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METRIC

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FEDERAL SPECIFICATION

CUSHIONING MATERIAL, UNCOMPRESSED BOUND FIBER FOR PACKAGING

This specification is 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 uncompressed fibrous cushioning materials in rolls, flat sheets, and molded forms for packaging and packing applications.

1.2 Classification. The cushioning material in roll and flat sheet form shall be furnished in the following types, classes, and grades (see 6.2):

Type I - Soft
Type II - Medium Soft
Type III - Medium Firm
Type IV - Firm
Type V - Extra Firm

Class A - Water resistant material
Class B - Commercial material

Grade 1 - Flame resistant material
Grade 2 - Low temperature material
Grade 3 - Standard material

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 to the extent specified herein.

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STANDARDS

Federal

FED-STD-313	Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
FED-STD-595	Colors Used in Government Procurement

(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

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-2073-1	DOD Materiel Procedures for Development and Application of Packaging Requirements

(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 Government documents. The following other Government

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documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Code of Federal Regulations

29 CFR 1910.1200 Hazard Communication

2.3 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) Standards

ASTM D2221	Creep Properties for Package Cushioning Materials, Test Method for
ASTM D3806	Small-Scale Evaluation of Fire-Retardant Paints (2-ft Tunnel Test), Test Method for

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

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified, samples shall be subjected to first article inspection (see 4.3 and 6.2.2).

3.2 Recycled and reclaimed materials. There is no exclusion to the use of recovered materials provided the finished product meets the requirements specified herein.

3.3 Materials.

3.3.1 Cushioning material. The cushioning material shall consist of a fibrous filler and a binding material which shall bind the fiber into a coherent resilient form.

3.3.2 Filler material. The filler material shall consist of vegetable fiber or synthetic fiber. The filler material shall be clean and free of foreign matter.

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3.3.3 Binding material. With the exception of natural latex rubber, the binding material shall not contain protein or starch. The supplier shall furnish a certificate to the contracting officer certifying to the absence of protein or starch.

3.4 Form and construction. The cushioning material shall be furnished uncompressed in flat sheets, rolls, or molded forms as specified (see 6.2).

3.4.1 Molded forms. Special requirements for molded forms shall be as specified in procurement documents. The requirements contained in drawings for molded forms (see 6.2) apply as requirements of this specification with the exceptions and additions specified herein.

3.4.2 Sheet and roll dimensions. The width, length, and thickness of flat sheets or rolls shall be as specified (see 6.2).

3.4.2.1 Tolerance.

3.4.2.1.1 Width. The width of sheets and rolls shall be within 3 percent or 0.6 cm (1/4 inch), whichever is larger, of the specified width (see 4.4.2.2).

3.4.2.1.2 Length. The length of sheets shall be within 5 percent or 1.3 cm (1/2 inch), whichever is larger, of the specified length. The length of any individual roll shall be not less than 95 percent of the specified length, and the average length of all rolls in any lot shall be not less than the specified length (see 4.4.2.3).

3.4.2.1.3 Thickness. For sheet or roll, the thickness shall be within plus or minus 15 percent of the specified thickness when measured as specified in 4.4.2.1.

3.5 Compression set. For each type and class of cushioning material, compression set shall be less than 10 percent of measured thickness when tested as specified in 4.4.3.

3.6 Dynamic compression resistance. For each static bearing stress, the peak acceleration of each type and class of bound fiber cushioning material at 23°C (73°F) shall be within ± 20 percent of the peak acceleration specified in table I when tested as specified in 4.4.4.

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TABLE I. Peak acceleration-static bearing stress.

Material Type	.43 .063	.50 .072	.55 .080	.68 .098	.78 .113	.89 .129	1.21 .176	1.75 .254	2.79 .404	kPa psi
I	29*	40	59 Gs							
II	19*			30		52 Gs				
III	21*			22	25		52 Gs			
IV	22				18*		24	53 Gs		
V	26						24*	32	60 Gs	

*see 3.9

3.7 Water resistance. When tested as specified in 4.4.5, class A water resistant cushioning material shall not retain more than 200 percent water by weight and shall not dissolve, decompose, separate, or alter in shape or form.

3.8 Flame resistance. When tested as specified in 4.4.6, grade 1, flame resistant cushioning material shall not have an Experimental Flame Spread (FSE) greater than 30.

3.8.1 Use of carcinogenic agents. The use of carcinogenic agents in the manufacturing or fabrication of flame resistant cushioning materials in a concentration of greater than 0.1 percent is prohibited. A carcinogen is defined as a chemical appearing on one or more of the following source documents:

Occupational Safety and Health Administration Regulated Carcinogens List

National Toxicology Program List

International Agency for Research on Cancer List 1, 2A, or 2B

3.8.1.1 Material Safety Data Sheets. The contracting activity shall be provided a Material Safety Data Sheet (MSDS) prior to contract award. The MSDS shall be prepared and submitted in accordance with FED-STD-313 and 29 CFR 1910.1200. In the event of a conflict, 29 CFR 1910.1200 shall take precedence. The MSDS shall be included with each shipment of the flame resistant cushioning material covered by this specification (see 6.2).

3.9 Low temperature dynamic compression resistance. For the asterisk marked test point, static bearing stress in table I, peak acceleration at -54°C (-65°F) for grade 2 low temperature applications material shall not be more than 40 percent greater

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than the peak acceleration at 23°C (73°F) when tested as specified in 4.4.7.

3.10 Tensile strength. When loaded in tension in plane of sheet, the material shall sustain a dead weight load of 10.3 kPa (1.5 psi) times the specimen cross-section area for 10 minutes without separating into two parts (see 4.4.8).

3.11 Dusting. When subjected to the dusting test in 4.4.9, the material shall not incur a weight loss in excess of 0.75 percent of its original weight.

3.12 Hydrogen ion concentration. When the material is tested as specified in 4.4.10, the hydrogen ion concentration (pH) of the solution extracted from the cushioning material shall be not less than 6.0 nor more than 8.0.

3.13 Acid content. When the material is tested as specified in 4.4.11, water soluble acidity shall be not more than .05 percent equivalent sulfur trioxide.

3.14 Color coding. The material in roll or sheet form shall be identified according to type by color coding. Either uniform dispersion of color in the binding material or color stripes shall be used to color code. The color stripes shall be applied in 5.1 ± 0.6 cm (2 ± 1/4 inch) widths with stripe centers spaced 15.2 ± 0.6 cm (6 ± 1/4 inches) apart. Coding colors shall correspond to material type and color numbers of FED-STD-595 according to table II.

TABLE II. Coding colors.

TYPE			COLOR		
I	-	Soft	Brown	-	No. 10091
II	-	Medium Soft	Yellow	-	No. 23655
III	-	Medium Firm	Orange	-	No. 22510
IV	-	Firm	Red	-	No. 21105
V	-	Extra Firm	Black	-	No. 27038

3.15 Workmanship. The material shall be clean cut, uniform, free of foreign matter, and free of imperfections such as voids, holes, cuts, or tears.

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.

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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 supplies and services conform to prescribed requirements.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

1. First article inspection (see 4.3 and 4.4).

2. Quality conformance inspection (see 4.5).

4.3 First article inspection. First article inspection shall consist of all the tests of table III and shall be performed by the contractor, after award of contract and prior to production, at a location acceptable to the Government. First article inspection shall be performed on sample units produced using materials, equipment and procedures which will be used in fulfilling the contract. First article approval is valid only on the contract on which it is granted, unless extended by the Government to other contracts.

4.3.1 First article waiver. First article inspection may be waived when the procuring activity or contract administrator has data or other evidence to indicate that prior successful first article inspection has been conducted (see 6.2). When the first article has been waived, the contractor shall certify that the material will conform to the requirements of this specification.

4.3.2 Test report. The contractor, upon completion of the first article tests, shall prepare a test report and furnish three copies of the report to the procuring activity.

4.3.3 Selection of first article samples. Five sample units shall be selected at random throughout the lot and tested (see 4.3). The five sample units shall be tested for the required attributes as indicated in table III. The sample unit shall contain at least 1 cubic foot of material.

4.4 Test methods.

4.4.1 Conditioning of test specimens. All specimens shall be preconditioned at 35 ± 2 percent relative humidity at 23 ± 2°C (73.4 ± 3.6°F) for 24 hours and then conditioned and tested at 50 ± 2 percent relative humidity and 23 ± 2°C (73.4 ± 3.6°F). Length of conditioning shall be a minimum of 16 hours and until the difference between two successive weights of

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the specimen determined at 1 hour intervals is less than 1 percent of the average specimen weight.

TABLE III. First article tests.

Characteristics	Specification Requirements	Test Method	Reported Numerically to Nearest
Dimensions	3.4	4.4.2	
Compression set	3.5	4.4.3	0.1 percent
Dynamic compression resistance	3.6	4.4.4	1 G
Water resistance (class A only)	3.7	4.4.5	1 percent
Flame resistance (grade 1 only)	3.8	4.4.6	1 flame spread classification no.
Low temperature dynamic compression resistance (grade 2 only)	3.9	4.4.7	1 G
Tensile strength	3.10	4.4.8	
Dusting	3.11	4.4.9	0.01 percent
Hydrogen ion concentration	3.12	4.4.10	0.1 pH value
Acid content	3.13	4.4.11	0.001 percent

4.4.2 Dimensions.

4.4.2.1 Thickness. For each sample unit, a specimen of rectangular solid form with 15.2 ± 0.3 cm (6 ± 1/8 inch) square top and bottom faces, resting on a flat rigid horizontal surface shall be loaded with a 20.2 ± 1.9 cm (8 ± 3/4 inch) square metal or plywood plate weighing 0.41 ± 0.02 kg (0.9 ± 0.05 pound). The perpendicular distance separating each of the four corners of the plate and the horizontal surface shall be measured 30 seconds after application of the load. The four measurements shall be averaged and the average shall be reported as the specimen thickness. The 5 values of specimen thickness shall be averaged and the average shall be reported as the sample thickness.

4.4.2.2 Width. The width of sheets shall be determined by one measurement across the end and one measurement across the midlength point of each sample. The width of rolls shall be determined by one measurement at the 1.5 m (5 foot) and one measurement at the 6.1 m (20 foot) point of the roll, these points being measured from the beginning of the roll. All

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measurements shall conform to the tolerance specified in 3.4.2.1.1.

4.4.2.3 Length. The length of sheets or rolls shall be determined by one measurement at one edge and one measurement at the midwidth point of each sample. All measurements shall conform to the tolerance specified in 3.4.2.1.2.

4.4.2.4 Dimensions of molded forms. Measurements shall be conducted by means such as calipers, rule, straight-edge, depth-gauge, etc., that will assure dimensions are within the tolerance specified on the drawing.

4.4.3 Compression set. The test specimens shall be 15.2 ± 0.3 cm (6 ± 1/8 inch) square with a minimum thickness of 5.1 cm (2 inches). If the specimen is less than 5.1 cm (2 inches) thick, multiple layers shall be used. Each specimen shall be preworked prior to testing. Preworking shall consist of compressing the specimen between parallel rigid plates to 65 percent of its thickness. Compress a total of 10 times at a rate of 25.4 to 50.8 cm (10 to 20 inches) per minute. The specimens shall be allowed to recover a minimum of 4 hours after the final compression. The preworked thickness shall be measured in accordance with 4.4.2 using a 20.3 ± 1.9 cm (8 ± 3/4 inch) square metal or plywood plate weighing .41 ± 0.02 kg (.9 ± 0.05 pound). The specimen shall then be loaded using a Kerstner Box (reference ASTM D2221, figure 1). The total load shall be 6.1 kg (13.5 pounds) for type I, 9.3 kg (20.25 pounds) for type II, 14.3 kg (31.5 pounds) for type III, 25.5 kg (56.25 pounds) for type IV, and 40.8 kg (90 pounds) for type V material. The load shall be applied to the specimen evenly and gently. Three minutes after application, the load shall be removed. One minute after the load has been removed, the 20.3 ± 1.9 cm (8 ± 3/4 inch), .41 ± 0.02 kg (.9 ± 0.05 pound) plate shall be centered on the specimen. The perpendicular distance separating each of the four corners of the plate from the horizontal surface shall be immediately measured and averaged. The average of the four measurements shall be the specimen's final thickness. Specimen compression set is the difference between the preworked and final thickness expressed as a percent and calculated as follows:

$$\text{Percentage compression set} = (t_p - t_f) \times 100/t_p$$

Where: t_p = preworked thickness
t_f = final thickness

The 5 values of specimen compression set shall be averaged and the average shall be reported as the compression set of the sample.

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4.4.4 Dynamic compression resistance. A dynamic compression resistance test machine shall be used. The test machine shall consist of an instrumented, weighted drop platen and an impact base with plane and parallel specimen bearing surfaces which are at least 2.5 cm (1 inch) larger than corresponding specimen dimensions. The weighted drop platen shall fall freely upon release onto the specimen which is supported by the impact base. The impact base shall be rigidly supported by a massive unyielding foundation. The drop platen, impact base, and supporting foundation shall be free of disturbing mechanical resonances over the frequency range 0-500 Hz. The test machine and instrumentation shall be capable of measuring the drop platen acceleration pulse generated by the cushioning specimen with an accuracy of ± 5 percent. If the test machine and instrumentation have not been certified (see 6.3), a detailed description of the test machine, instrumentation, supporting foundation and their operating characteristics shall be submitted for approval to the address indicated in 6.3. The test specimen shall be a rectangular solid, width 20.3 ± 0.3 cm (8 ± 1/8 inches), length 20.3 ± 0.3 cm (8 ± 1/8 inches), and thickness 10.2 ± 0.3 cm (4 ± 1/8 inches) made from plies of one sample unit. The drop platen loaded to the specified static bearing stress shall be dropped from a height sufficient to attain a velocity of 345.4 ± 5 cm (136 ± 2 inches) per second upon contact with the top surface of the test specimen. For a 61 cm (24 inch) free fall, the drop platen will attain a velocity of 345.4 cm (136 inches) per second. At impact, drop platen, impact base, and specimen bearing surfaces shall be centered and parallel. Five drops with a 1 to 2 minute recovery interval between drops shall be made on each specimen at each specified static bearing stress. Testing shall proceed in the order of increasing static bearing stress until either the test is completed or until 10 percent compression set is incurred by the specimen. When 10 percent compression set is incurred by a specimen, it shall be replaced by an untested specimen made from the same sample unit as the replaced specimen. For each static bearing stress, the 2nd through 5th drop peak accelerations shall be averaged and reported as the specimen peak acceleration. For each static bearing stress, the 5 specimen peak accelerations shall be averaged and reported as the sample acceleration. For any specified static bearing stress, a sample peak acceleration which is 20 percent greater or 20 percent less than the specified peak acceleration in table I shall constitute failure of the sample and cause rejection of the lot.

4.4.5 Water resistance. From each sample unit, one specimen 10.2 to 15.2 cm (4 to 6 inches) square and containing not less than 328 cubic cm (20 cubic inches) of material shall be conditioned as specified in 4.4.1 and then weighed to the nearest 0.1 gram. Submerge the specimens for 24 hours in potable water at 24 ± 3°C (75 ± 5°F). The specimen should be submerged a

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minimum of 2.5 cm (1 inch) from the uppermost surface and oriented in a manner so that a minimum of air is entrapped. After 24 hours, remove and let drain on a wire screen for 1 minute, then transfer to a weighing dish and individually weigh to the nearest .1 gram. Specimen percent water retained is the difference between the final weight and the initial weight multiplied by 100 and divided by the initial weight. The 5 specimen values shall be averaged and reported as the sample percent water retained (see 3.7). Visually inspect each specimen for degradation due to water immersion.

4.4.6 Flame resistance. The test method for flame resistance shall be in accordance with ASTM D3806. The coating sections of the test method shall be omitted. The rated standard shall be select grade red oak which has a Flame Spread Rating (FSR) of 100.

4.4.7 Low temperature dynamic compression resistance. Using an untested set of 5 specimens, the test point marked by an asterisk in table I shall be derived at 23°C (73°F) as specified in 4.4.4. After completion of the 5 drops, each specimen shall be conditioned 24 hours at a temperature of -54 ± 3°C (-65 ± 5°F) and then shall be subjected to a sixth drop while at a temperature of -54 ± 3°C (-65 ± 5°F). Except for temperature and an aluminum foil wrap, the test procedure and conditions shall be as specified in 4.4.4. If the test environment cannot be maintained at -54 ± 3°C (-65 ± 5°F), then the following procedure may be used to establish the specimen temperature during test. During low temperature conditioning and test, the specimen shall be wrapped in aluminum foil. The aluminum foil, no greater than 3 mils in thickness, shall be wrapped about the specimen so that the polished side faces the specimen, overlapping seams do not bear on either the drop platen or impact base, circulation of ambient air to the specimen is prevented and free venting of contained air on impact is allowed. An insulated transfer box which has been cooled to -54°C (-65°F) and which is capable of maintaining an interior temperature of -54 ± 3°C (-65 ± 5°F) during specimen transfer shall be used to transfer the specimen to the test area. After removal from the low temperature chamber and within 1 minute, the specimen shall receive the sixth drop. The 5 specimen peak accelerations for the sixth drop shall be averaged and this average shall be reported as the sample low temperature peak acceleration. For the specified test point, sample low temperature peak acceleration exceeding the specified peak acceleration by 40 percent shall constitute failure of the sample and cause for rejection of the lot.

4.4.8 Tensile strength. One test specimen, 20.3 cm (8 inches) long, 7.6 ± 0.3 cm (3 ± 1/8 inches) wide and of nominal sample unit thickness, shall be made from each sample unit. The two

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opposite ends of the specimen shall be securely clamped with a distance of 15.2 cm (6 inches) separating the clamps. A dead weight tensile load of 10.3 kPa (1.5 psi) times the specimen cross section area shall be applied between the clamps. Total separation of the specimen before the elapse of 10 minutes shall constitute specimen failure. Failure of one of the 5 specimens shall constitute sample failure.

4.4.9 Dusting. A 5.1 cm (2 inch) square shall be cut from each sample unit, cleaned with a brush and then weighed to the nearest 0.001 gram. A 0.34 ± 0.005 kg (0.75 ± 0.01 pound) cylindrical weight, having a flat face of 9.5 ± 0.06 square cm (1.48 ± 0.01 square inches) in area shall be dropped squarely upon the specimen from a height of 25.4 cm (10 inches) above the specimen. After a total of 10 such impacts, the sample shall be cleaned with a brush and weighed to the nearest 0.001 gram. Specimen weight loss is the difference between the initial and final weighings and shall be expressed in percent of initial specimen weight. The weight losses of the five specimens shall be averaged and the average shall be reported as the sample dusting weight loss.

4.4.10 Hydrogen ion concentration (pH). From each sample unit, cut sufficient pieces not over 0.3 cm (1/8 inch) in dimension to make a 5 gram specimen. Place 5 grams of air-dry cut material in a 500 ml Pyrex Erlenmeyer flask and add 350 ml of boiling distilled water having a pH of 6.7 to 7.1 at room temperature when free of carbon dioxide. To avoid the tendency of the material to float on the surface, the water should be added gradually and the flask should be well shaken. After the water is added, affix to the flask an aluminum-foil covered rubber stopper through which a Pyrex glass tube about 76 cm (30 inches) in length has been inserted to serve as a condenser. Place the flask in a heating bath which will maintain the contents of the flask at 98 to 100°C. Heat at this temperature for one hour with shaking at approximately 5-minute intervals. Cool the solution rapidly and determine the pH of the unfiltered extract electrometrically using a glass or quinhydrone electrode and calomel cell. The pH values of the 5 specimens shall be averaged and the average shall be reported as the sample hydrogen ion concentration expressed as pH.

4.4.11 Acid content. From each sample unit, cut sufficient pieces not over 0.3 cm (1/8 inch) in dimension to make two 5 gram portions. Condition the cut pieces to the atmosphere of the balance case and then weigh two 5 gram portions (to the nearest 1 mg). Determine the moisture content of one weighed portion as follows: Place the weighed specimen along with a suitable weighing container, such as a wide-mouth, glass-stoppered bottle, in a constant temperature oven at a temperature of 100 to 105°C for 2 hours. The oven should be equipped with means of assuring

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adequate temperature control and free circulation of air around the specimens and preferably equipped with means for drying the air entering the oven. At the end of 2 hours, place the specimen in the weighing container and close it, doing this (if possible) without removing the specimen from the oven. Let both the closed container and specimen cool to room temperature and weigh. Repeat periodic drying and weighing of the specimen until the difference in weight between two successive weighings is not more then 0.01 percent of the weight of the specimen. Make all weighings with the cover on the container and weigh to within 0.01 percent of the total weight of the original specimen. Transfer the other weighed portion to a 500 ml Pyrex Erlenmeyer flask and extract the material for one hour as described in 4.4.10. At the end of this period, pour the contents of the flask on a Buchner funnel (without filtering medium) and wash the material remaining in the flask into the Buchner funnel with 10 ml of distilled water having a pH of 6.7 to 7.1 at room temperature when free of carbon dioxide. Apply strong suction to the material, then cool the extract rapidly and titrate as soon as it reaches room temperature. Add phenolphthalein indicator and, if the extract remains colorless, determine the acidity by titrating with 0.01 normal NaOH until the first appearance of permanent pink coloration. (If the extract is colored from the material, titrate to a pH of 8.3, the end point for phenolphthalein, using a pH meter and glass electrode.) Make a blank titration on 360 ml of distilled water having a pH of 6.7 to 7.1 when free of carbon dioxide heated for one hour in the same bath and with the same glassware used for the extraction. Total acidity shall be expressed as a percentage of moisture-free material in terms of sulfur trioxide (SO_3) calculated as follows:

$$\text{Percent } SO_3 = (T - t) \times N \times 0.04 \times 100/W$$

T = ml NaOH required to neutralize the extract
t = ml NaOH required to neutralize the blank
N = normality of NaOH solution
W = weight of test specimen less moisture

The acid content test values of the 5 specimens shall be averaged and the average shall be reported as the sample acid content.

4.5 Quality Conformance Inspection.

4.5.1 Sampling. The lot submitted for inspection shall be sampled in accordance with MIL-STD-105 at inspection level I and acceptable quality level (AQL) 4.0 percent defective, unless otherwise specified. An inspection lot is defined to be all material of the same type, class, grade, and construction submitted for inspection at the same time.

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4.5.2 Dimension, form, material, and construction defects. The end item shall be inspected for defects listed in table IV. The lot size and sample units shall be expressed in sheets, rolls, or molded forms. The presence of any defect listed in table IV in excess of acceptable quality level (AQL) 4.0 percent defective shall constitute lot failure and shall be cause for lot rejection.

TABLE IV. Inspection for defects of end items.

INSPECT	DEFECTS
Construction	Fiber not bound. Binding material does not adhere to fiber filler. Cushioning material compressed. Cushioning material not uniform. Not color coded or improperly color coded (see 3.14).
Form	Not roll, sheet, or molded as specified.
Material	Fiber not vegetable or synthetic. Binding material not present. Cushioning material contains foreign matter.
Workmanship	Cushioning material not clean cut. Uneven application of binding material. Imperfections such as lumps, voids, holes, cuts, or tears present.
Dimension	Length, width, or thickness not as specified (see 3.4.2 and 4.4.2). Molded forms not in accordance with drawings (see 3.4.1 and 4.4.2.4).

4.5.3 Packaging defects. The end item shall be inspected to determine that packing, markings, materials, workmanship, and contents comply with the requirements of Section 5. Closed shipping containers shall be examined for closure defects. For inspection of end item preparation for delivery defects, lot size and sample unit shall be expressed in number of shipping containers. The presence of any defect listed in table V in excess of acceptable quality level (AQL) 4.0 percent defective shall constitute lot failure and shall be cause for lot rejection.

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TABLE V. Packaging defects.

INSPECT	DEFECTS
Markings	Incorrect, incomplete, illegible, or omitted. Improper size, location, or method of application.
Packing	Level of packing or container not as specified.
Workmanship	Incomplete closure of container or inadequate sealing. Inadequate application of components such as tape, straps, or staples or improper assembly. Bulged or distorted containers.
Contents	Not as specified.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packaging requirements for the desired levels of protection will be specified by the acquisition activity in their procurement document (see 6.2). If requirements are not specified, package in accordance with MIL-STD-2073-1.

5.2 Marking. Marking requirements will be specified by the acquisition activity in their procurement document (see 6.2). If requirements are not specified, mark in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. This cushioning is intended to protect against vibration and impact shock where a resilient cushion is required. This material is intended for general cushioning applications and is cut to size or molded as required. The molded forms are intended for specific articles and are molded to fit the contours of the article.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of specification.

b. Type, class, and grade of roll and sheet material required (see 1.2).

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c. Form and construction, including detailed drawings and special requirements for molded forms (see 3.4 and 3.4.1).

d. Dimensions of sheet or roll (see 3.4.2, 6.4, and 6.5).

e. Level A, B, or C of military packaging or commercial packaging (see 5.1).

f. Marking document to be used (see 5.2).

g. First article inspection required (4.3) or waived (4.3.1) (see 6.2.3).

h. If required, number of MSDS (see 3.8.1.1 and 6.7.1).

6.2.2 Contract data requirements. Data specified in paragraph 3.3.3 will be listed on a DD Form 1423 and incorporated into the contract.

6.2.3 First article. When a first article inspection is required, the item will be tested and should be selected from sample units produced using materials, equipment, and procedures which will be used in fulfilling the contract (see 4.3). The first article should consist of the samples specified in 4.3.3. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations and test approval of the first article.

6.3 Approval of dynamic compression resistance test machine. Information regarding dynamic compression resistance testing machine approval can be obtained by contacting HQ AFLC/LGTPM, Wright-Patterson AFB, OH 45433-5999.

6.4 Available widths and lengths. Roll width of 5 to 267 cm (2 to 105 inches) and roll length of 10.6 to 411 m (35 to 1350 feet) are available. Sheet width of 8 to 152 cm (3 to 60 inches) and sheet length of 25 to 183 cm (10 to 72 inches) are available. Bound fiber cushioning material is also available cut to size as specified (see 6.2).

6.5 Available thickness. Bound fiber cushioning material is commercially available in a variety of nominal thicknesses from 1.3 to 5.1 cm (0.5 to 2 inches) in single-layer thickness to unlimited fabrication height.

6.6 Disposability. One or more of the following methods shown in order of their preference shall be used to accomplish disposal of bound fiber: reuse, sanitary landfill, incineration, pyrolysis, composting, recycle, or sea disposal.

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6.7 Precautions in handling. Certain individuals may expecience adverse reactions of a respiratory, dermatological, or other nature or may be sensitive to ingredients used in the manufacture or fabrication of some flame-resistant cushioning materials. Problems or adverse effects resulting or suspected from handling these materials should be referred to the local medical department for appropriate follow-up. Safety concerns should be referred to the local safety office for review. Questions regarding specific packaging materials may be referred to the Navy Environmental Health Center, Code 34B, Norfolk, Va. If the flame-resistant cushioning material is found to contain carcinogenic agents, the following precautions during handling are recommended:

(1) Cotton gloves should be worn. Gloves should be changed at the end of the workshift, laundered before reuse, or discarded. Gloves should be changed more frequently if they fail to provide protection against skin contamination during the workday.

(2) Good general ventilation should be provided to insure that significant airborne levels of dust from fire-resistant cushioning materials do not accumulate in work areas. Questions should be referred to the local industrial hygienist for review. If dust generation is unavoidable, a National Institute for Occupational Safety and Health or Mine Safety and Health Administration approved respirator, selected based on the exposure of concern, must be provided and used. Contact the local industrial hygienist for specific guidance pertaining to requests for training and use of approved respirators.

6.7.1 Material Safety Data Sheets. Contracting officers will identify those activities requiring copies of completed MSDS prepared in accordance with FED-STD-313 and 29 CFR 1910.1200. The pertinent Government mailing addresses for submission of data sheets are listed in Appendix B of FED-STD-313 (see 3.8.1.1 and 6.2).

6.8 Subject term (key word) listing.

Bound Fiber
Cushioning
Fiber
Packaging

6.9 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes. The principal changes from PPP-C-1120B are metrification, deletion of the natural hair filler, insecticide treatment requirements,

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the insecticide effectiveness test, the insecticide information paragraph, and Section 5.

MILITARY INTERESTS:

Custodians
Army - GL
Navy - OS
Air Force - 69

Review Activities
Army - AR, AV, EA, ME, SM
Navy - AS, SH
Air Force - 03, 71, 80, 82, 84, 99
Other - DS

User Activities
Army - MD
Navy - MS, MC
DLA - DM

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Air Force - 69

DOD project 8135-0633

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	PPP C-1120C	930720

3. DOCUMENT TITLE

CUSHIONING MATERIAL, UNCOMPRESSED BOUND FIBER FOR PACKAGING

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)
	e. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code)
E. P. MORAVEC, JR. Physicist	(1) Commercial: 513-257-4519 (2) AUTOVON: 787-4519
c. ADDRESS (Include Zip Code) HQ AFMC/LGTP 5215 Thurlow Street, Bldg 70 Wright-Patterson AFB OH 45433-5540	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340

DD Form 1426, OCT 89 (EF) Previous editions are obsolete