

AEROSPACE MATERIAL SPECIFICATION



AMS 3867B

Issued JAN 1978
Revised APR 1991
Reaffirmed APR 2001

Superseding AMS 3867A

Boron Filament Tape, Epoxy-Resin-Impregnated

FOREWORD

This Reaffirm contains format/editorial changes only.

1. SCOPE:

1.1 Form:

This specification and its supplementary detail specifications cover boron filaments in the form of tape impregnated with epoxy resin, the resin to be supplied in a "B" stage condition.

1.2 Application:

Primarily for fabricating high-strength and high-modulus composite parts, with either hand-layup or automated-tape-layup.

1.3 Classification:

The tapes shall be as specified in the applicable detail specification, wherein each product is defined by filament nominal diameter, resin system, and continuous service temperature. An example is shown in 8.2. The tape covered by each detail specification appears as part of the title.

1.4 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

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2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

2.1.1 Aerospace Material Specifications:

AMS 2825	Material Safety Data Sheets
AMS 3824	Cloth, Type "E" Glass, Finished for Resin Laminates
AMS 3865	Filaments, Boron, Tungsten Substrate, Continuous
AMS 3898	Interleaf Carrier Material, Composite Tape

2.2 ASTM Publications:

Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 790	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D 790M	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials (Metric)
ASTM D 792	Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D 2344	Apparent Interlaminar Shear Strength of Parallel Fiber Composites by Short Beam Method
ASTM D 3039	Tensile Properties of Fiber-Resin Composites
ASTM D 3171	Fiber Content of Resin-Matrix Composites by Matrix Digestion
ASTM D 3410	Compressive Properties of Unidirectional or Crossply Fiber-Resin Composites
ASTM D 3529	Resin Solids Content of Carbon Fiber-Epoxy Prepreg
ASTM D 3530	Volatiles Content of Carbon Fiber-Epoxy Prepreg
ASTM D 3531	Resin Flow of Carbon Fiber-Epoxy Prepreg

2.3 U.S. Government Publications:

Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

2.3.1 Military Specifications:

MIL-R-9300	Resin, Epoxy, Low-Pressure Laminating
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2.3.2 Military Standards:

MIL-STD-2073-1	DOD Materiel, Procedures for Development and Application of Packaging Requirements
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2.4 AIA Publications:

Available from National Standards Association, Inc., 1321 14th Street, N.W., Washington, DC 20005.

NAS 992	Reel, Composite Filament Tape, Automated Machine Layup
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3. TECHNICAL REQUIREMENTS:

3.1 Detail Specifications:

The requirements for a specific tape shall consist of all requirements specified herein in addition to requirements specified in the applicable detail specification. In case of conflict between the requirements of this basic specification and an applicable detail specification, requirements of the detail specification shall govern.

3.2 Material:

3.2.1 Construction: The tape shall consist of parallel, unidirectional, boron filaments conforming to AMS 3865 impregnated with an epoxy resin which will yield a product meeting the requirements of the applicable detail specification. The boron filaments shall be arranged in a single in-plane layer and supported by a glass scrim cloth. The scrim cloth shall be an integral part of the tape and shall hold the collimated boron filaments in their fixed positions while in storage, during shipment, and when being handled during layup operations. The warp of the scrim cloth shall be parallel to the length of the boron filaments in the impregnated material. The glass fabric shall conform to the requirements of AMS 3824 for the type of cloth specified in the applicable detail specification and shall have an A-1100 soft finish.

3.2.2 Impregnating Resin: Impregnating resins shall conform to the general requirements of MIL-R-9300 and the physical properties in the detail specifications. The resin shall be free from foreign materials, noncorrosive to metal, and capable of being molded, using low pressure [25 to 100 psi (172 to 689 kPa)] laminating methods, to a fully thermoset state.

3.2.3 Splices: Not more than four filament splices shall occur in any 12-inch (305-mm) length of 3-inch (76-mm) wide tape. No more than three such groups of splices per 100 feet (30.5 m) of tape shall be permitted.

3.2.4 Storage Life: Tape, packaged in waterproof, heat-sealed bags, shall meet the requirements of the applicable detail specification after storage as specified therein.

3.2.5 Working Life: Tape shall meet the requirements of the applicable detail specification after exposure for a continuous period at the relative humidity and temperature specified therein.

3.2.6 Interleaf Carrier: When specified, the interleaf carrier shall conform to the applicable detail specification of AMS 3898, as specified in the applicable detail specification of AMS 3867.

3.3 Properties of Uncured Impregnated Product:

The as-received tape shall conform to requirements of this specification and the applicable detail specification. Tests shall be performed on the tape supplied and in accordance with test procedures specified herein or in the applicable detail specification.

3.4 Properties of Cured Laminate:

Test laminates shall conform to requirements of this specification and the applicable detail specification. Tests shall be performed on specimens cut from laminates prepared and tested in accordance with 4.5.

3.5 Quality:

Tape, as received by purchaser, shall be uniform in quality and condition, free from foreign materials and parting agents and free from imperfections detrimental to usage of the tape.

3.5.1 Visual Imperfections Acceptance Criteria: In any roll of tape supplied, there shall be no more than the equivalent of 2% of the total tape length of the roll marked for major imperfections based on the following imperfection classification. More than three minor imperfections in a 12-foot (3.7-m) length of tape shall be classified as a major imperfection.

Imperfection	Description and Limitation	Classification
Filaments not wetted	Visible area not wetted	Major
Filaments not collimated parallel to centerline	Filaments ± 0.25 degrees from parallel to centerline	Major
Crimps	Visible crimps present	Minor
Cured resin particles	None permitted	Major
Foreign material	None permitted	Minor
Glass fabric carrier distortion	None permitted	Major
Rippled interleaving	(to be determined)	
Resin starved area and voids	None allowed	Minor
Fiber crossovers	None allowed	Minor
Horizontal waviness (snaking)	Maximum of 0.030 inch (0.76 mm) from the edge for any 24-inch (610-mm) length	Minor
Flatness (marcelling)	Maximum of 0.125 inch (3.18 mm) across the width	Minor
Broken fiber	None allowed	Minor

3.5.1.1 Visible major imperfections shall be marked by inserts and shall be cause for rejection only if the total length of such areas exceeds 2% of the total tape length of the roll.

3.6 Sizes and Tolerances:

Shall be as follows, determined as in 4.5.7:

- 3.6.1 Width: Shall be 3.000 inches \pm 0.015 (76.20 mm \pm 0.38), determined by measuring the distance between the outsides of the extreme boron filaments.
- 3.6.2 Length per Roll: Shall be 125 to 500 feet (38 to 152 m) except that the last roll of a lot may have less than 125 feet (38 m). Any length of defective tape shall not be counted in the specified length.
- 3.6.3 Filament Count and Spacing: Shall be as specified in the applicable detail specification and shall be such that the filaments do not touch each other. The filament gap shall not exceed three filament diameters

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of tape shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the tape conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests for construction (3.2.1), properties of uncured impregnated product (3.3), longitudinal flexural strength, modulus of elasticity in flexure, and interlaminar shear strength, all at room and elevated temperatures, and fiber volume of cured laminates (3.4), quality (3.5), and tolerances (3.6) are acceptance tests and shall be performed on each lot.

4.2.2 Preproduction Tests: Tests for all technical requirements are preproduction tests and shall be performed prior to or on the initial shipment of tape to a purchaser, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.2.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, contracting officer, or request for procurement.

4.3 Sampling and Testing:

Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient tape shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than as specified in 4.5.

4.3.1.1 A lot shall be all tape produced in a single production run from the same batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time. A lot shall not exceed 2500 feet (762 m) for physical tests and 5000 feet (1524 m) for mechanical tests. A lot may be packaged in smaller quantities and delivered under the basic lot approval provided lot identification is maintained.

4.3.1.2 Vendor of tape shall, for purposes of traceability, maintain records of ingredients of each lot for not less than seven years.

4.3.1.3 When a statistical sampling plan has been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.6 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample tape shall be approved by purchaser before tape for production use is supplied, unless such approval be waived by purchaser. Results of tests on production tape shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production tape which are essentially the same as those used on the approved sample tape. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample tape. Production tape made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

Tests to determine conformance to this specification and the applicable detail specification shall be conducted as follows; requirements for the number of specimens to determine properties of the cured laminates (3.4) apply to each specified test temperature:

TABLE 1

Property	Minimum Number of Specimens per Requirement Preproduction Tests	Minimum Number of Specimens per Requirement Acceptance Tests	Test Procedure
Volatile Content	3	3	ASTM D 3530
Resin Solids Content	3	3	4.5.3
Resin Flow	3	3	4.5.4
Gel Time	2	2	4.5.5
Tack			4.5.6
As-received	2	2	
Tack retention	2	2	
Filament Count and Spacing	2	2	4.5.7.2
Flexural Strength and Modulus of Elasticity	5	3	4.5.9
Compressive Strength and Modulus of Elasticity (0 and 90 degrees Orientation)	5	0	ASTM D 3410
Interlaminar Shear Strength	5	3	4.5.10
Tensile Strength and Modulus of Elasticity (0 and 90 degrees Orientation)	5	0	4.5.11
Fiber Volume	5	3	ASTM D 3171
Density	3	3	ASTM D 792

- 4.5.1 Preparation of Test Laminates: Test laminates of suitable thickness and area shall be prepared from sufficient plies of impregnated tape oriented unidirectionally and cured in an autoclave, or equivalent, at a temperature and pressure to provide optimum properties. Details of time, temperature, rate of heating, and pressures used in the cure cycle shall be noted in the report. The resultant laminate shall be uniform in thickness within ± 0.003 inch (± 0.08 mm) and shall have a fiber volume of $51\% \pm 3$. The thickness per ply shall be within +10%, -5% of the nominal cured thickness, determined from the equation:

$$T = \frac{A}{B}$$

where:

T = Thickness per ply

A = Thickness of test panel

B = Number of plies in panel

- 4.5.2 Splices: Conformance to the requirements for splices shall be verified by examination of the tags on the spools as described herein.
- 4.5.3 Resin Solids Content: Shall be determined in accordance with ASTM D 3529. Dissolve resin by boiling the prepreg in methyl ethyl ketone.
- 4.5.4 Resin Flow: Shall be determined in accordance with ASTM D 3531. Flow shall be determined at 45 psi \pm 5 (310 kPa \pm 34) and 175 °C \pm 5 (347 °F \pm 9) for 11 minutes \pm 1. Report the average of the determinations and the individual minimum.
- 4.5.5 Gel Time: Cut a piece of impregnated tape approximately 0.25 inch (6.4 mm) square from the roll. Preheat a hot plate to 175 °C \pm 5 (347 °F \pm 9). Place a microscope slide cover glass on the hot plate, allowing 20 seconds for it to reach temperature equilibrium. Position the specimen at the center of the cover glass and simultaneously commence timing. Within 5 seconds, place a second cover glass over the specimen. After the resin softens and during the first 30 seconds, probe the cover glass and isolate a drop of resin. Observe the fluidity and color of the isolated resin drop periodically (continuously as the end point approaches). The lateral (spreading) movement of the resin upon probing will decrease or regress and the color shade will change as the gel point approaches. Stop the timer at the first indication of resin immobility and record the elapsed time to the nearest second. Report the average of the determinations and the individual minimum.
- 4.5.6 Tack: Shall be determined with the tape in the as-received condition and, for tack retention, after exposure for seven days at 20 to 25 °C (68 to 77 °F) and not higher than 65% relative humidity. For the latter requirement, the tape may be covered with a layer of polyethylene film for protection but it shall not be sealed off in any manner. The method of test shall be as agreed upon by purchaser and vendor.
- 4.5.7 Visual Defect Acceptance Criteria:
- 4.5.7.1 Allow a sample, approximately 12 feet (3.7 m) in length, to be exposed, while lying flat on the table, to standard environmental conditions for not less than 8 hours prior to inspection at 20 to 25 °C (68 to 77 °F) and not higher than 65% relative humidity.
- 4.5.7.2 Inspection aids and measuring devices of applicable accuracy shall be used as required. Perform the actual filament count and spacing measurements at 50 - 100X magnification using an optical comparator equipped with a micrometer attachment.
- 4.5.7.3 Report the results of the inspection for each sample of tape.

4.5.8 Normalized Property Values: Normalized strength and modulus values, based on 51% boron filament by volume in cured laminate, for all types are listed below. Normalization of longitudinal (0 degree) compressive, flexural, and tensile strengths and moduli shall be accomplished as follows:

$$\text{Normalized Strength, psi} = \frac{\text{Actual Strength (psi)} \times \text{Measured Laminate Thickness (inches)}}{\text{N.T. (inches)} \times \text{number of boron plies}}$$

$$(\text{MPa}) = \frac{\text{Actual Strength (MPa)} \times \text{Measured Laminate Thickness (mm)}}{\text{N.T. (mm)} \times \text{number of boron plies}}$$

$$\text{Modulus (10}^6 \text{ psi)} = \frac{\text{Actual Modulus (10}^6 \text{ psi)} \times \text{Measured Laminate Thickness (inches)}}{\text{N.T. (inches)} \times \text{number of boron plies}}$$

$$(\text{MPa}) = \frac{\text{Actual Modulus (MPa)} \times \text{Measured Laminate Thickness (mm)}}{\text{N.T. (mm)} \times \text{number of boron plies}}$$

Where, N.T. = Nominal ply thicknesses as specified in the applicable detail specification.

4.5.9 Flexural Strength and Modulus: Shall be determined in accordance with ASTM D 790 or ASTM D 790M, using the specimen shown in Figure 1 loaded as shown in Figure 2 herein. For the test to be valid, the failure shall originate in the tension face beneath the loading point.

4.5.9.1 Calculations: The normalized mechanical properties shall be calculated and reported to three significant figures, using the following equations:

4.5.9.1.1 Ultimate Flexural Strength (Modulus of Rupture):

4.5.9.1.1.1 For simply-supported unidirectional (0-degree) specimens under center loading:

$$F_b (\text{ult}) = \frac{3 PL (t)}{2 bt^2 t^1} \text{ psi (Pa)}$$

4.5.9.1.1.2 For simply-supported 90-degree specimens under two point loading:

$$F_b (\text{ult}) = \frac{3 Pa (t)}{bt^2 t^1} \text{ psi (Pa)}$$

$$\text{or when } a = \frac{L}{4}$$

$$F_b (\text{ult}) = \frac{3 PL (t)}{4 bt^2 t^1} \text{ psi (Pa)}$$

4.5.9.1.2 Flexural Modulus of Elasticity:

4.5.9.1.2.1 For simply-supported unidirectional (0-degree) specimens under center loading:

$$E_b = \frac{L^3 (\Delta P) (t)}{4 bt^3 (\Delta y) t^1} \text{ psi (Pa)}$$

4.5.9.1.2.2 For simply-supported 90-degree specimens under two-point loading:

$$E_b, \text{psi (Pa)} = \frac{a}{4bt^3} \frac{(\Delta P)}{(\Delta y)} (3L^2 - 4a^2) \frac{(t)}{t^1}$$

or when $a = \frac{L}{4}$

$$E_b, \text{psi (Pa)} = \frac{11L^3}{64bt^3} \frac{(\Delta P)}{(\Delta y)} \frac{(t)}{t^1}$$

Where,

F_b = Flexural strength, psi (Pa)

E_b = Modulus of elasticity in bending, psi (Pa)

P = Total applied load, pounds force (N)

L = Test span, inches (m)

a = maximum moment arm, inches (m)

b = measured width of specimen, inches (m)

t = measured thickness of specimen, inches (m)

t^1 = theoretical or normalized thickness, (nominal ply thickness as specified in the applicable detail specification times number of plies), inches (m)

y = measured center of deflection of specimen, inches (m)

Δ = increment of value for calculation purposes

4.5.9.2 Report the average of the determinations and the individual minimum.

4.5.10 Interlaminar Shear Strength: Shall be determined, using specimens not less than 0.600 inch (15.24 mm) in length and 0.250 inch \pm 0.001 (6.35 mm \pm 0.02) in width, in accordance with ASTM D 2344 and as follows:

4.5.10.1 The test span is dependent upon the thickness (t) of the specimen as follows:

TABLE 2

No. of Plies	Thickness Range	Span	L/t Nominal
See applicable detail specification	0.0735 - 0.0825 inch (1.867 - 2.096 mm)	0.400 inch \pm 0.005 (10.16 mm \pm 0.13)	5:1

4.5.10.2 The loading nose and supports shall be hardened 0.375 inch \pm 0.005 (9.52 mm \pm 0.13) diameter steel cylindrical surfaces. They shall have finely ground surfaces, free of indentation and burrs, and shall have all sharp edges relieved.

4.5.10.3 The loading nose shall be centered between the supports to within \pm 0.01 inch (\pm 0.3 mm).

4.5.10.4 The loading nose and supports shall be aligned so that their axes are parallel within 0.5 degree.

4.5.10.5 The specimens shall be placed on the supports with the longitudinal axis perpendicular to the loading nose and supports within 0.5 degree.

4.5.10.6 The specimens shall be tested with the boron surface, rather than the glass scrim cloth surface, in tension.

4.5.11 Tensile Strength and Modulus of Elasticity: Shall be determined in accordance with ASTM D 3039 on a curved laminate as close as possible to 0.30 inch (0.76 mm) in thickness.

4.6 Reports:

The vendor of tape shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements, including the identification of the resin system used, the cure cycle and fiber volume of the test laminate, and stating that the tape conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 3867B and its applicable detail specification number and revision letter if any, vendor's material designation, spool or sheet numbers, date of manufacture, quantity, (tape width and length), total length of defective tape, and location of test samples within the lot and spool.

4.6.1 A material safety data sheet conforming to AMS 2825, or equivalent, shall be supplied to each purchaser prior to, or concurrent with, the report of preproduction test results or, if preproduction testing be waived by purchaser, concurrent with the first shipment of tape for production use. Each request for modification of tape formulation shall be accompanied by a revised data sheet for the proposed formulation.

4.7 Resampling and Retesting:

If any specimen used in the above tests fails to meet the specified requirements, disposition of the tape may be based on the results of testing three additional specimens for each original nonconforming specimen, prepared from the original panel or a newly-prepared panel. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the tape represented. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Packaging and Identification:

5.1.1 Tape for Hand Layup: Shall be interleaved with a nonadherent film and wound on spools having a hub diameter not less than 8 inches (203 mm). Winding shall be uniform and shall provide for proper unreeling. Each spool shall contain 125 to 500 feet (38 to 152 m) except that one spool may contain less than 125 feet (38 m). Tape ends shall be secured.

- 5.1.1.1 Location of visually imperfect areas and of splices shall be plainly identified on the tape by suitable markers visible on the spool or reel and on the package. The total length of such areas in each roll shall be itemized in the applicable inspection report. Visually imperfect areas shall not be counted in conforming to any requirements for length.
- 5.1.2 Tape for Machine Layup: Shall be interleaved with a nonadherent film conforming to the specified detail specification of AMS 3898 and wound on NAS 992 reels of the type, size, and class specified (See 8.6). Quantity on each reel and marking of visually imperfect areas and of splices shall be as specified in 5.1.1.
- 5.1.2.1 The tape shall be placed on the interleaf (carrier) material within ± 0.015 inch (± 0.38 mm) of the center line of the interleaf or centered between the perforations (sprocket hole guides) by the same tolerance if perforated carrier is specified. If tape and interleaf are specified to have the same width, the tape shall be placed within 0.015 inch (0.38 mm) of the center line of the interleaf or no greater than 0.030 inch (0.76 mm) from an edge and shall not extend beyond the edge of the interleaf.
- 5.1.3 Sheet: Shall be supplied flat with a suitable nonadherent protective covering or separator film on each face.
- 5.1.4 Identification: Each reel or spool of tape shall be legibly identified with attached removable tags using characters which will not be obliterated by normal handling. Each tag shall be marked with not less than the following information:

BORON FILAMENT TAPE, EPOXY-RESIN-IMPREGNATED, _____*

AMS 3867B** _____

INTERLEAF MATERIAL, AMS 3898** _____ (when applicable)

NAS 992 REEL, TYPE _____ SIZE _____ CLASS _____

(when applicable)

MANUFACTURER'S IDENTIFICATION _____

PURCHASE ORDER NUMBER _____

DATE OF MANUFACTURE _____

LOT AND SPOOL NUMBERS _____

TAPE WIDTH _____

QUANTITY _____

* Insert type designation from applicable detail specification

**Insert applicable detail specification number

- 5.1.5 Each reel or spool shall be sealed in a bag of suitable nonadherent material to prevent penetration of moisture or loss of impregnating resin solvent.
- 5.1.6 Packaging of protected reels shall be accomplished to ensure that the tape during shipment and storage, will be protected against damage from exposure to moisture, weather, or any other normal hazard.

- 5.1.7 Each package shall be permanently and legibly marked with not less than the following information:

BORON FILAMENT TAPE, EPOXY-RESIN-IMPREGNATED _____ *

AMS 3867B** _____

PURCHASE ORDER NUMBER _____

MANUFACTURER'S IDENTIFICATION _____

LOT AND PACKAGE NUMBERS _____

TAPE WIDTH _____

QUANTITY _____

PERISHABLE - STORE BELOW -18 °C (0 °F)

* Insert type designation from applicable detail specification

**Insert applicable detail specification number

- 5.1.8 Packages of tape shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the tape to ensure carrier acceptance and safe delivery.
- 5.1.9 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-2073-1, Commercial Level, unless Level A is specified in the request for procurement.

6. ACKNOWLEDGMENT:

A vendor shall mention this specification number and the applicable detail specification number and their revision letters, if any, in all quotations and when acknowledging purchase orders.

7. REJECTIONS:

Tape not conforming to this specification and the applicable detail specification, or to modifications authorized by purchaser, will be subject to rejection.

8. NOTES:

- 8.1 A change bar (†) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this specification. An (R) symbol to the left of the document title indicates a complete revision of the specification, including technical revisions. Change bars and (R) are not used in original publications, nor in specifications that contain editorial changes only.

8.2 Classification:

The classification system used to identify each detail specification tape is shown by the following examples: