

INCH-POUNDS

MIL-B-26701F
15 September 1994
SUPERSEDING
MIL-B-26701E (In Part)
14 May 1982
Amendment 1
3 July 1984

MILITARY SPECIFICATION

BOTTLE, POLYMER, IN A COMBINATION CONTAINER,
SHIPPING AND STORAGE, AIR ELIGIBLE

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

1. SCOPE

1.1 Scope. This specification covers combination packaging with a polymer bottle inside of outer packages, needed to safely ship regulated materials. This specification's main use is to safely store and transport weak to moderately corrosive liquids throughout the world-wide civilian and military transportation systems.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are 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: Air Force Packaging Evaluation Activity, HQ AFMC/LGTP, 5215 Thurlow Street, Bldg 70, Wright-Patterson AFB OH 45433-5540, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8125

DISTRIBUTION STATEMENT A. Approved for public release;
distribution is unlimited.

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MILITARY STANDARDS

- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-2073-1 - DOD Materiel Procedures for Development and Application of Packaging Requirements (Part 1 of 2 Parts)

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Ave., Building 4D, Philadelphia, PA 19111-5094.)

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

UNITED STATES LAWS AND REGULATIONS

Code of Federal Regulations, Title 49, Parts 1 to 199

(The Code of Federal Regulations, Title 49, Parts 1 to 199 is available from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 371954, Pittsburgh, PA 15250-7954.)

2.1.3 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 the documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

INTERNATIONAL REGULATIONS

International Maritime Dangerous Goods Code

(The International Maritime Dangerous Goods Code is available from the International Maritime Organization, 4 Albert Embankment, London, England, SE1 7SR.)

Technical Instructions for the Safe Transport of Dangerous Goods by Air

(The Technical Instructions for Safe Transport of Dangerous Goods by Air is available from the International Civil Aviation Organization, 1000 Sherbrooke St, Suite 400, West Montreal, Quebec, Canada 113A 2R2.)

ASTM

- D 4919 Standard Specification for Testing Hazardous Materials Packaging (DoD Adopted)

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(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.)

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASTM D-1238 Measuring Flow Rates of Thermoplastics
by Extrusion Plastometer (DoD Adopted)

(Application for copies should be addressed to either the American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002; or ASTM address above.)

PLASTIC BOTTLE INSTITUTE

Technical Bulletin PBI-24 Voluntary Guidelines, Plastic
Bottle Material Code System-
Mold Modification Drawings

(Application for copies should be addressed to the Society of the Plastics Industry, 1275 K Street NW, Suite 400, Washington, DC 20005.)

(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.)

2.2 Order of precedence. In the event of a conflict between this text and the basic domestic or international hazardous material transportation regulations, those regulations take precedence. Conflicts with other documents 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 Packaging material requirements. The bottle, filler material (if any) and the outer packaging all must satisfy the requirements outlined in 49CFR 173, subpart B and 49CFR 178, subpart L for the moderately corrosive materials intended to be carried in transport (see 4.3 and 4.4).

3.1.1 Inner bottle. Plastic bottles or jerricans shall be made from natural color, blow molding grade, polymer resin, either homopolymer or copolymer. The use of clean, internally generated, regrind or reclaimed material conforming to the applicable regulations is permissible. Unless otherwise specified (see 6.2), formed handles or hand grips shall be integral parts of the bottles or jerricans and shall be provided for greater than one gallon (3.8 L) bottles. The bottle or jerrican's material content shall be permanently encoded in accordance with PBI-24 for maximum resin recycle ability. The bottles or jerricans shall have a maximum melt index of 1.0 when tested as specified in 4.4.2.

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3.1.2 Filler material. The filler material, as deemed necessary by the manufacturer and mark certifying activity in 49CFR 178, subpart L, shall not be combustible, absorbent, or reactive to the intended contents.

3.1.3 Outer packaging. The outer packaging shall be an approved outer packaging for a moderately corrosive liquid carrying combination packaging in 49CFR 173, subpart E. The material shall be of sufficient size to adequately contain and protect the inner bottle from damage which can be expected during either the commercial or military transportation (including air) systems. The outer packaging shall be properly marked to certify that the tests outlined in the specification have passed. The marking shall reflect the requirements of 49CFR 178.3 and 49CFR 178, subpart L. It shall also include the marking "air-eligible."

3.2 Test report. The supplier shall supply, to the ordering government organization, two copies of the test report required in 49CFR 178. The report shall include all information, including cap torque, required to comply with the domestic and international regulations and within this specification (see 4.3.2).

3.2.1 Compatibility. The test report shall include a compatibility chart for both the bottle or jerrican, liner and the cap, if composed of different materials. The information shall include chemical groups or families that are and are not compatible with the bottle or jerrican material to the time requirement of 49CFR 173.

3.2.2 Packaging instructions. The test report shall completely document all information, required from the manufacturing and marking organizations, for the shipping activities to fulfill their requirements in 49CFR 173, Subpart B, and 178, including Subparts L and M. These test reports shall include complete directions on how to pack the combination packaging for shipment, including from 49CFR 173, Subpart B relating to air transport of mixed contents. Any additional material required to meet 49CFR requirements shall be standard government or military issue.

3.3 Closure. The caps furnished under this specification may be made of the same material as the bottle or jerrican. If the cap and liner material, if needed, are different from the bottle or jerrican, they shall also be compatible with the same chemical classes as the bottle material (see 4.3.2).

3.3.1 Cap liner. The cap liners, if needed, shall be of mildly corrosive-resistant material. Liners shall be molded within the cap or attached to the cap with a suitable adhesive, compatible with the moderately corrosive liquids, to become an integral part of the cap. There shall be no loose pieces. If applicable, the material must successfully pass the material compatibility test (see 4.4.4.1).

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3.3.2 Attachment of caps. When specified (see 6.2), each bottle shall have a cap affixed to the neck. If not specified to be affixed to the neck, the cap shall be placed inside the sealed shipping container configuration.

3.3.3 Threads. Threads on the neck of the bottle with the cap shall be of the buttress or semi-buttress type allowing at least one revolution before seating of the cap against the bottle or jerrican. When the cap is completely screwed onto the bottle, the rim of the bottle or jerrican shall seat firmly against the inner bearing surface of the cap or against the liner to ensure sealing.

3.4 Assembly. The combination packaging, except the bottle or jerrican to its cap, shall be received assembled by the originating government organization. The outer container must be secured in such a way as not to damage the container or its material characteristics when opened (see 4.3.2).

3.5 Outage. The outage or air space of the bottles or jerrican shall be a minimum of 5 percent and a maximum of 10 percent when tested as specified in 4.4.3.

3.6 Test Results. (see 4.4.4)

3.6.1 Drop test. The combination packaging must successfully pass the test outlined in 49CFR 178, subpart M.

3.6.2 Stacking test. The combination packaging must successfully pass the test outlined in 49CFR 178, subpart M.

3.6.3 Leakproofness test. All individual bottles must successfully pass the test outlined in 49CFR 178, subpart M.

3.6.4 Hydrostatic pressure test. The bottle alone or as a part of the combination container must successfully pass the test outlined in 49CFR 178, subpart M.

3.6.5 Vibration standard. The combination packaging must successfully pass the test outlined in 49CFR 178, subpart M.

3.7 Bottle capacities. The plastic bottles or jerricans furnished under this specification shall have the following nominal capacities: (see 4.3.2 and 6.2)

1 pint	(473 millilitres)		2 gallons	(7.57 litres)
500 millilitres	(1.06 pints)		8 litres	(2.11 gallons)
1 quart	(0.946 litres)		10 litres	(2.64 gallons)
1 litre	(2.113 pints)		15 litres	(3.96 gallons)
1 litre	(0.26 gallons)		5 gallons	(18.93 litres)
2 litres	(0.528 gallons)		20 litres	(5.28 gallons)
1 gallon	(3.8 litres)		25 litres	(6.61 gallons)
4 litres	(1.06 gallons)		10 gallons	(37.85 litres)
5 litres	(1.32 gallons)		50 litres	(13.2 gallons)

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3.8 Workmanship. (see 4.3.2)

3.8.1 Finish. The bottle finish shall be smooth. The surface shall be free from ridges, pinch-off flash, flow marks or depressions on mold partition line crevices.

3.8.2 Freedom from defects. The bottles shall be free from bubbles, cracks, pinholes, dirt, foreign matter, chipped edges, blisters, scratches, and other defects affecting their serviceability or appearance. The outer packaging must also be free of defects which could fail and create a hazard to life, equipment or the environment.

3.8.3 Uniformity. The bottles shall be uniform in color, texture, finish, and physical properties.

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 facility suitable for performance of the inspection requirement 6 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 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 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 materials.

4.1.2 Sampling for inspection. Sampling for inspection shall be performed in accordance with the provisions set forth in Table I, except where otherwise indicated. For purposes of sampling, an inspection lot for examination and test shall consist of all containers of the same capacity, produced under the same process and formulation, and submitted for delivery at one time.

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

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- a. Product quality conformance inspection (see 4.4).
- b. Inspection of shipping packaging (see 4.5).

4.3 Inspection of the end item.

4.3.1 Testing of the end item. The sample unit for performance of all tests outlined in section 4.4 shall consist of the number of bottles, jerricans or combination containers as outlined in the test procedure. No failures shall be observed.

Characteristic	Requirement	Test Method	Test Quantity Required
Packaging Materials	3.1	4.4.1	All
Melt Index	3.1.1	4.4.2	3
Outage	3.5	4.4.3	3
Drop Test	3.6.1	4.4.4.2	5
Stacking Test	3.6.2	4.4.4.3	3
Leakproofness Test	3.6.3	4.4.4.4	All
Hydrostatic Pressure Test	3.6.4	4.4.4.5	3
Vibration Test	3.6.5	4.4.4.6	3

4.3.2 Examination of the end item for defects in appearance, construction, and general workmanship. The sample size shall be determined using Table I with no defects.

<u>EXAMINE</u>	<u>DEFECTS (Major)</u>
BOTTLES OR JERRICANS	Bottle does not rest evenly upon a flat, smooth level surface.
	Surface finish not smooth; evidence of flow marks or ridges.
	Not clean, dry or ready to use.
	Presence of bubbles, blisters, cracks, chipped edges, dirt, foreign matter, deep scratches, or abrasions.
	Thread of neck and within cap not buttress or semi-buttress type.
	Threads not clean; threads distorted or contain sharp edges.

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EXAMINE (cont.)	DEFECTS (Major)
BOTTLES OR JERRICANS (cont.)	Cap liners not molded or securely attached within the cap, not tight fitting. Bottles greater than 1 gallon without hand holds or a handle. Not a capacity listed in 3.3. Bottles not properly marked as required in 49CFR 178, subpart L, and material content to promote recycling.
FILLER MATERIAL	Not present, if required. Material combustible, chemical reactive, or not absorbent.
OUTER PACKAGING	Not made from a material approved as an outer packaging for corrosive liquids in 49CFR 173, subpart E. Not correct size in relation to the inner packaging. Not properly marked as required in 49CFR Paragraph 178.3 and Part 178, subpart L. Not marked "air-eligible."
TEST REPORT	Two copies not supplied to the government procuring office. Tests performed and results from 49CFR 178, subpart M are not completely documented. Procedure needed to properly assemble package for shipment is not completely documented. Results of tests involving packaging material from 49CFR 178, subpart L are not completely documented. Test report marking not the same as on the outer packaging. Test report doesn't include a chemical family compatibility chart.
CLOSURE	Cap not affixed to neck, if required.

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EXAMINE (cont.)DEFECTS (Major)

Cap or liner doesn't fit securely on either the bottle or jerrican.

Liner, when required, is not molded or secured into cap.

Threads not buttress or semi-buttress type.

ASSEMBLY

Combination packaging not assembled as required. Missing components. Damage to outer packaging when opened by user.

Table 1

<u>Paragraph</u>	<u>Lot Size</u>	<u>Sample Size</u>	<u>Paragraph</u>	<u>Lot Size</u>	<u>Sample Size</u>
4.3 and	2-8	all	4.5	2-5	all
4.4	9-90	8		6-50	5
	91-150	12		51-90	7
	151-280	19		91-150	11
	281-500	21		151-280	13
	501-12K	29		281-500	16
	12K1-32K	35		501-12K	19
	32K1-100K	38		12K1-32K	23
	100K1-350K	46		32K1-100K	29
				100K1-350K	35

4.4 Test methods.

4.4.1 Hazardous material tests. All packaging materials, as required by 49CFR 173, subpart B and 49CFR 178, subpart L shall be tested and pass the required tests prior to initiation of the performance tests (see 3.1).

4.4.2 Melt index. Bottles and jerricans shall be tested for melt in accordance with requirements specified in ANSI/ASTM D-1238, procedure A, condition E (see 3.1.1).

4.4.3 Outage. A minimum of three sample bottles or jerricans are to be tested in the following manner to determine compliance with 3.5.

4.4.3.1 Procedure. The bottle or jerrican and cap shall be weighed empty. The bottle or jerrican shall be filled with water equal in volume to the nominal capacity of the bottle or jerrican, and the bottle or jerrican shall be re-weighed. The bottle or jerrican shall then be completely filled to the top with water and the cap screwed tight. Care shall be taken to ensure that no air bubbles are entrapped in the bottle or jerrican. The bottle or

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jerrican shall be wiped dry and weighed again. The outage shall be calculated as follows:

$$\text{Percent Outage} = \frac{W3 - W2}{W3 - W1} \times 100$$

NOTE: Weights are to the nearest gram for sizes less than one quart and to the nearest ounce for larger bottles or jerricans.

W1= Weight of empty bottle or jerrican.

W2= Weight of bottle filled to rated capacity with water.

W3= Weight of bottle completely filled with water.

4.4.4 Hazardous material performance testing. All packaging configurations shall be tested to the requirements set forth in 49CFR 178, the Technical Instructions for the Safe Transport of Dangerous Goods by Air, and the International Maritime Dangerous Goods Code. The test procedure shall follow regulatory and general industry accepted testing procedures such as those listed in ASTM D-4919.

4.4.4.1 Compatibility test. Before performing any of the following tests, the bottles or jerricans shall complete this test. The compatibility test shall be performed using a sulfuric acid solution with a specific gravity of 1.28.

4.4.4.2 Drop test. The test samples, either as a complete combination packaging configuration or as an individual bottle or jerrican, must successfully pass the Packing Group II drop test requirements set forth in 49CFR 178, subpart M (see 3.6).

4.4.4.3 Stacking test. The test samples, either as a complete combination packaging configuration or as an individual bottle or jerrican, must successfully pass Packing Group II stacking test requirements set forth in 49CFR 178, subpart M (see 3.6).

4.4.4.4 Leakproofness Test. All polymer bottles must successfully pass the leakproofness requirements set forth in 49CFR 178, subpart M (see 3.6).

4.4.4.5 Hydrostatic pressure test. The test samples, either as a complete combination packaging or as an individual bottle or jerrican, must successfully pass the Packing Group II hydrostatic pressure test requirement set forth in 49CFR 178, subpart M (see 3.6).

4.4.4.6 Vibration standard. The test samples, as a complete combination packaging must successfully pass the vibration requirements set forth in 49CFR 178, subpart M (see 3.6).

4.5 Outer packaging quality conformance. Visual inspection of final packages shall be performed to determine compliance to the packaging and marking requirements set forth in paragraph 5 or

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required by the acquisition documents from paragraph 6.2. Sample size shall be determined using Table I.

5. PACKAGING

5.1 Packaging requirements. Packaging requirements for the combination packaging to the desired level of protection will be specified by the acquisition activity in their acquisition documents (see 6.2). If requirements are not specified, package in accordance with MIL-STD-2073-1.

5.2 Shipping Container requirements. Marking requirements will be specified by the acquisition activity in their procurement document (see 6.1). If requirements are not specified, mark in accordance with MIL-STD-129 and include the following: "Internal containers conform to (49CFR 178, subpart L marking)" and "Bottles made from (polymer material)."

6. NOTES

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

6.1 Intended use. This combination packaging covered by this specification is intended for use as containers for mildly corrosive liquids and other regulated material within the limits set forth by this specification, tests performed, physical characteristics, and applicable international and domestic hazardous materials transportation regulations. These limitations include packing group test qualifications and plastic compatibility set forth in the test report. The containers, properly packed, qualify for use in transporting hazardous materials by air and submarine.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).
- c. If handles or hand grips are required on a bottle less than 3.8L or not required on a bottle greater than that size (see 3.1.1).
- d. If the caps must be attached to the neck of the bottle (see 3.3.2).
- e. Size of inner container required (see 3.7).
- f. Levels of packaging and packing (see 5.1).

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g. Marking requirements (see 5.2)

6.3 Supersession data. This specification supersedes MIL-B-26701E for packaging liquids which are compatible with the polymer bottle and which are subject to government and international transportation regulations for hazardous materials. When packaging nonregulated liquids, refer to Commercial Item Description A-A-58030.

6.4 Subject term (key word) listing.

hazardous material liquid shipping container
corrosive liquids
combination container
air-eligible

6.5 Changes from previous issues. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - GL

Navy - SA

Air Force - 69

Preparing Activity:

Air Force - 69

Project (8125-0378)

Review activities:

Army - MD, SM, AR

Air Force - 99

Navy - AS, MC

DLA - GS