

L-T-100B
July 12, 1988
Supersedes
L-T-100A
August 30, 1960

FEDERAL SPECIFICATION

TAPE, PRESSURE-SENSITIVE ADHESIVE, POLYESTER FILM

This specification is approved by the Commissioner,
Federal Supply Services, GSA, for the use of all
Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. - This specification defines the requirements for pressure-sensitive tapes possessing a high degree of stability, solvent resistance, and designed for applications where the properties of a polyester film are desired (see 6.1).

1.2 Classification

1.2.1 Types. - The pressure-sensitive tapes covered by this specification shall be of the following types (see 6.2):

Type I - Transparent polyester solvent resistant.

Type II - Colored polyester solvent resistant.

2. APPLICABLE DOCUMENTS

2.1 Government Publications: The following documents, of the issues in effect on date of invitation for bids or request for proposal form a part of this specification:

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Federal Specifications:

TT-S-735 - Standard Test Fluids, Hydrocarbon
QQ-A-250/5 - Aluminum Alloy Alclad 2024, Plate and Sheet
PPP-T-680 - Tape, Pressure-Sensitive Adhesive: Packaging &
Packing of

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Auburn, WA.)

Military Specifications:

MIL-T-5624 - Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-L-7808 - Lubricating Oil, Aircraft Turbine Engine, Synthetic
Base
MIL-H-5606 - Hydraulic Fluid Petroleum Base, Aircraft, Missile,
and Ordnance

(Copies of Military specifications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the Contracting Officer.)

2.2 Other Publications: The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal will apply.

American Society for Testing and Materials (ASTM):

D 3330 - Peel Adhesion of Pressure-Sensitive Tape at 180
degrees Angle, Test for
D 3652 - Thickness of Pressure-Sensitive and Gummed Tapes,
Test for
D 3715 - Quality Assurance of Pressure-Sensitive Tapes,
Practice for
D 3759 - Tensile Strength and Elongation of Pressure-Sensitive
Tapes, Test for
D 3815 - Accelerated Aging of Pressure-Sensitive Tapes by Carbon-
Arc Exposure Apparatus, Practice for

Application for copies of ASTM documents should be addressed to the American Society for Testing and Materials; 1916 Race Street; Philadelphia, PA 19103.

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Technical Association of the Pulp and Paper Industry (TAPPI):

T 402 - Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets and Related products.

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

3. REQUIREMENTS

3.1 Material. - The tape backing shall consist of a nonhygroscopic solvent resistant polyester film coated on one side with a solvent resistant, water insoluble, pressure-sensitive adhesive requiring no moisture, heat or other preparation prior to application.

3.2 Physical Properties. The mean average of the test values for the tape shall comply with the Physical Property requirements listed in Table I.

3.3 Corrosion. There shall be no evidence of corrosion or pitting of the aluminum panels under the tape after the elevated temperature aging test (See 4.3.7).

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Table I - Physical Properties

| Property | Type I | Type II | Test Paragraph |
|---|--------|---------|----------------|
| Thickness, in. max | 0.003 | 0.003 | 4.3.4 |
| Tensile Strength, lb/in width | 17 | 17 | 4.3.4 |
| Elongation at Break (Percent minimum) | 70 | 70 | 4.3.4 |
| Adhesion (oz/in width) minimum | | | |
| Initial | 20 | 20 | 4.3.4 |
| After accelerated weathering | 50 | 50 | 4.3.5 |
| After 24 hrs. immersion in distilled water | 20 | 20 | 4.3.6 |
| After 72 hrs. immersion in Jet Engine Fuel Grade JP-4, (MIL-T-5624) | 20 | 20 | 4.3.6 |
| After 24 hrs. immersion in Standard Test Fluid Type II - (TT-S-735) | 15 | — | 4.3.6 |
| After 72 hrs. immersion in Hydraulic Fluid (MIL-H-5606) | 20 | 20 | 4.3.6 |
| After 24 hrs. immersion in Lubricating Oil (MIL-L-7808) | 20 | 20 | 4.3.6 |
| After 168 hrs. at 180 deg. F ± 5 deg. F | 50 | — | 4.3.7 |
| After 20 hrs. adhesive aging | 15 | 15 | 4.3.9 |
| Printing Stability | -- | -- | 4.3.8 |

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3.4 Rolls. - The tape shall be furnished in evenly and uniformly wound rolls, adhesive side in, on cores made of paper fiber or non-fibrous plastic. The cores shall have sufficient rigidity to prevent distortion of the roll under normal conditions of transportation, storage and use. The inside diameter core shall be 3 inches, -0 , $+ 1/16$ inch in 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.

3.5 Length and Width. - The length of the rolls shall be 72 yards (minimum). The width of the roll shall be $1/4$, $1/2$, $3/4$, 1, $1-1/2$, or 2 inches, or other commercially available widths, as specified (see 6.2). A tolerance of plus or minus $1/32$ inch shall be allowed on widths up to and including $3/4$ inch. The tolerance for widths over $3/4$ inch will be plus or minus $1/16$ inch.

3.6 Splices. - The tape shall consist of a single length of tape, except any single roll may contain a maximum of 3 splices. The splices shall be such that they will not separate when the roll is unwound.

3.7 Printing. - The Type I tape shall be capable of being printed on the adhesive side. When printing is required by the contract or purchase order, it shall be distinct, clear, and of proper size required thereto.

3.7.1 Print Transfer. - There shall be no transferring or offsetting of the ink from one lap of the tape to the adjacent lap either initially or after the print stability test. (See 4.3.8 and 4.3.8.1)

3.8 Color and Transparency. - Type I tape shall be furnished transparent only without added pigment. Type II tape shall be furnished in gold and silver or other commercially available colors as specified in the contract or order (see 6.2).

3.9 Workmanship. - Tapes shall be free from defects that affect serviceability or appearance in accordance with 4.2.1.

3.10 Age. - The tape shall be not more than 90 days of age from the date of manufacture to date of shipment.

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4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. - The contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the contractor may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government. The Government reserves the right to perform any of the inspections as deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 INSPECTION PROCEDURES

4.2.1 End Item Inspection. - Lot size, sampling and examination for this inspection shall be as specified in paragraph 6.3 of ASTM D 3715.

4.3 TEST PROCEDURES.

4.3.1 End Item Testing. - Lot size and sampling for this inspection shall be as specified for end item testing in paragraph 6.4 of ASTM D 3715. The AQL shall be 4.0 percent defective. Each unit of product shall be tested to the applicable requirements of Table I of this federal specification.

4.3.2 Specimens. - The first three plies of tape shall be removed from the rolls before taking specimens for testing. An equal number of specimens from all sample rolls shall be tested.

4.3.3 Conditioning. - The tape shall be conditioned for testing for not less than 24 hours at 73 degrees \pm 3.5 degrees F and 50 \pm 2 percent relative humidity, and shall be tested under these conditions.

4.3.4 Test Methods. - The following tests shall be conducted according to the following methods, as indicated:

| <u>Test</u> | <u>Method</u> |
|---------------------|-----------------------|
| Adhesion, initial | ASTM D 3330, Method A |
| Tensile, Elongation | ASTM D 3759 |
| Thickness | ASTM D 3652 |

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4.3.5 Accelerated Weathering. - Three 1-inch specimens of tape, selected and applied as described in ASTM D 3330 to aluminum alloy 5" by 2" plates conforming to QQ-A-250/5, shall be exposed as described in ASTM D 3815 for a total of 96 hours. After exposure and conditioning for 24 hours, the specimens shall be tested for adhesion as described in ASTM D 3330. The tapes shall not be removed from the aluminum panels prior to testing.

4.3.6 Adhesion After Immersion. - Two 1-inch wide specimens, selected and applied as described in ASTM D 3330 to aluminum alloy 2" by 5" plates conforming to QQ-A-250/5, shall be prepared for every fluid in which the adhesion of the tape to the test panel is to be evaluated. Two panels shall be completely immersed in each of the following test fluids: Distilled water; turbine fuel (MIL-T-5624, Grade JP-4); standard test fluid (TT-S-735 Type II); hydraulic fluid (MIL-H-5606); and lubrication oil (MIL-L-7808). After immersion for the time specified in Table 1, the panels shall be removed from the test fluid, and drained of excess fluid for 15 minutes. The specimens shall then be tested for adhesion as described in ASTM D 3330. The tape shall not be removed from the aluminum panels prior to testing.

4.3.7 Elevated Temperature Aging. - Five 1-inch specimens of the tape, selected and applied as described in ASTM D 3330 to aluminum alloy 2" by 5" plates conforming to QQ-A-250/5 shall be exposed in an air circulating oven maintained at 180 ± 5 degrees F for 168 hours. Evaluate for compliance to the requirements of Table 1. Cool the specimens at room temperature for 2 hours and test for adhesion as described in ASTM D 3330. After conducting the adhesion test examine the aluminum test panels for corrosion to determine compliance with the requirements of 3.3.

4.3.8 Printing Stability. - A roll of printed tape, previously tested for print transfer and offsetting (3.7) shall be placed on a perforated rack in an air-circulating oven maintained at 100 degrees plus or minus 5 degrees for a period of 24 hours. At the end of this period the roll shall be removed from the oven and conditioned for 2 hours under conditions cited in TAPPI test method T 402. The tape shall then be unwound from the freely rotating roll at 15-20 inches per second. The printing shall be distinct and clear and shall comply with the requirements of 3.7.

4.3.8.1 Printing Transfer. - Tape shall be unwound from a freely rotating roll at a rate of 15-20 inches per second. The tape removed in this manner shall be evaluated to determine whether it complies with the requirement of paragraph 3.7.1.

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4.3.9 Exposed Adhesive Aging. - A specimen of tape as described in ASTM D 3330 taken from each sample roll shall be tested as follows: Each strip shall be placed adhesive side exposed on a separate steel plate as described in ASTM D 3330. The tape specimen shall be secured to the panel at each end of the tape specimen strip by 2 separate 1/2 inch wide strips of the same tape so that a full 4-inch length of the test specimen remains exposed. The test assemblies shall be vertically mounted, exposing the adhesive side to the light, in a weathering apparatus as described in ASTM D 3815 and conditioned as specified in this method for a total exposure time of 20 hours. In this test no water spray shall be used. After exposure is completed, the test assemblies shall be removed from the weathering unit and conditioned at standard conditions, as described in ASTM D 3330 for 1 hour. The tape specimens shall then be removed from the steel panels and subjected to the adhesion test according to Method A of ASTM D 3330. Only the area of the tape specimen where the adhesive was openly exposed shall be tested.

5. PREPARATION FOR DELIVERY

5.1 Tape shall be prepared for delivery in accordance with the applicable levels of protection of Federal Specification PPP-T-680.

6. NOTES

6.1 Intended Use.

6.1.1 Type I - Type I tape is intended for uses where a high degree of resistance to solvents, oils and hydraulic fluid is required. Examples of such applications are in dissimilar metal separation on aircraft and covering of pressure-sensitive identification tapes used on fluid lines and wiring harnesses in aircraft, missiles and vehicles. It is also recommended for covering labels on shipping containers where exterior exposure is anticipated. Printing on the adhesive side of type I tape is intended for use where the printed message must be protected from weathering, solvents and abrasion.

6.1.2 Type II - Type II tape is intended for uses where weather resistant, long aging label (printed form) or decorative stripping or color coding is required. For a solvent resistant printed label, Type II, printed, and overlaid with Type I tape should be used.

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6.2 Ordering Data. - Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Type, width, and color (See 1.2.1, 3.5 and 3.8).
- (c) Selection of applicable levels of packaging and packing (see 5.1).

MILITARY INTERESTS:

Military coordinating activity:

Army - GL
Navy - SA
Air Force - 99

Preparing Activity:

GSA - FSS

Review activities:

Army - EA, ME
Air Force - 84
DNA - DS

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