INCH-POUND

MIL-B-36970A
29 October 1991
SUPERSEDING
MIL-B-36970
28 May 1975

MILITARY SPECIFICATION

BOX, BLOOD PRODUCTS SHIPPING

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of blood shipping container suitable for transporting refrigerated whole human blood to military blood processing laboratories.

2. APPLICABLE DOCUMENTS

2.1 Government Documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Headquarters, Defense Personnel Support Center, ATTN: Directorate of Medical Materiel, DPSC-MST, 2800 South 20th Street, Philadelphia, PA 19101, by using the self-addressed Standardization Document Improvement Proposal, (DD Form 1426) appearing at the end of this document or by letter.

AMSC/NA FSC 8115

SPECIFICATIONS

Federal

PPP-B-636	Boxes, Shipping, Fiberboard
PPP-F-320	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade), and Cut Shapes

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized Unit Loads

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from: Navy Publishing and Printing Service Office, Building 4D NPM-NPODS, 700 Robbins Avenue, Philadelphia, PA 19111-5094).

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWING

Defense Personnel Support Center (DPSC)

25019	Box, Whole Blood Shipping Compartmented, Small

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

ASTM

C177	Standard Method of Test for Thermal Conductivity of Materials by Means of the Guarded Hot Plate
D882	Tests for Tensile Properties of Thin Plastic Sheeting
D1621	Standard Method of Test for Compressive Strength of Rigid Cellular Plastics
D1622	Standard Method of Test for Apparent Density of Rigid Cellular Plastics

(Application for Copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103).

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), 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 Material. The outer box shall be solid weatherproof fiberboard (see 3.1.1); the insert, insert cover, and partitions shall be polystyrene foam. Materials shall conform to the applicable specifications and requirements specified herein. Materials not specifically designated shall be of high commercial quality throughout, and shall be entirely suitable for the intended purpose.

3.1.1 Outer box. Box shall be constructed of corrugated fiberboard conforming to PPP-F-320, having a dry bursting strength of either 275 or 350 pounds per square inch. Box shall conform to PPP-B-636, class weather resistant, grade V3c, style CSSC.

3.1.2 Insert, insert cover, and partitions. The insert, insert cover, and partitions shall be foam molded parts of polystryene having the characteristics specified herein. The molded foam shall be firm in composition and essentially unicellular or closed cell structure. The molded foam shall be homogeneous and of uniform texture and density. There shall be no visible large void openings, accumulations of unexpanded material, inclusions, tears, or tears that have been cemented together. The molded surfaces shall be essentially smooth, suitable for easy cleaning and drainage, and free from ridges and grooves. Edges and corners shall be well defined, and there shall be no areas containing filled-in material. All surface areas of the molded parts shall be free from evidence of moisture or liquid water when examined visually. Molded parts shall be non-hygroscopic, dry, and free from foreign matter. The color of the end product shall be natural or neutral with no color additives. The molded foam shall be free from any objectionable odor and shall not contain any fire retardant additives.

3.1.2.1 Polystyrene foam. The polystyrene foam shall be fabricated of expandable medium-size polystyrene beads which shall be aged for a minimum of 10 hours and a maximum of 48 hours after pre-expansion. The polystyrene shall have a density range of 2.0 to 2.4 pounds per cubic feet. The molded foam (insert, insert cover, and partitions) shall have a minimum compressive strength of 18 psi (at yield or 5 percent compression, whichever occurs first) and a maximum average thermal conductivity of 0.28 BTU per inch per hours per square foot per degree Fahrenheit. The maximum absorption shall be 0.10 pounds per square foot of skinless or rindless surface. The polystyrene foam shall be tested as specified in 4.4.1.

3.1.3 Plastic bags. The bags shall be fabricated from extruded, seamless, lay-flat, polyethylene tubing. Wall thickness shall average 0.004 inch and minimum thickness at any point shall be not less than 0.0036 inch. Polyethylene shall be 100 percent virgin material, of the best quality, and shall have the following tensile properties when tested as specified in 4.4.6:

Tensile strength:	Lengthwise	2800 p.s.i., minimum
Tensile strength:	Crosswise	1500 p.s.i., minimum

3.2 Construction.

3.2.1 Blood products shipping box. The blood products shipping box shall consist of a rectangular outer fiberboard box, and the following molded foam components: an insert with two removable partitions, and an insert cover. The blood products shipping box shall be in accordance with Defense Personnel Support Center (DPSC) Drawing 25019. The blood products shipping box shall be suitable for shipping refrigerated whole blood with conditioning medium. The box shall be capable of maintaining temperature requirements as specified in 3.4. When fully packed, the box shall be capable of passing through a circular opening with a twenty-five inch diameter. The box shall be furnished completely assembled, ready for loading, and shall contain two plastic bags, (see 3.1.3). The fully loaded, assembled box shall have sufficient strength and rigidity to be capable of being stacked or palletized for storage to six boxes high. When stacked, the bottom box shall display no signs of stress or evidence of deformation of sides after being stored in this configuration for up to five days and then checked with a straight edge. The weight of the unloaded blood shipping box (outer box, insert, insert cover, partitions, and two empty temperature conditioning medium bags) shall not exceed 9-1/2 pounds. The complete whole blood shipping box including a full pack of PRBC and 14 pounds of bagged, cubed ice shall not exceed 75 pounds.

3.2.2 Outer box. The outer box shall be as specified in 3.1.1 and DPSC drawing 25019. In addition, front side of box shall be coated with "Michaelman Wax" as indicated on DPSC drawing 25019. The outer box shall be suitable for holding the fully loaded, assembled insert, and insert cover (3.2.3), and shall be capable of being handled without damage to the box and contents.

3.2.3 Insert, insert cover and partitions. The insert shall have sufficient capacity for receiving and holding 30 units of packed red blood cells contained in 600 ml blood bags or 27 units of packed red blood cells contained in 800 ml blood bags, plus 14 pounds of bagged, cubed ice. The partitioned insert shall protect bags from abrasion and permit optimum circulation of air while supporting the blood bags upright and providing protection from the weight of the ice.

3.2.4 Ice bag. Each temperature conditioning medium (ice) bag shall be made from one piece of polyethylene tubing as specified in 3.1.3. The tubing shall be heat sealed across one end to form the bag. The bag shall extend 1/2 plus or minus 1/4 inch beyond the heat seal. The heat seal shall have a total width of 1/8 plus or minus 1/16 inch. A double heat seal shall be permitted. Bag shall not leak when tested as specified in 4.4.7.

3.3 Surface dryness. The supplier shall insure dryness of all molded parts. The choice of drying methods used in obtaining dry parts is left to the discretion of the supplier. However, the method used shall have no deleterious effect on the molded parts, such as blistering or formation of surface crust. All surface areas of the parts shall be free from evidence of moisture or liquid water, when examined by visual means.

3.4 Performance. In an ambient temperature of 120°F plus or minus 1°F, the "blood temperature" in a fully loaded blood products box shall not exceed 50°F starting with pre-conditioned temperature of 39°F plus or minus 1°F for a minimum of 48 hours (without replenishing the temperature conditioning medium), when tested in accordance with 4.4.4.

3.5 Identification marking. All marking or printing shall be permanent and legible. The outer box shall be marked in accordance with DPSC Drawing 25019. The name of the contractor shall be molded on the bottom outside surface of the insert.

3.6 Workmanship. The complete shipping box and component parts shall be clean, well made, and free from defects which detract from their appearance or impair their serviceability. Occasional minor marks from knockout pins, steam ports, or sink marks are acceptable provided that serviceability is not affected.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to the prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Records. Records of examinations and tests performed by or for the contractor shall be maintained by the contractor and made available to the Government, upon the Government's request, at any time, or from time to time, during the performance of the contract and for a period of 2 years after delivery of the supplies to which such records relate.

4.1.3 Inspection. Inspection, as used in this specification, is defined as both examination (such as visual, and auditory, investigation without the use of special laboratory appliances or procedures) and testing (determination by technical means of physical and chemical properties) of the item.

4.1.4 Certificates of quality. Certificates of quality, supplied by the manufacturer of the component fiberboard box or of the plastic material may be furnished in lieu of actual performance of such testing by the contractor, provided lot identify has been maintained and can be demonstrated to the Government. The certificate shall include the name of the contractor, the contract number, the name of the manufacturer or supplier, the NSN, the Item Identification, the name of the component/material, the lot number, the lot size, the sample size, the date of testing, the test method, individual test results, and the specification requirements.

4.2 Sampling.

4.2.1 Sampling for examination. Sampling for examination shall be conducted in accordance with MIL-STD-105. The inspection levels and acceptable quality levels (AQL's) shall be as indicated in table I.

TABLE I. Sampling for examination.

	Inspection level	AQL (Percent defective)
For visual examination		
Major defects	II	2.5
Total defects (Major and Minor combined)	II	4.0
For dimensional examination	S-1	2.5

4.2.2 Sampling for tests. Sampling for tests shall be conducted in accordance with MIL-STD-105.

4.2.2.1 Polystyrene units. Sampling shall be as specified in table II. The inspection lot shall be units of products from one batch of raw material supplied by one manufacturer. Minimum sample size shall be three, except as specified for temperature test.

TABLE II. Sampling of polystrene units.*

Characteristic	Requirement	Test Procedure	Inspection level
	Polystyrene	Polystyrene	
Density	3.1.2.1	4.4.1	S-2
Compressive strength	3.1.2.1	4.4.1	S-2
Thermal conductivity	3.1.2.1	4.4.1	S-2
Water absorption	3.1.2.1	***	S-2
Integrity of structure	3.1.2.1	***	S-2
Temperature test	3.4	4.4.4	**

* Acceptable quality level (AQL) shall be zero for all sample sizes.
** A lot shall consist of a maximum of 800 units (boxes). One temperature test shall be performed on one unit from each lot.
*** Manufacturer of raw material shall supply certificate of conformance.

4.2.2.2 Polyethylene ice bag. Sampling shall be as specified in table III. Unit of product shall be the bag.

TABLE III. Sampling of polyethelene ice bag.*

Characteristic	Requirement	Test procedure	Inspection level	AQL (percent defective)
	Polyethylene	Polyethylene		
Minimum thickness of wall	3.1.3	**	S-2	1.5
Average thickness of wall	3.1.3	**	S-2	-
Tensile strength	3.1.3	4.4.6	S-2	1.5
Lengthwise				
Crosswise	3.1.3	4.4.6	S-2	1.5
Leakage	3.2.4	4.4.7	S-2	1.5

* Minimum sample size for all characteristics shall be three. Where possible, the same sample unit shall be used for the determination of two or more test characteristics.

** Manufacturer of raw material shall supply certificate of conformance.

4.3 Examination. The blood products shipping box shall be examined to determine compliance with the requirements of this specification.

4.3.1 Classification of defects. Examination shall be conducted in accordance with the classification of defects listed below.

TABLE IV. Classification of defects.

Categories	Defects *
Major	
101	Style, design, and construction of blood shipping box not as specified.
102	Blood shipping box not complete with all specified component parts. (Outer box, insert with two partitions, insert cover and two plastic bags).
103	Molded components not free from cracks, ruptures, or tears.
104	Molded components not free from visible voids of more than 1/8 inch across the largest dimension.
105	Molded components not free from visible accumulation of unexpanded material.
106	Insert cover not snug fit on insert.
107	Molded components not properly formed.
108	Molded components warped or distorted.
109	Marking (as specified on drawing) missing, incomplete, or illegible.
110	Marking not placed in specified locations, or not dimensioned or colored as specified.
111	Insert partitions not easily inserted or removed.
112	Molded components not free from objectionable odor.
113	Molded components not free from blistering or formation of surface crust.
114	Molded components not free from evidence of moisture or liquid water.
115	Plastic bag not free from holes, cuts, and tears.
116	Bag not proper size.

TABLE IV. Classification of defects. Continued.

Categories	Defects *
117	Bag's heat seal incomplete, irregular.
118	Heat seal not the proper width or distance from the end of the bag.
Minor	
201	Color not as specified.
202	Molded components not free from sharp edges.
203	Marketing missing on insert.
204	Molded components not free from flash.
205	Plastic bag not clear and colorless.

* Examination shall not be restricted to the classified possible defects listed above.

4.4. Tests. Tests shall be conducted to determine compliance with the requirements of this specification.

4.4.1 Polystyrene plastic. The molded polystyrene foam (insert, cover, and partitions) shall be tested for density in accordance with the test methods as specified in ASTM D1622; for compressive strength (procedure A of ASTM D1621); and for thermal conductivity (ASTM C177).

4.4.2 Temperature test. The temperature test shall be conducted on a fully loaded blood products box which shall contain 30 filled blood collecting and dispensing bags (see 3.2.3) containing water and anticoagulant solution, and conditioning medium. The conditioning medium shall be packaged as described herein and placed on the top of the filled blood bags.

The blood bags shall be filled by adding water to the solution, which is furnished in each bag. The bags shall be sealed to prevent leakage (by heat sealing or knotting the tubing) and the excess tubing cut off and discarded.

The conditioning medium shall consist of 14 pounds of cubed ice in 2 quarts (64 ounces), plus or minus 2 ounces, of ice water in double temperature conditioning bags (2 bags, one inside the other). Each conditioning bag shall be separately sealed (heat sealing or knotting).

Prior to the test, the blood products shipping box and filled blood bags shall be separately stored (pre-conditioned) at 39°F plus or minus 1°F for 24 hours. Thermocouples and temperature recorders shall be utilized. Thermocouples shall be properly calibrated copper-constantan type. Recording test equipment shall be properly calibrated and accurate to plus or minus 1°F. Two thermocouples shall be used. One thermocouple shall be placed at each of the following locations:

a. One thermocouple shall be located between the third and fourth bag in the center partition attached to the outside surface of either bag by suitable means to preclude movement. The thermocouple shall be centralized 2 plus or minus 1/8 inches above the bottom of the bag (where the seal makes contact with the fluid) prior to the addition of the water. The temperature measured by this thermocouple shall be considered the "blood temperature" for test purposes. Feeding of the thermocouple leads through the box shall be accomplished by placing the leads between the insert cover mating surfaces, and between the seams of the outer box.

b. One thermocouple shall be located at a suitable location so as to properly measure the ambient temperature of the climatic chamber.

For testing purposes, the outer box shall be sealed in accordance with 5.2.1, together with one strip of tape over the lengthwise seam of the top outer flaps. All tapes shall be as specified in 5.2.1

The fully loaded blood products shipping box shall be placed in a climatic chamber having an ambient temperature of 120°F plus or minus 1°F and allowed to stand for a minimum period of 48 hours. Temperature measurements shall be recorded continuously.

4.4.3 Tensile strength. The tensile strength of the polyethylene, lengthwise and crosswise, shall be determined in accordance with method A of ASTM D882.

4.4.4 Leakage. Three liters of water shall be poured into a bag, and the bag shall be suspended for one hour.

4.5 Inspection of packaging. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification and the marking requirements of MIL-STD-129.

5. Packaging.

5.1. Preservation. Preservation shall be level A, as specified (see 6.1).

5.1.1 Level A.

5.1.1.1 Unit. One assembled box, as specified, constitutes one unit.

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

5.2.1 Level A. Each box shall be shipped completely assembled. Closure of bottom flaps shall be as specified in PPP-B-636, Methods III or V. Closure of top flaps shall be accomplished by using Velcro tabs as indicated on DPSC drawing 25019.

5.2.2 Unitized loads. Assembled boxes shall be unitized as specified in MIL-STD-147 on type IV or type V 4-way entry pallets. Pallet shall have a length of 40 inches and a width of 48 inches. Pallet loads, including the pallet, shall not exceed 54 inches in height, 43 inches in length and 52 inches in width. As an alternate, assembled boxes may be unitized by using suitable fiberboard cartons in lieu of pallets.

5.3 Marking.

5.3.1 Level A.

5.3.1.1 Unit. Each assembled box shall be marked in accordance with 3.5 and DPSC drawing 25019.

5.3.1.2 Unitized load. Each unitized load shall be marked as specified in MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The box will be used for shipping refrigerated whole human blood with conditioning media to maintain refrigeration.

6.2 Acquisition requirements.

a. Title, number, and date of the specification.

b. Issue of DODISS to be cited in the solicitation and if required, the specific issue of individual documents referenced (see 2.1 and 2.2).

c. Applicable level of preservation and packing (see 5.1 and 5.2).

d. Whether Government furnished material will be furnished (see 6.4).

6.3 Applicability. This specification does not cover all types, classes, grades, or sizes of the commodity indicated by the title of this specification, or those which are commercially available, but is intended to cover the types which are normally procured to meet requirements.

6.4 Government furnished material. When specified in the contract, blood collecting bags shall be furnished the contractor by the Government for use in testing the blood box. Government furnished material shall consist of four units of NSN 6215-00-079-9483 BLOOD COLLECTING - DISPENSING BAG AND DONOR SET. 450 cc, Disposable, 6's.

6.4.1 Blood bags for testing. When Government furnished material is not required in the contract blood bags which are considered suitable for use in testing the blood box are manufactured by Fenwal Laboratories, Catalog No. 4R0513, CPD Single Blood Pack Unit. Each unit contains 6 bags.

6.5 Subject term (key word) listing.

Foam container
Ice refrigerant
Outer fiberboard

6.6 The outer box in 3.1.1 and the partitions in 3.1.2 are stock listed as follows:

National Stock Number	Item Identification
8115-01-339-8742	PARTITION, BOX, BLOOD PRODUCTS, SHIPPING; Replacement Item
8115-01-339-8743	BOX, OUTER, BLOOD PRODUCTS, SHIPPING; Replacement Box

6.7 Item identification. The following National Stock Number is covered by this document:

8115-00-935-9761

Custodians:

Army - MD
Navy - MS
Air Force - 03

Review activities:

Army - GL

Civil Agency Coordinating Activities:

USPHS
FDA - MPQAS

Preparing activity:

DoD - MB

Agent:

DLA - DM

Project No.8115-0524

Location: BXBLMM11.DOC

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-B-36970A	2. DOCUMENT DATE (YYMMDD) 29 October 1991

3. DOCUMENT TITLE: BOX, BLOOD PRODUCTS SHIPPING

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)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING activity

a. NAME DEFENSE PERSONNEL SUPPORT CENTER ATTN: DPSC-MSE	b. TELEPHONE (Include Area Code) (1) Commercial: AC 215-737-2870 (2) AUTOVON: AV 444-2870
c. ADDRESS (Include Zip Code) 2800 SO. 20TH STREET PHILADELPHIA, PA 19145	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