification is approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal Agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification states the requirements for waterproof tape used in the closure and sealing of fiberboard containers, covering exterior labels and general packaging applications (see 6.1).

1.2 Classification.

1.2.1 The waterproof tape shall be of the following types and classes as specified (see 6.2):

Type III - Film Backing
Class 1 - colored
Class 2 - transparent

Type IV - Woven cloth backing
Class 1 - colored

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of the specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

SPECIFICATION

FEDERAL

PPP-T-680

Tape, Pressure-Sensitive Adhesive: Packaging and Packing of

STANDARD

FEDERAL

FED-STD-595

Colors

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration, Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, Philadelphia, PA 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 regions.)

(Copies of Military Specifications and Standards required by contractors in connection with specification acquirement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 3330	Test Method for Peel Adhesion of Pressure-Sensitive Tape at 180-Degree Angle
D 3611	Practice for Accelerated Aging of Pressure-Sensitive Tapes
D 3652	Test Method for Thickness of Pressure-Sensitive and Gummed Tapes
D 3654	Test Method for Holding Power of Pressure-Sensitive Tapes
D 3662	Test Method for Bursting Strength of Pressure-Sensitive Tapes
D 3715	Quality Assurance of Pressure-Sensitive Tapes

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) (Continued)

D 3759	Test Method for Tensile Strength and Elongation of Pressure-Sensitive Tapes
D 3811	Test Method for Unwind Force of Pressure-Sensitive Tapes
D 3813	Test Method for Curling and Twisting on Unwinding of Pressure-Sensitive Tapes
D 3815	Practice for Accelerated Aging of Pressure-Sensitive Tapes by Carbon-Arc Exposure Apparatus
D 3816	Test Method for water Penetration Rate of Pressure-Sensitive Tapes
D 3833	Test Method for Water Vapor Transmission of Pressure-Sensitive Tapes

(Application for copies by Federal activities should be addressed to the Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Application for copies by industry should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY (TAPPI)

TAPPI T 414 om-82 Internal Tearing Resistance of Paper

(Copies of TAPPI standards may be obtained from the Technical Association of the Pulp and Paper Industry, P.O. Box 105113, Atlanta, GA 30348.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article inspection. Unless otherwise specified, tape submitted for acceptance shall first be subjected to first article inspection (see 4.4, 4.5.1, 6.2 and 6.4).

3.2 Materials. The materials used in the construction of the waterproof tape shall be such as to assure performance of the tape over the temperature range of -65°F to +160°F (-54°C to 71°C) and shall conform to the requirements of this specification.

3.2.1 Backing. The manufacturer shall, when specified in the contract or order (see 6.2), certify that the backing complies with the following applicable requirements:

3.2.1.1 Type III. Type III backing material shall be plastic film.

3.2.1.2 Type IV. Type IV backing shall be a woven fabric cloth having a count necessary to meet functional product properties. The running length of the fabric shall be in the warp direction.

3.2.2 Adhesive. The adhesive shall be pressure-sensitive, water insoluble and shall require no moisture, heat or other preparation prior to or after application to clean, dry surfaces. The adhesive shall be coated in a smooth and evenly distributed layer on one side of the backing (see 4.5.3.1).

3.3 Finished tape.

3.3.1 Rolls. The tape shall be evenly wound in rolls, adhesive side in, on cores made of paper-fiber or plastic. The core shall have sufficient rigidity to prevent distortion of the roll under normal conditions of transportation and use. Unless otherwise specified (see 6.2), the core shall be 3 inches, $+1/16 -0$, inch, inside diameter. When the roll is unwound, the backing shall not tear, and the adhesive shall not transfer or split from the face of the tape to the back of the adjacent layer (see 4.5.3.1).

3.3.1.1 Length and width. Unless otherwise specified (see 6.2), the length of the roll shall be 60 yards and the width of the roll shall be 1-1/2, 2, 3, 4, 6 inches or other commercially available widths. A tolerance of $+ 1/32$ inch shall be allowed on all widths (see 4.5.3.1).

3.3.1.2 Splices. The tape shall consist of a single length of tape, except any single roll may contain a maximum of 2 splices. The splices shall be such that they will not separate when the roll is unwound (see 4.5.3.1).

3.3.1.3 Marking of core. Unless otherwise specified and except as noted in 6.3, the core of each roll of tape shall be marked on the inside or on the edge with numerals or letters indicating the month and year of manufacture (i.e., 5/86), specification number, type and class of tape. In addition, the manufacturer's name and designation of the product shall be marked in the core.

3.3.2 Color and transparency.

3.3.2.1 Color. The color of type III, class 1 and type IV, class 1 tape shall correspond reasonably in shade to the applicable color card number(s) of Federal Standard No. 595 as shown in table I (see 6.2).

3.3.2.2 Transparency. Class 2 tape shall be sufficiently clear and transparent to allow easy reading of 10 point type when tape is applied directly over the printed matter (see 4.5.3.1).

TABLE I. Color card numbers.

Color	High gloss	Semi-gloss	Lusterless
Red	11136	21136	31136
Olive drab	X14087	X24087	X34087
Dark green	14110	24108	34108
Black	17038	27038	37038
White	17875	27875	37875
Tan	---	20450	30450

3.4 Physical properties. The tape shall comply with the physical requirements listed in table II (see 4.5.3.2). (Note: The condition of the roll of tape after accelerated aging must be such that the unwinding of the roll shall be as required by the test procedure and the roll's use; otherwise the roll shall be considered defective.)

TABLE II. Physical requirements.

Property	Type III		Type IV	Reference paragraph or table III
	Class 1	Class 2	Class 1	
Adhesion, oz./in. width, min.				
At 73°F (23°C)				
As received	50	50	40	table III
Aged	45	45	30	table III
Weathered	45	N/A ¹	25	table III
To own backing				
As received	15	N/A	15	4.6.1.5
Aged	15	N/A	15	4.6.1.5
Bursting strength, min. psi	90	90	65	table III
Curling, inches, max.				
As received	2	2	2	table III
Aged	2	2	3	table III
Holding power, minutes, min.				
At 73°F (23°C) to fiberboard				
As received	2000	2000	45	4.6.1.2
Aged	2000	2000	45	4.6.1.2
At 150° (65.5°C) to steel				
As received	5760	5760	1440	4.6.1.2
Aged	5760	5760	1440	4.6.1.2
Roll distortion, inches, max.				
Radius	0.5	0.5	0.5	4.6.1.3
Width	0.5	0.5	0.5	4.6.1.3

TABLE II. Physical requirements (continued).

Property	Type III		Type IV	Reference paragraph or table III
	Class 1	Class 2	Class 1	
Tear resistance, gr., min., weaker direction	N/A	N/A	350	table III
Tensile strength, lbs/inch width, min.				
Longitudinal	45	45	40	table III
Transverse	45	45	N/A	table III
Thickness, inches, max.	0.004	0.004	0.015	table III
Twisting, degrees, max.				
As received	180	180	360	table III
Aged	180	180	450	table III
Unwind, lbs/inch width, max.				
As received	4	4	4	table III
Aged	4	4	4	table III
Water penetration rate gr./100 in. ² /24 hrs., max.	3.0	3.0	5.0	table III
Water vapor transmission rate gr./100 in. ² /24 hrs., max.	1.0	N/A	N/A	table III

N/A - Not applicable.

1 - See requirement for type III, class 2 in paragraph 3.4.2.

3.4.1 Holding power. When tested at 73°F (23°C) and at 150°F (65.5°C) both as received and aged as described in 4.6.1.2, the tape under test shall not show creeping or slippage in excess of 1/8 inch within the time specified in table II.

3.4.2 Weathering. After exposure as specified in ASTM D 3815, table III, the color of type III, class 1 and type IV, class 1 tape shall not have faded to the extent that it is not similar to the original color. Type III, class 2 tape shall meet the transparency requirements of 3.3.2.2 after exposure as specified in 4.6.1.4. The tape shall exhibit no curling at the edges, blistering or separation from the test panel. The tape shall conform to the adhesion requirement of table II. The specimen shall not be removed from the panel before testing for adhesion.

3.5 Workmanship. The tape shall be uniformly constructed and free from defects which impair the usefulness of the material for the purpose intended. The adhesive coating shall be uniform, covering the entire area of one side of the tape. Edges shall be clean cut, straight and unbroken. Rolls shall be evenly wound and the finished product shall conform to the levels of quality established herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of Sections 3 and 5. The inspections 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

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

- a. First article inspection (4.4).
- b. Quality conformance inspection (4.5).

4.3 Inspection conditions. Unless otherwise specified all inspections shall be performed in accordance with the test conditions specified in the applicable test procedures in 4.6.1.

4.4 First article inspection. First article inspection shall include all examinations and tests of this specification except Section 5. Unless otherwise specified, no tape shall be submitted for acceptance under any contract or order until the first article samples prescribed in 4.4.1 have been subjected to first article inspection and pronounced satisfactory by the acquiring activity (see 3.1, 6.2 and 6.4). However, approval of the first article samples shall not relieve the supplier of his obligation to meet the quality conformance inspection (4.5).

4.4.1 First article test samples. Samples for first article inspection shall consist of five rolls of two inch wide tape which have been produced by the contractor using the same production process, procedures and equipment as will be used in fulfilling the contract. Samples shall be forwarded to and tested at a test laboratory approved by the Naval Air Development Center for conducting the first article inspection tests. Information on approved test laboratories may be obtained from the Commander, Naval Air Development Center, Code 6062, Warminster, PA 18974-5000. Samples shall be plainly marked with the following information:

Tapes, Pressure-Sensitive Adhesive, Waterproof,
 for Packaging and Miscellaneous Utility Applications
 Samples of material for first article inspection testing
 (indicate type and class)
 Name of manufacturer (plant in which material is manufactured)
 Manufacturer's designation
 Date of manufacture
 Submitted by (name) (date) for Contract No.

The manufacturer shall submit a copy of test results with the samples showing conformance with the first article inspection requirements of this specification (see 3.1, 6.2 and 6.4).

4.4.2 Rejection. If any sample fails to comply with any of the applicable requirements, the first article sample shall be rejected. The Government reserves the right to terminate its inspection upon any failure of the sample to comply with any of the stated requirements.

4.4.3 First article samples and inspection for a subsequent contract. If a contractor has previously furnished the tape in accordance with the requirements of this specification and his product has been found satisfactory, the requirement for a first article sample and its submittal for any subsequent contract or order may be waived at the discretion of the acquiring activity.

4.5 Quality conformance inspection. Quality conformance inspection shall consist of all of the requirements of this specification except the following:

Adhesion after aging	(table III)
Curling after aging	(table III)
Holding power after aging	(table III)
Roll distortion	(4.6.1.3)
Twisting after aging	(table III)
Unwind after aging	(table III)
WPR	(table III)
WVTR	(table III)

4.5.1 Certification. The manufacturer shall certify that there has been no formulation or process change from that which resulted in the production of the first article inspection sample (see 3.1, 4.4, 5.2 and 6.4).

4.5.2 Lot size. Lot size shall be as specified for the applicable inspection (see 4.5.3).

4.5.3 Sampling and inspection procedures.

4.5.3.1 End item examination. The lot sizes and sampling for visual inspection shall be as specified in the end item examination, 6.3 of ASTM 3715. Sample unit shall be one roll of tape.

4.5.3.2 End item testing. Lot size and sampling for end item testing shall be as specified in end item testing, 6.4 of ASTM D 3715. The AQL shall be 4.0 percent.

4.5.3.3 Packaging. Lot size, sampling and inspection procedures and AQL shall be in accordance with Section 5 and PPP-T-680.

4.6 End-item testing. The end-item shall be tested for conformance with the physical requirements in table II. Only one test specimen shall be selected from each unit of product for each test except where the test method specifically requires more than one specimen. In the latter case, the value used to represent any single unit of product for that quality characteristic shall be the one specified to be reported in the test method.

4.6.1 Test procedures. The tests shall be conducted in accordance with the test methods in table III, and 4.6.1.1 through 4.6.1.6.

TABLE III. Test methods.

Test	Method
Adhesion, as received and aged	ASTM D 3330 Procedure A
Bursting strength	ASTM D 3662
Curling as received and aged	ASTM D 3813
Holding power	ASTM D 3654 ^{1/}
Tearing resistance	TAPPI T 414
Tensile strength	ASTM D 3759
Thickness	ASTM D 3652
Twisting, as received and aged	ASTM D 3813
Unwinding, as received and aged	ASTM D 3811
Water penetration rate	ASTM D 3816
Watervapor transmission rate	ASTM D 3833
Weathering (72 hours) (type III, class 1 and type IV, class 1)	ASTM D 3815

^{1/} Mosinee Paper Corporation, Mosinee, WI 54455, telephone 715/693-2111. Mosinee paper, 767, 120# basis wt., neutral pH paper may be used as a substitute for the Std. Ref. Mtl. 1810, specified in ASTM D 3654.

4.6.1.1 Accelerated aging.

4.6.1.1.1 Type III, class 1 and type IV, class 1. All rolls of these tapes selected for testing of aged material shall be conditioned as described in ASTM D 3611 (see 3.4.2).

4.6.1.1.2 Type III, class 2. All rolls of tape selected for testing of aged material shall be conditioned as described in ASTM D 3611 except the oven temperature shall be 120°F (49°C) (see 3.4.2).

4.6.1.2 Holding power.

4.6.5.2.1 Holding power, type III, classes 1 and 2 at 73°F (23°C). The holding power for type III, class 1 and 2 tapes shall be conducted as described in ASTM D 3654, Procedure A, except the area adhered to the test panel shall be 1.0 by 1.0 inch (see 3.4.1).

4.6.1.2.2 Holding power, type IV, class 1 at 73°F (23°C). The holding power for type IV, class 1 tape shall be conducted as described in ASTM D 3654, Procedure A, except the test surface shall be the steel panel, and the area adhered to the test panel shall be 1.0 by 1.0 inches (see 3.4.1).

4.6.1.2.3 Holding power, type III, classes 1 and 2 at 150°F (65.5°C). The holding power for type III, classes 1 and 2 shall be conducted as described in ASTM D 3654, Procedure A, except the test area shall be 1.0 by 1.0 inches, the oven maintained at 150°F (65.5°C) and the test mass shall be 100 g (see 3.4.1).

4.6.1.2.4 Holding power, type IV, class 1 at 150°F (65.5°C). The holding power for type IV, class 1 tape shall be conducted as described in ASTM D 3654, Procedure C, except the test area shall be 1.0 by 1.0 inches, the oven maintained at 150°F (65.5°C) and the test mass shall be 100 g (see 3.4.1).

4.6.1.3 Roll distortion. The evaluation of the roll distortion shall be made through the comparison of the two principal dimensions of the sample rolls of tape before and after accelerated aging (see table II). The measurement of the difference between the largest and smallest diameters shall be made with a ruler graduated in 1/32 of an inch or vernier calipers. The individual roll distortions shall be averaged and shall be reported to the nearest 1/32 of an inch.

4.6.1.4 Weathering, type III, class 2 only. The specimen shall be prepared and exposed as described in ASTM D 3815 for 72 hours except the specimen shall be 2 inches wide and shall be applied for a 1-inch wide strip of white bond paper printed with 10 point type. The strip of paper shall be 6 inches long and tape shall be centered over it (see 3.4.2).

4.6.1.5 Adhesion to backing. The adhesion to backing procedure shall be as described in ASTM D 3330 Procedure A except that the test panel shall first be covered with a strip of the tape under test. Adhesion specimen is then applied to this strip (see table II).

4.6.1.6 Color. The color of the tape shall be determined by visual comparison with color chips described in Federal Standard No. 595. Specular gloss need not be considered nor measured. The tape sample shall be prepared by applying three layers of tape to a card cut to approximately 3 inch by 5 inch size (see table I).

5. PACKAGING

5.1 Preservation, packing and marking. The preservation, packing and marking shall be in accordance with the requirements of PPP-T-680 as specified for the applicable levels of packaging (see 6.2).

6. NOTES

6.1 Intended use. The tapes covered by this specification are intended for use when packaging and sealing performance against water penetration and low temperatures are desired. The word "packaging" as used in the title and for describing these tapes refers to the broad concept rather than the more limited one used in 5.1. Packaging in the broad concept is a coordinated system of preparation of goods for shipment, distribution, storage and merchandising at optimum costs compatible with the requirements of the product. Type III, class 1 tape is to be used in packaging application where waterproofness, high strength and resistance to rain, sunlight and other deteriorating elements are required. Type III, class 2 tape is to be used in attaching, covering and protecting labels both interior and exterior containers. It may also be used for closing and sealing containers where a transparent packaging tape is desired. Type IV, class 1 tape is to be used for less critical packaging demands and cloth tape is desired.

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

- a. Title, number and date of this specification.
- b. Type and class required (see 1.2.1).
- c. Core size if other than 3 inch (see 3.3.1).
- d. Length and width of tape required (see 3.3.1.1).
- e. Color required (see 3.3.2.1).
- f. Selection of applicable levels of preservation and packing (see 5.1).
- g. First article inspections are not required (see 3.1).
- h. Backing must be certified (see 3.2.1).

6.3 Marking core. When tape conforming to this specification is to be used by a subcontractor in preparing supplies under Government contract, the marking of the core (see 3.3.1.3) is not required.

6.4 Contract data requirements. When this specification is used in a procurement which incorporates a DD Form 1423 and invokes the provisions of 7-104.9(n) of the Defense Acquisition Regulations, the data requirements identified below will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of DAR 7-104.9(n) are not invoked, the data specified below will be delivered by the contractor in accordance with the contract requirements. Deliverable data required by this specification is cited in the following paragraphs:

<u>Paragraph</u>	<u>Data Requirement</u>	<u>Applicable DID</u>
4.4.1	First Article Inspection Reports	DI-T-4902
4.4 and 4.4.1	First Article Inspection Procedure	DI-T-4901

(Copies of data item descriptions required by the contractors in connection with specific procurement functions should be obtained from the acquiring activity or as directed by the contracting officer.)

MILITARY INTERESTS:

Custodians:

- Army - GL
- Navy - AS
- Air Force - 69

Review Activities:

- Army - ME, ER, AV, AR
- Navy - SH, SA, YD, MC, OS
- Air Force - 99

User Activities:

- Army - SM

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - AS

DOD Project 7510-0340

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER

PPP-T-60E

2. DOCUMENT TITLE

TAPE; PACKAGING WATERPROOF

3a. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION (Mark one)

VENDOR

USER

MANUFACTURER

OTHER (Specify): _____

b. ADDRESS (Street, City, State, ZIP Code)

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER (Last, First, MI) - Optional

b. WORK TELEPHONE NUMBER (Include Area Code) - Optional

c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional

8. DATE OF SUBMISSION (YYMMDD)

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