

HH-I-595C
 April 9, 1976
 SUPERSEDING
 Fed. Spec. HH-I-595B
 February 24, 1972

FEDERAL SPECIFICATION

INSULATION TAPE, ELECTRICAL, PRESSURE-SENSITIVE ADHESIVE, PLASTIC

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the requirements of 80 deg. C (176 deg. F) polyvinyl chloride or copolymer of vinyl chloride and vinyl acetate, flame retardant, cold and weather resistant, pressure-sensitive, electrical insulating tape.

1.2 Classification. Insulation tape shall be furnished in the following width, lengths, and colors and identified by a type designation number.

1.2.1 Type designation number. Insulation tapes covered by this specification shall be identified by a type designation number formed as indicated below. This type designation number is intended for cataloging and ordering purposes and not for surface printing on the insulation tape.

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Spec. No. (1.2.2)	Width of tape (1.2.3)	Length of tape (1.2.4)	Color of tape (1.2.5)
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1.2.2 Insulation tape specification No. HH-I-595.

1.2.3 Width of tape shall be indicated as follows:

- A - 1/2 inch wide tape.
- B - 3/4 inch wide tape.
- C - 1 inch wide tape.

1.2.4 Length of tape shall be indicated as follows:

- 66 - 66 feet long
- 108 - 108 feet long

1.2.5 Color of tape shall be indicated as follows:

Number	Color	Number	Color
0	black	5	green
1	brown	6	blue
2	red	7	violet
3	orange	8	gray
4	yellow	9	white

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2. APPLICABLE DOCUMENTS

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

Federal Specifications:

- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-636 - Boxes, Shipping Fiberboard.
- PPP-B-665 - Boxesw, Paperboard, Metal Stayed.
- PPP-B-767 - Boxes, Setup.

Federal Standards:

- Fed. Std. No. 123 - Marking for Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers 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, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Specifications:

- MIL-P-116 - Preservation, Methods of.

Military Standards:

- MIL-STD-104 - Limit for Electrical Insulation Color.
- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.

(Copies of Military Specifications and Standards 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 shall apply.

American Society for Testing and Materials (ASTM):

- ASTM D 1000 - Pressure-Sensitive Adhesive Coated Tapes Used for Electrical Purposes.

(Copies may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103).

Underwriters' Laboratories (UL) Inc. Standards:

No. 510 - Insulating Tape.

(Application for copies should be addressed to the Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611; 1285 Walt Whitman Road, Melville, Long Island, New York 11746; or 1655 Scott Blvd. Santa Clara, California 95050.)

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, D.C. 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

3. REQUIREMENTS

3.1 Fire and casualty hazards. Each contractor shall submit to the contracting agency proof that the tape he proposes to supply under this specification conforms to the requirements of the Underwriters' Laboratories, Inc., Standard No. 510 for insulating tape. The label, or listing mark of the UL, may be accepted as evidence that the tape conforms to this requirement. Compliance with the above preliminary requirements in regard to fire and casualty hazards does not absolve the bidder from complete compliance with the requirements of this specification in order to secure acceptance of his material.

3.2 The tapes furnished under this specification shall be tested and bear the Federal verification mark of UL (see 3.6.2).

3.3 The tape shall be in accordance with UL 510 except where requirements herein exceed UL 510.

3.4 Dimensions.

3.4.1 Length. Unless otherwise specified (see 6.1), the length of tape in the roll shall be either 66 (20.1 m) feet long or 108 (32.9 m) feet long with a tolerance of minus 1.0 percent.

3.4.2 Width. The width of the tape shall be either 1/2 (12.7mm), 3/4 (19.05mm), or 1 inch (25.4mm) wide with a tolerance of +/- 1/32 inch (0.76mm).

3.4.3 Thickness. The thickness of the tape shall be 0.007 +/- 0.001 inch (0.178 +/- 0.025mm).

3.5 Marking. The marking of the roll shall be in accordance with UL 510.

3.6 Physical requirements.

3.6.1 The minimum average breaking strength for vinyl tape shall be 15 lb/in of width (see 4.4.3).

3.6.2 Flame retardant, cold and weather resistant. The tape shall be flame retardant, cold and weather resistant in accordance with UL 510 and paragraph 3.6.3 of this specification.

3.6.3 Low temperature requirements.

3.6.3.1 Adhesion strength to backing at 19.5 deg. F (-7.0 deg. C). The tape shall be tested for low temperature adhesion strength in accordance with 4.4.2.1. The minimum average adhesion strength shall be 16 ounces per inch of width.

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3.6.3.2 Unwind force at 19.5 deg. F (-7.0 deg. C). The tape shall be tested for low temperature unwind force in accordance with 4.4.2.2. The minimum average unwind force shall be 32 ounces/in. and the maximum average shall be 128 ounces/in. of width.

3.6.3.3 Static elongation at 19.5 deg. F (-7.0 deg. C). The tape shall be tested for low temperature static elongation in accordance with 4.4.2.3. The minimum average elongation shall be 15 percent.

3.7 Color. The color code of the tape shall be in accordance with paragraph 1.2.5.

3.8 Rolls. The tape shall be uniformly and smoothly wound in rolls with the adhesive side in without liner or separator on cores having an inside diameter of either 1 +/- 1/16 inch or 1-1/2 +/- 1/16 inch. The cores shall be of sufficient rigidity to prevent distortion of the roll under normal conditions of use. Each roll of tape shall contain no more than one splice.

3.9 Storage.

3.9.1 Gapping. The tape shall not gap, when stored in the original container, for a period of one year at ambient temperatures of 73 deg. F +/- 10% and 50% +/- 10% relative humidity.

3.9.2 Telescoping. The tape may telescope, when stored in the original container, up to a maximum of 1/4 inch for a period of one year.

3.10 Workmanship. The pressure-sensitive adhesive tape shall be uniformly constructed, and free from defects which impair the intended usefulness of the material. 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 supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 that supplies and services conform to prescribed requirements.

4.2 Sampling for examinations. All insulation tape of the same width and length offered for delivery at one time shall be considered a lot for purposes of examination. Random samples of the insulation tape shall be selected from each lot in accordance with MIL-STD-105. The samples, for purposes of determining the sample size in accordance with MIL-STD-105, shall be expressed in units of rolls of tape. The inspection level shall be S-1. The Acceptable Quality Level (AQL) shall be 2.5 expressed as percent defective.

4.3 Examination of the end item. Examination of the end item shall be made in accordance with the classification of defects listed below:

TABLE I

Examination Paragraph	Inspection Level	AQL
4.3.1	S-2	6.5
4.3.2	S-2	6.5
4.5	S-2	4.0

4.3.1 Examination of the end item for defects. The units for this examination shall be one roll of tape, omitting the outside turn.

TABLE II

Examine	Defects
Appearance	Any tears, cuts, or holes. Blisters, creases, folds, or puckers. Color not as specified. Adhesive missing. Presence of dirt, foreign material or imbedded particles. Roll not tightly wound, gaps in adjacent turns. Roll marking not as specified. Roll telescoped, uneven.
Appearance	Roll contains more than one splice. Adhesive side exposed on roll.
Workmanship	Adhesive coating not evenly and smoothly applied over entire area of one side of backing; any bare spots or lumps. Edges not clean cut, straight, or unbroken.
Width	Varies by more than plus or minus 1/32 inch from width specified or required by contract order (see 3.4.2).
Length	Not as specified, see 3.4.1.
Thickness	Not as specified, see 3.4.3.
Core	Core not within 1 +/- 1/16 inch, or 1-1/2 +/- 1/16 inch (see 3.8).
Flame retardant, cold and weather resistant	Not UL certified as specified, see 3.6.2, 3.6.3, 4.4.1, 4.4.2, and 4.4.3.

4.3.2 Examination of the assembled roll of tape for average length per roll. The sample unit for this examination shall be one finished assembled roll of tape. The roll of tape shall be weighed to the nearest 1/10th of a gram after the core has been removed. A specimen of tape, approximately 3 feet long, shall be removed from the roll and placed on a smooth, flat surface. The specimen shall be allowed to relax to remove any latent elongation inducted by the tension exerted on the tape in the roll or during unwinding. The relaxed length shall be measured to the nearest 1/10 inch. The specimen shall be weighed and the yards per roll shall be calculated as follows:

$$\text{Yards per roll} = \frac{\text{Weight of roll (less core)}}{\text{Weight of specimen}} \times \frac{\text{Length of specimen in inches}}{36}$$

4.4 Tests.

4.4.1 Flame retardant, cold and weather resistant. The tape shall be tested in accordance with UL 510 and paragraph 3.6.3 of this specification.

4.4.2 Low temperature tests.

4.4.2.1 Adhesion strength to backing at 19.5 deg. F (-7.0 deg. C). The tape shall be tested to the low temperature adhesion test in ASTM D 1000.

4.4.2.2 Unwind force at 19.5 deg. F (-7.0 deg. C). The tape shall be tested to the low temperature unwind force test in ASTM D 1000.

4.4.2.3 Static elongation at 19.5 deg. F (-7.0 deg. C). The tape shall be tested to the low temperature static elongation test in ASTM D 1000.

4.4.3 Breaking strength. The tape shall be tested in accordance with ASTM D 1000.

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4.5 Inspection of preparation for delivery requirements. An inspection shall be made to determine that the packaging, packing, and marking comply with the requirements in section 5 of this specification. Defects shall be scored in accordance with Table III. For examination of the packaging and packing, the sample unit shall be one shipping container prepared for delivery, selected at random just prior to the closing operations. Sampling shall be in accordance with MIL-STD-105. Defects of closure listed shall be examined on shipping containers fully prepared for delivery. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 percent defective.

TABLE III. Classification of preparation for delivery defects

Examine	Defects
Markings	Omitted; incorrect, illegible; improper size; location; sequence or method of application.
Materials	Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure of container flaps, inadequate stapling, distortion of container.
Contents	Number per container is more or less than required.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A, B, or C, as specified (see 6.1).

5.1.1 Level A. Each roll of tape shall be individually packaged, Method III, boxed, of MIL-P-116. The box shall be in accordance with PPP-B-636, PPP-B-566, PPP-B-676, or PPP-B-665.

5.1.2 Level B. Each roll of tape shall be packaged in a cellophane or plastic wrap or in a small plastic container. The identification label may be secured to the outside of the packaging or be printed directly on the wrap or container. The wrap or container shall be secured to prevent accidental opening.

5.1.3 Level C. Each roll of tape shall be packaged to prevent damage during shipping from supplier to the initial destination.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.1).

5.2.1 Level A. Multiple units packaged, as specified in paragraph 5.1, shall be packed in snug-fitting containers conforming to PPP-B-636, class weather-resistant. Contents of the fiberboard box shall not exceed the specified size and weight limitation of the type and class selected. Closure and reinforcement requirements shall be as specified in the appendix of the box specification.

5.2.2 Level B. One hundred (100) rolls of 1/2 inch tape, 100 rolls of 3/4 inch tape, or 50 rolls of 1 inch tape shall be packed in a snug-fitting box conforming to PPP-B-636, class domestic. Closure shall be in accordance with the appendix to PPP-B-636, Method I. Quantities of tape of other widths to the shipping container shall be as specified (see 6.1).

5.2.3 Level C. The insulation tape shall be packed to assure carrier

acceptance and safe arrival at destination in compliance with the Uniform Freight Classification Rules or National Motor Freight Classification Rules.

5.3 Marking.

5.3.1 Civil agencies. In addition to markings required by the contract or order, the unit package and the shipping container shall be marked in accordance with Fed. Std. No. 123.

5.2.3 Military agencies. In addition to markings required by the contract or order, the unit package and the shipping container shall be marked in accordance with MIL-STD-129.

6. NOTES

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

- (a) Title, symbol, and date of this specification.
- (b) Type designation No. (see 1.2.1).
- (c) Level of packaging and marking required (see section 5).

6.2 Federal Specifications do not include all electrical tapes indicated by the title of the specification or which are commercially available, but are intended to cover the electrical tapes which are suitable for Federal Government requirements.

MILITARY COORDINATING ACTIVITY:

Army-EL

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-FSS, PCD
 DC Govt-DCG
 DOT-FIS
 HEW-FEC
 USDA-ARS
 VA-DMS

Review Activities:

Army-AV, ME

Preparing Activity:

GSA - FSS

User Activities:

Army-MI, MU, AT

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