PPP-C-1924
January 7, 1975

FEDERAL SPECIFICATION

DUNNAGE MATERIAL, VERMICULITE AND PERLITE (FOR PACKAGING PURPOSES)

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

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers expanded or exfoliated vermiculite and expanded perlite in dry, loose condition for use as loose fill dunnage material for packaging purposes.

1.2 Classification.

1.2.1 Types and classes. The dunnage material shall be of the following types and classes, as specified (see 6.2):

Type I - Vermiculite.
Class 1 - Extra coarse.
Class 2 - Coarse.

Type II - Perlite.
Class 1 - Extra coarse.
Class 2 - Coarse.

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:

L-P-378 - Plastic Sheet and Strip, Thin Gauge, Polyolefin.
UU-S-48 - Sacks, Shipping, Paper.

Federal Standard:

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

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

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

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

Military 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 suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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

American Society for Testing and Materials (ASTM) Standards:

C 136 - Method of Test for Sieve or Screen Analysis of Fine and Coarse Aggregates.
C 520 - Method of Test for Density of Granular Loose Fill Insulations.

(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., Tariff Order Section, 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.)

3. REQUIREMENTS

3.1 Materials. The dunnage material shall be made from such materials, specified in 3.1.1 and 3.1.2, as to insure compliance with all of the requirements of this specification.

3.1.1 Type I material. Vermiculite material shall be produced by the expanding or exfoliating of natural vermiculite ore by grading and heating.

3.1.2 Type II material. Perlite material shall be produced by the expanding of natural perlite ore by heating, crushing, and grading.

3.2 Density. When tested as specified in 4.5.1, the density of the dunnage material shall conform to the requirements of table I.

TABLE I. Density

Designation		Dry loose weight, lb. per cu. ft.	
Type	Class	Min.	Max.
I	1	3-1/2	7
I	2	4	8
II	1	4	9
II	2	4	9

3.3 Size. When tested as specified in 4.5.2, the size of the dunnage material particles shall conform to the requirements of table II.

TABLE II

SIEVE SIZE

Type	Class	3/8 in.		No. 4		No. 8		No. 16		No. 30		No. 50		No. 100	
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
I	1	0	40	30	90	65	98	85	100	-	-	-	-	-	-
I	2	-	-	0	5	20	80	75	99	90	100	97	100	-	-
II	1	-	-	-	-	0	15	15	60	40	80	75	100	90	100
II	2	-	-	-	-	0	5	5	45	40	65	60	100	80	100

3.4 Combustibility. When tested as specified in 4.5.3, the dunnage material shall not spark, ignite, or smoke.

3.5 Workmanship. The dunnage material shall be clean and free of extraneous particles and all other defects which would adversely affect its usability.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Sampling. Sampling for inspection and testing shall be in accordance with MIL-STD-105.

4.2.1 Lot. Unless otherwise specified (see 6.2), a lot shall consist of each type and class of dunnage material submitted for inspection at one time.

4.3 Inspection of the end item. The end item shall be inspected for the defects specified in table III at inspection level S-2 with an acceptable quality level (AQL) of 2.5 percent defective for major defects and 4.0 percent defective for minor defects.

TABLE III. Classification of defects, end item

Defects	Major	Minor
Type not as specified.	X	
Class not as specified.	X	
Dirty or damp dunnage material.		X

4.4 Inspection of preparation for delivery. An inspection shall be made to determine that the packaging and marking comply with the requirements in section 5. Defects shall be scored in accordance with table IV. For examination of interior packaging, the sample unit shall be one shipping container fully prepared for delivery, selected at random just prior to the closing operations. The lot size shall be the number of shipping containers in the end item inspection lot. The inspection level shall be S-2 with an AQL of 4.0 defects per hundred units.

TABLE IV. Classification of preparation for delivery defects

Examine	Defects
Markings	Omitted; incorrect; illegible; improper size, location, sequence, or method of application.
Containers	Not as specified. Any component missing or damaged.
Workmanship	Inadequate application of components such as incomplete closure.
Contents	Net volume is more or less than required.

4.5 Test methods. The dunnage material shall be tested at inspection level S-2 with an AQL of 2.5 percent defective.

4.5.1 Density. The density of the dunnage material shall be determined in accordance with ASTM C 520 to determine compliance with the requirement of 3.2.

4.5.2 Size. The size of the dunnage material shall be determined in accordance with ASTM C 136 to determine compliance with the requirement of 3.3.

4.5.3 Combustibility. The dunnage material shall be held in a suitable fixture and positioned in direct contact with the tip of the flame of a Bunsen burner for 15 seconds to determine compliance with the requirement of 3.4.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.1.1 Level A. Dunnage material shall be packed in quantities as specified in the contract or purchase order in sacks conforming to UU-S-48, level A, 6-6X, except the inner wall of kraft paper shall be replaced with material conforming to L-P-378, minimum 1 mil thick. Alternatively, the dunnage material may be placed in poly-coated bags or in plastic bags constructed from material conforming to L-P-378, minimum 3 mils thick. The plastic bags shall be heat sealed after filling. Excess air within the filled bag shall be kept to a practicable minimum. When the UU-S-48 sack is used, the gross weight shall not exceed 40 pounds.

5.1.2 Level B. Dunnage material shall be packed in quantities as specified in the contract or purchase order in sacks conforming to UU-S-48, level B, 3-3x, except the inner wall of kraft paper shall be replaced with material conforming to L-P-378, minimum 1 mil thick. Alternatively, the dunnage material may be placed in poly-coated bags or in plastic bags constructed from material conforming to L-P-378, minimum 3 mils thick. The plastic bags shall be heat sealed after filling. Excess air within the filled bag shall be kept to a practicable minimum. When the UU-S-48 sack is used, the gross weight shall not exceed 40 pounds.

5.1.3 Level C. Dunnage material shall be packed in containers that will assure carrier acceptance and safe arrival at destination in compliance with the Uniform Freight Classification rules or the National Motor Freight Classification rules.

5.2 Marking.

5.2.1 Civil agencies. In addition to markings required by the contract or order, the bags and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.2.2 Military agencies. In addition to marking required by the contract or order, the bags and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The material covered by this specification is intended for use in packing or shipping applications as cushioning and dunnage where a bulk, loose fill, lightweight absorbent material is desirable. If the material is not damaged beyond permanent deformation, it should be suitable for one or more reuses.

6.1.1 Application. To provide the optimum degree of protection when used for cushioning applications or for packaging of hazardous liquids, the container should be filled to top of pack, vibrated slightly so that the material will fill voids and settle particles; then overfill container to a point where it may be just closed by using fairly heavy pressure on flaps or lid. NOTE: Perlite is very abrasive and should not be used to pack articles sensitive to abrasion.

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

(a) Title, number, and date of this specification.
(b) Type and class of dunnage material (see 1.2).
(c) Quantity required by volume (cubic feet).
(d) Level of packing required (see 5.1).
(e) Size of lot if different from 4.2.1.

6.3 Description of dunnage material.

6.3.1 Type I material. Vermiculite is a micaceous mineral containing a small amount of combined water. The crude vermiculite ore is mined, cleaned, and milled to a controlled size. It is then heated to a temperature of about 2,000°F. which causes each granule to expand about 12 times its original size. The expanded vermiculite contains thousands of entrapped air cells which account for its light weight.

6.3.2 Type II material. Perlite is an inert siliceous volcanic rock containing a small amount of combined water. When crude perlite particles are heated above 1,600°F., the combined water vaporizes and the perlite expands and turns white. Expanded perlite contains thousands of macroscopic air cells which account for its light weight.

Custodians:
Army - GL
Navy - SA
Air Force - 69

Review Activities:
Army - EL, SM
Navy - AS, YO, OS, S4
Air Force - 84

Users:
Army - ME
Navy - MC

Civil Agency Coordination Activity:
GSA - FSS

Preparing activity:
GSA - FSS

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein. Price 30 cents each.