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SUPERSEDING
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FEDERAL SPECIFICATION

CUSHIONING MATERIAL, PACKAGING (FLEXIBLE CELLULAR, PLASTIC FILM) FOR PACKAGING APPLICATIONS

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 establishes requirements for flexible, closed cell, anti-static, heat sealable, and fire retardant, non-corrosive plastic film for use in cushioning and packaging applications. (see 6.1)

1.2 Classification

1.2.1 Classes. The cushioning materials shall be of the following classes, as specified.

Class 1- Regular
Class 2 - Anti-static, tinted
Class 3 - Fire retardant

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:

QQ-A-250/4 - Aluminum Alloy 2024, Plate and Sheet
QQ-C-502 - Copper Rods and Shapes; And Flat Products
with Finished Edges (Flat Wire, Strips and Bars)
QQ-S-365 - Silver Plating, Electrodeposited: General Requirements
For)
UU-P-268 - Paper, Kraft, Wrapping
PPP-B-601 - Boxes, Wood, Cleated-Plywood
PPP-B-636 - Box, Shipping, Fiberboard
PPP-B-1055 - Barrier Material, Waterproofed, Flexible
PPP-F-320 - Fiberboard, Corrugated and Solid, Sheet Stock and Cut
Shapes (Container Grade)

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PPP-T-60 - Tape, Packaging, Waterproofed
PPP-T-76 - Tape, Packaging, Paper (For Carton Sealing)

Federal Standards:

Federal Test Methods Standard No. 101 - Preservation, Packaging and Packing Materials: Test Procedure
Federal Standard No. 123 - Marking for Domestic Shipment (Civil Agencies)

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and Commercial Item Descriptions. The Index, which includes cumulative bimonthly 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 and commercial item descriptions 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; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications

MIL-B-131 - Barrier Materials: Water Vaporproof, Flexible, Heat Sealable.

Military Standards

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 contractors 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 identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards

D568 - Test Method for Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position

D3951 - Standard Practice for Commercial Packaging

E84 - Test Method for Surface Burning Characteristics of Building Materials

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103).

National Motor Freight Traffic Association, Inc. Agent:

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, NW, Washington DC 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.)

(Technical Society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Material. The cushioning material shall be constructed of a composite of two or more sheets of plastic film. The composite material shall have uniformly distributed closed cells. The plastic film shall be laminated, coated, or fabricated in such a manner to insure that the resulting material will meet the requirements of this specification.

3.2 Heat sealability. The material shall be heat sealable on both surfaces, to the extent that it will be capable of passing the heat sealability test specified in 4.6.5.

3.3 Form. The material shall be furnished in rolls, perforated rolls, or sheets in nominal thickness as specified by the procuring activity. Standard rolls shall be 48 inches in width, and length will be as specified by procuring activity. Widths from 2 to 48 inches may be obtained when specified. Dimensional tolerance on widths of rolls shall be in accordance with 4.4.2.

3.4 Perforations. The material shall be perforated when specified. The perforations shall be spaced not greater than 1/4 inch between perforations for thin and medium material and not more than 1/2 inch for thick material. The size of the perforations shall be such that the material can be separated at the perforations with reasonable ease.

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3.5 Nominal cushion thickness. The nominal thickness of the composite cushioning material shall be determined by cell height (see Table I). The nominal cushion thickness shall be determined by measurement of cell height as specified in 4.6.1.

TABLE I

Nominal cushioning thickness	Cell height in inches
Very thin	Up to 1/8
Thin	1/8 to 1/4
Medium	1/4 to 3/8
Thick	Greater than 3/8

3.6 Transparency. The material shall be transparent or pink tinted for anti-static identification. Unless otherwise specified, transparency shall be required for classes 1 and 2 material (see Table II and 6.2).

3.7 Performance. The material shall conform to the requirements of Table II when tested as specified in Section 4.

TABLE II Physical properties

Property	Requirements	Test paragraph
Resistance to blocking	No signs of blocking, rupture, or separation.	4.6.2
Contact corrosivity	No corrosion, etching, or pitting on contact area.	4.6.3
Transparency (Class 1 and 2 only)	Lettering shall be legible when viewed through material.	4.6.4
Heat sealability (seam strength)	No separation.	4.6.5
Low temperature flexibility	Surface shall show no cracks, tears, no separation when bent over mandrel.	4.6.6
Abrasion	No rupture, tear, microscopic scratch on material or microscopic scratches on metal panel.	4.6.7
Creep	Ten percent maximum at room temperature.	4.6.8

Flammability (Class 3)	Self-extinguishing	4.6.9
Flame spread (Class 3)	50 maximum	4.6.9.2
Smoke density (Class 3)	60 maximum	4.6.9.3
Altitude	Four percent maximum	4.6.10
Anti-static (Class 2)	Two second decay minimum	4.6.11

3.8 Workmanship. The material shall be uniformly fabricated in accordance with good commercial practice, and free from cracks, cuts, holes, chafed spots, or other imperfections which might impair its usefulness. The material shall be free from dirt, contamination, mold release compounds, or other foreign matter. Rolls and perforated rolls shall be evenly wound. Sheets shall be evenly stacked.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract 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 that supplies and services conform to prescribed requirements.

4.1.1 Inspection of components and materials. In accordance with 4.1, the supplier is responsible for insuring that materials and components used were manufactured, tested, and inspected in accordance with the requirements of referenced subsidiary specifications and standards to the extent specified or, if none, in accordance with this specification. In the event of conflict, this specification shall govern.

4.2 Quality conformance inspections. Quality conformance inspections shall consist of all the tests listed in Tables I and II. Unless otherwise specified, inspection shall be performed in accordance with MIL-STD-105 and the examinations of 4.4 of this specification.

4.3 Sampling

4.3.1 Inspection lots. The lot size, for the purpose of determining the number of sample units for testing, shall consist of all material manufactured by the same process, from the same components at one time at one plant by one manufacturer. Maximum size of the lot shall be 500,000 square feet.

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4.3.2 Samples for quality conformance tests. The sample unit as referenced herein is defined as the amount of cushioning material required to perform all of the tests required. A sample unit shall consist of thirty square feet of cushioning material. A minimum of three specimens shall be taken from each sample unit for each test.

<u>Lot size in sq. ft.</u>	<u>Sample units</u>
100,000 or less	3
100,001 to 500,000	5

Failure of any sample unit to meet any of the requirements of Tables I and II shall be cause for rejection of the lot.

4.3.3 Samples and acceptance criteria for examination. The sample size and acceptance criteria based on defects per hundred units inspection shall be as specified in Table III. Sampling and acceptance or rejection shall be in accordance with MIL-STD-105.

TABLE III. Sampling size and acceptance criteria

<u>Inspection or characteristic</u>	<u>Test method</u>	<u>Inspection level</u>	<u>AQL</u>
Examination for appearance and workmanship	4.4.1	1	4.0
Examination for defects related to rolls or sheets	4.4.2	S-3	4.0
Examination for preparation for delivery	4.4.3	S-3	4.0

4.4 Examinations.

4.4.1 Examination of the end product for defects in appearance and workmanship. The lot size for this examination shall be expressed in units of square feet of cushioning material. The sample unit shall be one square foot. Sufficient rolls or sheet stock shall be selected at random so that by examining approximately 20 linear feet of each roll or an equivalent quantity of sheet stock the required sample size in accordance with MIL-STD-105 will be obtained.

<u>Examine</u>	<u>Defects</u>
Check both sides of cushioning material	
Form	Not roll, perforated rolls, sheets, as specified.
Cleanness	Not clean, evidence of mold release compound, or presence of foreign matter.

<u>Examine</u>	<u>Defects</u>
Workmanship	Delamination. Embrittlement. Cracks. Holes. Cuts. Chafed spots. Other defects that would impair usefulness of material.
Construction	Not uniform. Closed cells, blisters, or other closed protuberances not uniformly distributed.

4.4.2 Examination of the end product for defects related to the roll or package of sheets. The sample taken in 4.4.1 shall be utilized for examination of the following defects.

<u>Examine</u>	<u>Defects</u>
Roll length	Less than required.
Roll width	More than 1/4 inch greater than specified width. Less than specified width by more than 1/4 inch.
Sheet width	More than 1/4 inch greater than specified width. Less than specified width by more than 1/4 inch.
Sheet length	More than 1/4 inch greater than specified length. Less than specified length by more than 1/4 inch.
Unwinding rolls	During unwinding, material sticks together to the extent that unrolling causes tearing or injury to surfaces. Material not wound evenly. Telescoping.
Nominal cushion thickness (cell height)	Not within specified height.
Spacing between perforations	Greater than 1/4 inch on thin and medium material. Greater than 1/2 inch on thick material.

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4.4.3 Examination for preparation for delivery. An examination shall be made to determine the packaging, packing, and marking shall comply with the requirements of section 5. Defects shall be scored as specified in Table IV. Sampling shall be in accordance with MIL-STD-105. The sample unit shall be one container fully prepared for delivery. The lot shall be the number of containers offered for inspection at one time. The inspection level shall be S-3 with an AQL of 4.0 defects, expressed in terms of defects per hundred units.

TABLE IV. Examination of preparation for delivery

<u>Examine</u>	<u>Defects</u>
Markings	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Materials	Component missing or damaged.
Workmanship	Bulging or distortion of container.
Contents	More or less than required.
Containers	Not as specified.

NOTE: The containers, from which the sample rolls, perforated rolls, or sheets are selected for examination under 4.4.1 and 4.4.2, shall also be used for examination under 4.4.3.

4.5 Test conditions. The material selected for testing shall be conditioned for 24 hours at 23 ± 1 degrees C (73 ± 2 degrees F), and 50 ± 5 percent relative humidity.

4.6 Test methods.

4.6.1 Nominal cushion thickness (cell height).

4.6.1.1 Preparation of test specimens. Sheets of cushioning material, conditioned as specified in 4.5, shall be cut into 5 by 5-inch samples or sheets to permit a minimum of four aligned aircells, whichever is the larger. Samples shall be cut to provide a maximum number of closed air cells, and each sample shall have a similar pattern of air cells. The samples shall be stacked approximately one inch high with the cell pattern in each sample placed so that each cell is directly over the corresponding cell in the sheet below. Samples shall be stacked on a piece of glass approximately 1/2 inch larger than the specimen size and approximately 1/8 inch in thickness. Layers shall be carefully interleaved with sheets of thin non-coated, virgin kraft fiberboard approximately 5-1/2 inches by 5-1/2 inches in size and 0.024 to 0.036 inch in thickness. A second piece of glass, similar to the described above, shall be placed on the top layer of cushioning material. Each stack prepared for determining thickness may subsequently be used for the Creep test specified in 4.6.8.

4.6.1.2 Test procedure. A weight shall be placed on the center of the top piece of glass of each specimen, so as to exert a force of 0.1 pound per square inch (psi) on the material samples. After a period of one hour, the distance between the glass plates shall be measured at each of the four corners of the specimen with a vernier caliper, micrometer, or other instruments which will measure to a thousandth of an inch. Measurement shall be carefully taken so as not to disturb the specimen. The thickness of material shall be the average of one reading per corner at the four corners of the specimen, less the total thickness of the interleaving sheets used, divided by the number of layers of cushioning material in the specimen.

4.6.2 Resistance to blocking.

4.6.2.1 Preparation of specimen. Six 5 by 5-inch sample or sheets cut to permit a minimum of four aligned air cells, whichever is the larger, shall be conditioned as required in 4.5.

4.6.2.2 Apparatus. The apparatus used in this test is described in paragraph 3 of Method No. 2013 of Fed. Test Method Std. No. 101 and is depicted in figure 1 of the same method.

4.6.2.3 Test procedure. A resilient pad (Durometer hardness, Type "A", 60 ± 2) $1\frac{1}{2}$ inch smaller than the test specimen and a maximum of $\frac{1}{4}$ inch in thickness shall be placed on the inside bottom of the outer box of the apparatus. Two 5 by 5-inch test specimens, aligned with air cells directly over air cells, shall be placed over the pad and centered thereon. A stack of three test specimen couples shall thus be built, one couple being separated from the adjacent one by a resilient pad. The inner box shall be loaded with a weight exerting $1 \text{ psi} \pm 0.1 \text{ psi}$ at 160 ± 2 degrees F (-7 ± 1.11 degrees C) for two hours. Then, the entire assembly shall be removed and allowed to come to room temperature while still under load. The assembly shall then be dismantled and the specimens examined for blocking. If slight blocking occurs between the faces of a couple, an attempt shall be made to separate them by clamping a free end of one of the blocked sheets in a vertical position so that the couple hangs freely. A 200-gram weight shall then be gently attached to the corresponding free end of the opposite sheet. If after 2 minutes the sheets do not separate, the material shall be considered blocked. The sheets shall be examined for rupture or separation.

4.6.3 Contact corrosivity. The manufacturer initially shall conduct this test to establish that the product is noncorrosive. The test shall be repeated quarterly or whenever there is any change in the manufacturing process or materials.

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4.6.3.1 Materials.

(a) Copper test bars: Three 3/16-inch to 1/4-inch diameter by 1-1/2 inch test bars of electrolytic tough pitch (ETP) copper conforming to QQ-C-502. The temper is unimportant. Copper Development Association (CDA) alloy 110, ETP copper is the commercial equivalent. Bars shall be silver plated, 0.003-inch minimum thickness in accordance with QQ-S-365, type II, grade B. (Plated bars shall be immediately protected in such a manner that surfaces will remain tarnish-free until the time of use.)

(b) Specimens: Two 4-inch by 12-inch samples of cushioning material.

(c) Glycerine (glycerol)--distilled water solution having a specific gravity of 1.1724 ± 1.67 degrees C (75 ± 3 degrees F). SG 1.1724 is 67 percent glycerine or 785.5 grams of glycerine in a liter (1000 cc).

(d) Barrier material, MIL-B-131, class 1, 10-1/2 inch by 15-inch samples.

4.6.3.2 Equipment.

(a) Heat sealing equipment. Equipment shall be suitable for heat sealing MIL-B-131, class-1 bags.

(b) Desiccator, minimum effective inside diameter, 10 inches. Desiccator plate shall be fitted with a single support to facilitate handling (see figure 1).

(c) Oven. Oven shall be suitable for maintaining temperature of desiccator at 49 ± 1.11 degrees C (120 ± 2 degrees F).

4.6.3.3 Preparation of test assemblies. Prepare two test assemblies in the following manner: Fold the 15-inch length of the barrier material and heat seal adjacent to the fold. Complete the open bag by applying double heat seals to the sides. Wipe plated copper test bars with surgical gauze that has been moistened with methanol. Wipe dry with surgical gauze. Place the bar along the 4-inch edge of the 4-inch by 12-inch cushioning sample. The surfaces with the bubbles shall be in contact with the plated test bar. Loosely wrap the 12-inch long section around the test bar. Place wrapped test bar in bag. The test bar shall be approximately parallel to the bottom of the bag. Apply two heat seals across the top of the bag. Prepare a control test assembly that contains only a plated bar, without the cushioning wrap material, in the barrier bag.

4.6.3.4 Procedure. The test assemblies shall be placed on a clean desiccator plate. Place the plate in the desiccator which contains the 500 milliliters (ml) of synthetic glycerine-water solution prepared in accordance with paragraph 4.6.3.1 (c). The desiccator shall be sealed and immediately placed in a circulating air oven maintained at 49 ± 1.11 degrees C (120 ± 2 degrees F). After an exposure period of 504 hours (21 days), the assemblies shall be removed. The wrapped samples shall be compared with the control sample. Indications of corrosion, etching, pitting, and/or surface contamination are causes for rejection.

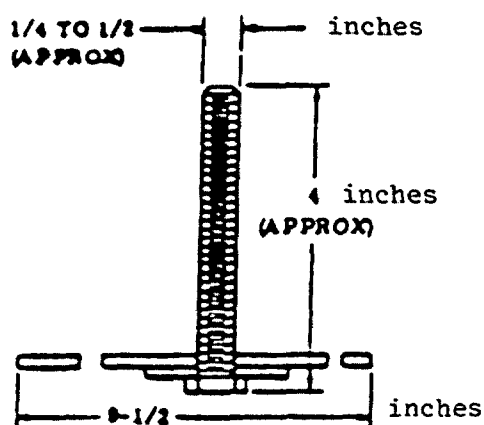


FIGURE 1 - Desiccator Plate

4.6.4 Transparency (Classes 1 and 2). Lettering of 10-point type (approximately $1/8$ inch in height) shall be held directly behind and touching the cushioning material. Lettering shall be clearly legible through a single layer of the cushioning material. (See Table II).

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4.6.5 Heat sealability (Seam strength).

4.6.5.1 Preparation of test specimen. Two 6 by 12-inch samples shall be cut, one from each principal direction of the roll or sheet, and tested in accordance with Method 2024 of Fed. Test Method Std. No. 101. Each sample shall be folded in half, with the cell of the blister side inside so that the cells or blisters are sealed together, and the crease parallel to the twelve inch edge. The free long (12 inch) edges shall be sealed in accordance with the manufacturers' instructions, one-half inch from the edges. The sealed area shall be defined by a line drawn on the back or flat face of the sample to show the seal limits. Two 1-inch wide specimens shall be cut from each sample perpendicular to the fold and seam.

4.6.5.2 Test procedure. The test specimens shall be tested using a one-pound weight in accordance with the procedure specified in Method 2024 of Fed. Test Method Std. No. 101.

4.6.6 Low temperature flexibility.

4.6.6.1 Preparation of specimens. Cut five specimens, 4 by 12 inches, and condition for 3 hours at -71 ± 1.11 degrees C (-20 ± 2 degrees F). The specimens shall be arranged in the low temperature chamber in a manner which allows circulation of air against all surfaces of the specimens. A round, steel, 1/4-inch diameter mandrel and the test specimens shall be placed in the low temperature chamber simultaneously.

4.6.6.2 Procedure. After low temperature conditioning, immediately bend each specimen over the mandrel so that specimen is subjected to a 180-degree bend. Bending shall be accomplished at the conditioning temperature. The flexing operation over the mandrel shall take 2 to 3 seconds. Each specimen shall be bent so that the opposite face of the specimen is toward the mandrel; the bending procedure is then repeated as above (see Table II).

4.6.7 Abrasion. A specimen of cushioning material of any convenient size shall be placed with the protuberances contacting the surface of a polished 2024-T2, QQ-A-250/4 aluminum plate. The width of the plate shall be greater than the width of the specimen and the length shall be sufficient so that the specimen remains on the plate during the complete rubbing cycles. A weight exerting 1 psi shall be placed on the specimen and the specimen shall be pulled back and forth with a horizontal stroke of 6 inches for 30 seconds at an approximate speed of 1 foot per second. This shall then be repeated using the other side of the specimen in direct contact with the plate.

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4.6.8 Creep.

4.6.8.1 Preparation of test specimens. Sheets of cushioning material, conditioned as specified in 4.5, shall be cut into 5 by 5-inch samples, or sheets to permit a minimum of four aligned air cells, whichever is the larger, and specimens shall be prepared as specified in 4.6.1.1. Specimens previously used for determining thickness of material in 4.6.1.2 may be used for the Creep test.

4.6.8.2 Test at room temperature. Utilizing the apparatus specified in 4.6.2.2 place the specimen in the outer box and evenly and gently apply the unloaded inner box to the entire upper surface of the specimen. A load to exert a force of 1.0 psi on the material sample shall then be added gently to the inner box so that the inner box does not become wedged in the outer box. After the load has been applied for one hour measure the distances between the two glass plates, deduct the total thickness of the interleaving sheets used and find the average thickness. The average distance between loading surfaces shall be recorded as "initial thickness under load".

The loaded specimens shall remain undisturbed at the conditions specified in 4.5 for a period of 120 hours. The distance between the glass plates (less the total thickness) of the interleaving sheets used shall then be measured and shall be considered as the final thickness. The amount of creep is obtained by subtracting the final thickness from the initial loaded thickness, and is expressed as a percentage by dividing this difference by the initial loaded thickness, times 100.

4.6.9 Flammability (Class 3). The contractor initially shall conduct this test to establish that the product is fire retardant. The test shall be repeated 12 months or whenever there is any change in the manufacturing process or materials.

4.6.9.1 Preparation of test specimens. Cut 3 test strips 1 inch by 18 inches. Gauge each strip 3 inches from either end to leave a 12 inch piece from which measurements are to be made. Clamp top 1 inch in a vertical position within 12x12x30 inch chamber which is open at the top and bottom and stands on 2-inch legs. A side view window is used to observe the test. A Bunsen burner flame is applied to the lower end of the sample until it is ignited (or for a maximum of 15 seconds.) If the sample does not burn at 15 seconds or extinguishes before reaching the upper gauge mark, it passes. If the sample burns past the upper gauge, it fails.

4.6.9.2 Flame spread. The flame spread rating shall be determined in accordance with ASTM E-84 (see Table II).

4.6.9.3 Smoke density. The smoke density rating shall be determined in accordance with ASTM E-84 (see Table II).

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4.6.10 Altitude.

4.6.10.1 Preparation of test specimens. One eight-inch-wide strip shall be cut in the transverse direction of the roll across its full width. This strip shall be examined for defective air cells. Any such cells found shall be marked with a suitable marking pen.

4.6.10.2 Test procedure. The test specimen shall be folded loosely on itself so that it will fit inside a vacuum desiccator of sufficient size equipped with a hose connection to a suitable vacuum source. The gage pressure inside the desiccator shall be adjusted to 18.80 inches of mercury vacuum, which is equivalent to an altitude 25,000 feet above sea level, and held there for five minutes. The pressure shall then be returned to sea level and the specimen removed. The specimen shall then be examined for any ruptured cells not previously marked. Random cells shall be squeezed between the thumb and forefinger in an attempt to transfer the air from one bubble to an adjacent one. Material shall be able to withstand a pressure drop with not more than 4 percent cell failure.

4.6.11 Anti-static material. When tested in accordance with Method 4046 of Federal Test Method Standard No. 101, anti-static material shall have static decay time not greater than 2.0 seconds. Twelve-day preconditioning and 24-hour water wash not required. Samples shall be conditioned at 23 ± 23 degrees C (73 ± 5 degrees F) and 15 percent RH for 24 hours before testing. A static decay time greater than 2 seconds shall be cause for rejection.

5. PREPARATION FOR DELIVERY

5.1 Packaging. The levels of packaging shall be level A or Commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Rolls and perforated rolls. Each roll shall be evenly wound on a core with a minimum inside diameter of 3 inches and restrained from unwinding or telescoping. The rolls shall be wrapped with material conforming to UU-P-268 or PPP-B-1055. Each roll shall be completely wrapped and closed at the ends and secured with pressure-sensitive tape conforming to PPP-T-60, Type IV, or PPP-T-76.

5.1.1.2 Sheets. Sheets shall be bundled in quantities as specified (see 6.2). Fiberboard pads conforming to PPP-F-320, type CF, class domestic, variety SW, grade optional shall be placed on the top and bottom of each bundle. Bundles shall be wrapped and sealed as specified for rolls in 5.1.1.1.

5.1.2 Commercial. Cushioning material shall be packaged to afford protection against deterioration, physical damage, or loss during shipment from the supply source to the first receiving activity for immediate use. DoD may use Commercial Packaging Standard ASTM D-3951.

5.2 Packing. Packing shall be Level A or Commercial as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 Rolls, perforated rolls, and sheets. Rolls and perforated rolls, packaged as in 5.1.1.1, sheets packaged as in 5.1.1.2, shall be packed in boxes conforming to PPP-B-601, overseas type.

5.2.2 Commercial. The cushioning material shall be packed in containers to insure safe delivery at destination, to provide for safe redistribution by the initial receiving activity, and shall be acceptable to common carrier under National Motor Freight Classification Rules or Uniform Freight Classification Rules. The quantity per shipping container shall be as specified in the contract or order. DoD may use Commercial Packaging Standard ASTM D-3951.

5.3 Marking.

5.3.1 Military agencies. In addition to any marking specified in the contract or order, all individual packages and shipping containers shall be marked for shipment in accordance with MIL-STD-129 or ASTM D 3951, as applicable.

Federal stock number or other identification number as specified in purchase document.

Manufacturer's material designation.

Contract or Order Number.

Class and thickness.

Dimensions of rolls or sheets and nominal net footage. (Net footage is the number of square feet of usable area of material in the rolls or bundles).

Date of manufacture (month and year).

5.3.2 Civil agencies. In addition to any marking specified in the contract or order, shipping containers shall be marked in accordance with Fed. Std. No. 123 or ASTM D 3951, as specified.

6. Notes.

6.1 Intended use. The cellular cushioning materials described in this specification are intended for use within packages to protect items from damage due to shock, vibration, concentrated forces, contamination, and abrasion during handling and shipment. The transparent class 1 material is especially suitable for use as cushioning inserts within transparent bags and envelopes. Transparency of class 1 materials permits inspection of the contents, without opening the package, for condition of humidity indicators. The flexibility of the material permits it to be used also as pads, bags, wrap, dunnage, or filler. When maximum transparency is desired, the use of class 1 material should be limited to one thickness. Class 2 material is used to protect electrostatic discharge sensitive electronic devices. Class 3 material is used when fire-retardancy is required.

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

- (a) Title, number, and date of this specification.
- (b) Quantity.
- (c) Class (see 1.2, and 3.6).
- (d) Thickness.
- (e) Form (rolls, perforated rolls, or sheets), (see 3.3).
- (f) Length and width of rolls and perforated rolls (if other than standard), (see 3.3), and length of roll between perforations if perforated roll.
- (g) Length and width of sheets (3.3).
- (h) Quantity per bundle (5.1.1.2).
- (i) Level of packaging and level of packing required (5.1, 5.2).
- (j) The anti-static material shall be furnished when specified.
- (k) Fire-retardant material shall be furnished when specified.

6.4 Environmental. Cushioning material shall be easily disposed of by incineration.

MILITARY INTERESTS:

PREPARING ACTIVITY:

Military Coordinating Activity

GSA - FSS

Army - GL

Custodians

Army - GL

Navy - AS

Air Force - 69

Review Activities

Army - AR, MD, MI

Navy - CG, DS

Air Force - 99

User Activity

Army - AV