



Designation: **D5749 – 17** **D5749 – 24**

## Standard Specification for Reinforced and Plain Gummed Tape for Sealing and Securing<sup>1</sup>

This standard is issued under the fixed designation D5749; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

### 1. Scope\*

1.1 This specification covers plain and reinforced paper gummed adhesive tapes suitable for securing and banding paper products and closing fiberboard boxes.

1.2 This specification is intended to replace Fed. Specs. CID A-A-1492, CID A-A-1671, and PPP-T-45 in part.

1.3 The values stated in SI units are to be regarded as standard. The values given in parentheses are for information only.

1.4 The following safety hazards caveat pertains only to the test methods portion, Section 11, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

[D685 Practice for Conditioning Paper and Paper Products for Testing](#)

[D828 Test Method for Tensile Properties of Paper and Paperboard Using Constant-Rate-of-Elongation Apparatus](#)

[D996 Terminology of Packaging and Distribution Environments](#)

[D1974/D1974M Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes](#)

[D3951 Practice for Commercial Packaging](#)

#### 2.2 TAPPI Standards:

[T 401 Fiber Analysis of Paper and Paperboard](#)<sup>3</sup>

[T 410 Weight per Unit Area \(Basis Weight or Substance\)](#)<sup>3</sup>

[T 414 Internal Tearing Resistance of Paper \(Elmendorf-Type Method\)](#)<sup>3</sup>

[UM 575 Water Resistance of Adhesive Bond in Laminated Paper and Paperboard](#)<sup>3</sup>

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.14 on Tape and Labels. Current edition approved April 1, 2017/March 1, 2024. Published June 2017/March 2024. Originally approved in 1995. Last previous edition approved in 2012/2017 as D5749 – 04/D5749 – 17. (2012). DOI: 10.1520/D5749-17-10.1520/D5749-24.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from Technological Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Suite 115, Peachtree Corners, GA 30092, http://www.tappi.org.

\*A Summary of Changes section appears at the end of this standard

2.3 *ANSI/ASQC Standards:*

[ANSI/ASQC Z 1.4 Sampling Procedures and Tables for Inspection by Attributes](#)<sup>4</sup>

[ANSI/ASQC Z 1.9 Sampling Procedures and Tables for Inspection by Variables for Percent Defective](#)<sup>4</sup>

2.4 *Federal Specifications:*

[PPP-T-45 Tape, Gummed, Paper, Reinforced and Plain, for Sealing and Securing](#)<sup>5</sup>

[PPP-T-681 Tape, Gummed, Packaging and Packing of](#)<sup>5</sup>

[CID A-A-1492 Commercial Item Description Tape, Gummed, Paper, Plain](#)<sup>5</sup>

[CID A-A-1671 Commercial Item Description Tape, Gummed, \(Paper, Reinforced, Laminated\)](#)<sup>5</sup>

2.5 *ISO Standard:*

[ISO 9002 Quality Systems Model for Quality Assurance in Production and Installations](#)<sup>4</sup>

### 3. Terminology

3.1 *Definitions*—General definitions for packaging and distribution environments are found in Terminology [D996](#).

### 4. Classification

4.1 *Type I Reinforced, ~~Laminated~~ Laminated (typically non-unitized loads):*

4.1.1 *~~Class 1~~ Grade A Strippable Light duty.*

4.1.2 *~~Class 2~~ Grade B Nonstrippable Medium duty.*

4.1.3 *Grade C Heavy duty.*

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<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

<sup>5</sup> Available from U.S. Government Publishing Office, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.gpo.gov>. Federal specifications are available online at ASSIST Quick Search, <https://quicksearch.dla.mil/>.

4.2 ~~Type II Plain, Single Ply, Strippable~~-Ply (typically unitized loads):

4.2.1 *Grade A*—Light duty, for lightweight packages.

4.2.2 *Grade B*—Medium duty, for medium-sized packages.

4.2.3 *Grade C*—Heavy duty, for heavy-duty packages.

## 5. Significance and Use

5.1 Type I is a reinforced gummed tape ~~which may be strippable (Class 1) or nonstrippable (Class 2). It is intended for use in Methods 2C2, 2C3, and any other closing methods in Practice D1974/D1974M: for domestic storage and shipments of fiberboard boxes, or closing wrappers of packages and banding of paper and paper products.~~

5.2 Type II is a plain ~~paper-backed nonstrippable gummed tape. It is paper gummed tape intended for use in Methods 2C4, 2C5, and other closing methods in Practice D1974/D1974M: for general closing of fiberboard boxes or wrappers of packages; or for protection against abrasion on fragile products.~~

## 6. Ordering Information

6.1 The inquiry or order shall include the following:

6.1.1 ASTM designation and date of issue,

6.1.2 ~~Type, class, Type~~ and grade required (5.1),

6.1.3 ~~When core plugs are~~ If a core is required (7.7),

6.1.4 If tape is to be wound gummed side out (7.7),

6.1.5 Roll width and length (9.1 and 9.2),

6.1.6 Acceptance sampling plan and desired acceptance quality level (Section 12),

6.1.7 ~~When backing certification~~ paper certification is required (15.1),

6.1.8 When testing and inspection certification is required (15.1),

6.1.9 Level of packaging and packing if other than commercial (Section 17), and

6.1.10 When packaging for shipments to the U.S. ~~Government~~ (Government) (17.2).

## 7. Materials and Manufacture

7.1 The materials used in the construction of the tape shall be such as to ensure performance of the tape over the range of ~~–55 to +71°C (–65 to +160°F) service conditions and the following service conditions: –18 °C to +60 °C (0 °F to +140 °F) for Type I and –34 °C to +204 °C (–30 °F to +400 °F) for Type II~~ and shall conform to the requirements of this specification.

### 7.2 Paper:

7.2.1 *Stock*—The paper used in the fabrication of the tape shall be a kraft paper. The use of recycled pulp in the paper is encouraged.

7.2.2 *Weight*—The weight of the paper prior to gumming shall conform to the requirement of Table 1, when tested as described in TAPPI T 410.

TABLE 1 Weight of Ungummed Paper

	Minimum Weight	
	(24 × 36 — 500 sheets)	lb/ream
Type I, Classes 1 and 2	30	43
Type I		
Grade A	65	40
Grade B	73	45
Grade C	81	50
Type II		
Grade A	57	35
Grade B	90	55
Grade C	138	85

7.3 *Adhesives*—The adhesives used shall not have an offensive odor (dry or wet) and shall meet the environmental considerations of 16.1. Adhesive shall be capable of being quickly activated with water. The wetted adhesive shall show pronounced tackiness and shall cause the tape to remain so firmly affixed that it cannot be removed without failure of either the tape or paper when tested in accordance with 13.6.1.

7.3.1 Type I, Class 1 adhesive shall be capable of being quickly activated with water. The wetted adhesive shall show pronounced tackiness and shall cause the tape to remain so firmly affixed that it cannot be removed without leaving a thin film of paper from the tape on the test paper, when tested in accordance with 13.6.1.

7.3.2 Type I, Class 2, and Type II adhesive shall be capable of being quickly activated with water. The wetted adhesive shall show pronounced tackiness and shall cause the tape to remain so firmly affixed that it cannot be removed without failure of either the tape or paper when tested in accordance with 13.6.1.

7.4 *Reinforcing Materials*—The reinforcing fibers used in fabricating Type I tapes shall be composed of glass or polyester, or both, glass, polyester, both, or other suitable fibers, of such size as to permit the reinforced tape to meet the requirements set forth in Table 2 when tested as described in 13.5.

7.5 *Laminating Materials*—The laminating material for Type I tape shall be non-asphaltic, water resistant, flexible, and non-staining. Water resistance of the finished tape shall be tested in accordance with TAPPI UM 575:UM 575 using a 2 h soak for commercial use and a 24 h soak for DoD use. Test specimen dimension can be as specified in UM 575, or 25.4 cm (10 in.) by tape width.

7.6 *Construction*—*Construction*: Type I tape shall consist of two strips of paper in roll form, securely laminated together with reinforcing fibers embedded in the laminate. The reinforcing laminated tape shall be completely and uniformly coated on one side with an adhesive.

TABLE 2 Physical Properties

Type	Tensile Strength, kN/m (lb/in.) min		Tearing Resistance, grams force (mN) min <sup>A</sup>	
	Machine direction	Cross direction <sup>B</sup>	Machine direction	Cross direction
Type I	11 (63)	5.25 (30)		
Type I				
Grade A	9 (50)	3.5 (20)	N/A	N/A
Grade B	12 (70)	4.4 (25)	N/A	N/A
Grade C	14 (78)	4.9 (28)	N/A	N/A
Type II				
Grade A	4.5 (26)		540 (55)	647 (66)
Grade A	4.0 (23)	1.8 (10)	540 (55)	647 (66)
Grade B	8 (45)		1109 (113)	1315 (134)
Grade B	7.4 (42)	3.5 (20)	1109 (113)	1315 (134)
Grade C	12 (68)		1991 (203)	2197 (224)
Grade C	11.0 (63)	4.4 (25)	1991 (203)	2197 (224)

<sup>A</sup>This requirement does not apply to tapes less than 63 mm (2.5 in.) in width. Tested in accordance with TAPPI T 414. 1/4 in. in width.

<sup>B</sup>This requirement does not apply to tapes less than 76 mm (3 in.) in width.

7.6.1 ~~The Type I tape shall consist of two strips of paper in roll form, securely laminated together with reinforcing fibers embedded in the laminate. The reinforcing laminated tape shall be completely and uniformly coated on one side with an adhesive. The tape shall be reinforced by not less than 2 fibers/25 mm (1 in.) fibers/25 mm (1 in.) on average in both the machine and crosswise directions. If a diamond pattern is employed for crosswise reinforcement, the spacing between the parallel sides of the diamond shall not be more than 32 mm (1.25 in.) 32 mm (1.25 in.). In addition to the diamond-patterned reinforcement, a three-way tape shall be reinforced in the machine direction by not less than 2 fibers/25 mm (1 in.) fibers/25 mm (1 in.) on average.~~

7.6.2 Type II tapes, all grades, shall consist of one strip of paper in roll form of the applicable grade, completely and uniformly coated on one side with an adhesive.

7.7 ~~Rolls—Unless otherwise specified, the tape shall be evenly wound and tightly wound in rolls with the gummed side in (6.1.4). Type II shall be wound on a core having sufficient rigidity to prevent distortion of the roll under normal conditions of transportation and use. The I and Type II tapes shall not be required to have a core. If a core is required, then the inside diameter of the core shall be not less than 13 mm 13 mm (1/2 in.). When specified, Type II tape shall have the core secure with a plug (in.). 6.1.3. Type I tape shall not be required to have a core. The end of the outer leaf of the tape shall be adhered to the next layer to prevent unwinding. The tape in each roll shall be furnished in one continuous length and have no more than three splices per roll. All splices shall be neatly and evenly made with glue or double-sided double-sided pressure sensitive tape and shall not separate upon unwinding.~~

## 8. Physical Properties

8.1 The tape shall meet the physical property requirements in [Table 2](#).

## 9. Dimensions, Mass, and Permissible Variations

9.1 The width of the roll for Type I shall be ~~70, 72, and 76 mm (2.75, 2.82, and 3 in.); 70 mm, 72 mm, and 76 mm (2.75 in., 2.82 in., and 3 in.);~~ For Type II ~~25, 38.5, 50, 70, and 76 mm (1, 1.64 mm and 76 mm (2.5 in. 1/2, 2, 2.75, and 3 in.) and 3 in.).~~ Other widths may be commercially available.

9.1.1 A width tolerance of  ~~$\pm 1.5$  mm  $\pm 1.5$  mm ( $\pm 1/16$  in.) in.)~~ shall be allowed on all widths.

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### 9.2 Length:

9.2.1 ~~Type I—The length of the roll shall be a minimum of 140 m (450 ft) or other commercially available lengths, available in 137 m (450 ft). Other lengths may be commercially available, as specified (6.1.5).~~

9.2.2 ~~Type II—The length of the ClassGrade A roll shall be 150 m (500 ft) or other commercially available length (available in 152 m 6.1.5) (500 ft). The length of the ClassGrade B roll shall be 185 m (600 ft), or other commercially available length (available in 185 m 6.1.5) (600 ft). The length of the ClassGrade C roll shall be 115 m (375 ft), or other commercially available length available in 115 m (375 ft). Other lengths may be commercially available, as specified (6.1.5).~~

## 10. Workmanship, Finish, and Appearance

10.1 The tape shall be clean and free of folds, sharp creases, tears, cuts, and holes. The adhesive coating shall cover the entire area of one side of the tape. The tape shall be cleanly cut without nicks, or ragged or fuzzy edges, and shall conform to the levels of quality established in this specification.

## 11. Specimen Preparation and Number of Tests

11.1 Specimen preparation shall be as specified in the appropriate test method.

11.2 The number of tests per unit of product shall be as specified in the appropriate test method or method [Table 2](#).

12. Sampling

12.1 *Inspection Levels*—The acceptance sampling plan inspection level shall be as specified in the purchase order or contract. If not otherwise specified (6.1.9), ANSI/ASQC 1.4 and ANSI/ASQC 1.9 shall be used with an acceptable quality limit (AQL) of 4 %.

13. Test Methods

13.1 *Responsibility for Inspection*—Unless otherwise specified in the contract or order, the manufacturer is responsible for the performance of all inspection requirements in this specification.

13.2 *Responsibility for Compliance*—All items must meet all requirements of Sections 7 through 17. The inspections set forth in this specification shall become part of the manufacturer’s overall inspection system or quality program for the contract or order. The absence of any inspection requirement in the specification shall not relieve the manufacturer of the responsibility of ensuring that all rolls of tape submitted for acceptance comply with all the requirements of the contract or order. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the buyer to accept defective material.

13.3 *Test of Component Materials:*

13.3.1 *Paper*—The paper component shall be tested for the stock requirements in 7.2.1 as described in TAPPI T 401 and for basis weight requirements in 7.2.2 as described in TAPPI T 410. The lot shall consist of all paper received at one time from one source of supply for use in fabrication of one type and grade of tape. The lot size shall be expressed in units of kilograms (pounds). The sample unit shall be 0.65 m<sup>2</sup> (1000 in.<sup>2</sup>) of paper. The sample size shall be as described in 12.1. The test reports shall include all values upon which results are based. There shall be no failures to meet the composite or lot average requirements. A composite shall consist of small portions taken from all sample units and combined into a single sample.

13.3.2 *Reinforcing Material*—The manufacturer shall submit a certification of compliance stating that the composition of the reinforcing material used in Type I tape is in conformance with the requirements of 7.4.

13.3.3 *Laminating Material*—The manufacturer shall submit a certification of conformance stating that the laminate of Type I conforms to the requirements of 7.5 as applicable.

13.4 *Inspection for the End Item*—The end item shall be examined for defects at the inspection levels and acceptable quality levels set forth in 13.4.1. Random samples shall be drawn from each lot of the end item for inspection for examination of visual, roll construction, and dimensions. The lot size shall be expressed in units of rolls for examination in 13.4.1, 13.4.2, and 13.4.3.

13.4.1 *Examination for Visual Defects*—The sample unit for this examination shall be (1 yd) of tape from the roll. Only one sample unit shall be taken from any roll. The sample shall be positioned randomly in all rolls examined, and the rolls shall be randomly selected from the lot. (See Table 3.)

13.4.2 *Examination for Defects in Roll Construction*—The sample unit for this examination shall be one roll. (See Table 4.)

13.4.3 *Examination of Defects in Dimensions*—The sample unit for this examination shall be one roll. (See Table 5.)

TABLE 3 Examination for Visual Defects

Examine	Defect
Form	Type, class, or grade not as specified
Form	Type or grade not as specified
Adhesive coating	Not coated on one side only Not uniform; bare spots or lumps Does not cover entire area Has offensive odor (dry or wet)
Construction (Type I)	Tape not securely laminated, any blister or ply separation
Workmanship	Any dirt, foreign matter, or slime spot Any hole, tear, cut, fold, or sharp crease