

MIL-D-23119F
6 May 1985
SUPERSEDING
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MILITARY SPECIFICATION

DRUMS, FABRIC, COLLAPSIBLE, LIQUID FUEL, CYLINDRICAL, 500-GALLON CAPACITY

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

1. SCOPE

1.1 Scope. This specification covers three types of nonvented cylindrical, collapsible rubber drums, 500-gallon capacity, for storing and transporting fuels.

1.2 Classification. The drum shall be the following types as specified (see 6.2).

Type I - 78 inches long, with both internally mounted fuel/defuel valve and with 2 inch x 2 inch coupler valve and adapter.

Type II - 58 inches long, with one, 2 inch x 1-1/2 inch coupler valve and adapter.

Type III - 58 inches long with two, 2 inch x 1-1/2 inch coupler valves and adapters.

1.2.1 Part number. The part numbers for the drums shall be as follows:

M23119-01 (type I)
M23119-02 (type II)
M23119-03 (type III)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research and Development Center, ATTN: STRBE-DS, Fort Belvoir, VA 22060-5606 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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SPECIFICATIONS

FEDERAL

- | | |
|-----------|---|
| QQ-S-781 | - Strapping, Steel, and Seals. |
| PPP-B-35 | - Bags, Textile, Shipping, Burlap, Cotton, and Waterproof Laminated. |
| PPP-B-601 | - Boxes, Wood, Cleated-Plywood. |
| PPP-B-640 | - Boxes, Fiberboard, Corrugated, Triple-Wall. |
| PPP-C-795 | - Cushioning Material, Flexible Cellular, Plastic Film, for Packaging Applications. |
| PPP-P-291 | - Paperboard, Wrapping and Cushioning. |
| PPP-T-60 | - Tape: Packaging, Waterproof. |

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| MIL-P-116 | - Preservation, Methods of. |
| MIL-N-5877 | - Nozzle, Pressure Fuel Servicing, Locking, Type D-1, Nominal 2-1/2 Inch Diameter. |
| MIL-T-6396 | - Tank, Aircraft Propulsion Fluid System, Internal, Removable, Non-Self-Sealing. |
| MIL-S-7916 | - Sealing Compound, Thread and Gasket, Fuel, Oil, and Water Resistant. |
| MIL-A-8625 | - Anodic Coatings, for Aluminum and Aluminum Alloys. |
| MIL-T-25959 | - Tie Downs, Cargo, Aircraft. |
| MIL-G-46015 | - Gasoline, Automotive, Combat, Referee Grade. |

STANDARDS

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| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - Marking for Shipment and Storage. |
| MIL-STD-130 | - Identification Marking for US Military Property. |
| MIL-STD-889 | - Dissimilar Metals. |
| MS24484 | - Adapter, Pressure Fuel Servicing, Nominal 2-1/2 Inch Diameter. |

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein.

DRAWINGS

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|--------------|--|
| TA13216E9170 | - Drum, Fabric, Collapsible, Liquid Fuel, 500 Gallon Capacity, Type II, (Shortie). |
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TA13217E2990

- Drum, Fabric, Collapsible, Liquid Fuel, 500
Gallon Capacity, Type I, Class 3 (Longie).

TA13227E6314

- Drum, Fabric, Collapsible Liquid Fuel, 500
Gallon Capacity, Type III (Shortie).

(Copies of specifications, standards, and drawings required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM D 381 - Existent Gum in Fuels by Jet Evaporation.
- ASTM D 471 - Rubber Property - Effect of Liquids.
- ASTM D 814 - Rubber Property - Vapor Transmission of Volatile Liquids.
- ASTM D 2000 - Rubber Products in Automotive Applications.
- ASTM D 3951 - Standard Practice for Commercial Packaging.
- ASTM E 8 - Tension Testing of Metallic Materials.

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

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Description. The type I, type II and III drums shall be as shown on Top Assemblies TA13216E9170, TA13217E2990, and TA13227E6314 and as specified herein.

3.1.1 Drawings. The drawings forming a part of this specification are end product drawings. No deviation from the prescribed dimensions or tolerances is permissible without prior approval of the contracting officer. Where tolerances could cumulatively result in incorrect fits, the contractor shall provide tolerances within those prescribed on the drawings to insure correct fit, assembly, and operation of the drum. Any data (e.g. shop drawings, layouts, flow sheets, processing procedures, etc.) prepared by the contractor or obtained from a vendor to support fabrication and manufacture of the production item shall be made available, upon request, for inspection by the contracting officer or designated representative.

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3.2 First article. When specified (see 6.2), three samples shall be subjected to first article inspection (see 4.3 and 6.3).

3.3 Materials. Materials shall be as specified herein and as shown on the drawings. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.3.1 Material deterioration and control. The item(s) shall be fabricated from compatible materials, inherently corrosion resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable operation and storage environment to which the item may be exposed.

3.3.2 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative.

3.3.3 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.4 Inner liner rubber compound. The inner liner rubber compound shall conform to ASTM D 2000, composition M5BG610A14EF21. The maximum volume swell requirement under EF21 shall be 50 percent.

3.3.5 Outer cover rubber compound. The outer cover rubber compound shall conform to ASTM D 2000, composition M5BC610A14C12EF21. The maximum volume swell requirement under EF21 shall be 65 percent.

3.3.6 Cord or fabric rubber compound. The cord or fabric rubber compound shall conform to ASTM D 2000, composition M5BG610A14EF21. The maximum volume swell requirement under EF21 shall be 65 percent.

3.3.7 Compound, thread sealing. All threaded connections of the metal fittings shall be sealed with a sealing compound conforming to MIL-S-7916.

3.3.8 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces and parts incorporated in the drum may be newly fabricated from recovered materials to the maximum extent practicable, provided the drum produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the drum.

3.4 Construction. Figure 1 indicates the general configuration of the type II drum (see 6.6).

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3.4.1 Body, drum. The drum shall be cord or fabric reinforced rubber construction, with an inner liner of material as specified in 3.3.4 and an outer cover of material as specified in 3.3.5. The cord or fabric reinforced center layer shall be impregnated with rubber compound as specified in 3.3.6.

3.4.2 Fuel/defuel valve. Each type I drum shall be equipped with a fuel/defuel valve shown in drawing D13216E9194 (part of TA13217E2990) which shall permit filling and emptying of the drum by means of a D-1 nozzle conforming to MIL-N-5877. The fuel/defuel valve shall be capable of performing the fuel/defuel cycle to either shut off flow to the drum upon reaching an internal pressure of 4.5 \pm 0.5 pounds per square inch gage (psig) above local atmospheric pressure, or to open upon the application of a negative pressure at the adapter inlet. The valve shall be fitted with a pressure fuel servicing adapter conforming to the high strength type of MS24484. The fuel/defuel valve shall neither extend externally more than 1.125 inches beyond the bearing plate shown on TA13227E6314 or TA13217E2990 nor extend internally more than 3.250 inches beyond the inside face of the closure plate shown in TA13217E2990. All surfaces of the valve that shall contact the drum wall shall be smooth and rounded with no sharp edges or radii smaller than 0.5 inch. Weight of the valve shall be not more than 5.250 pounds. The fuel/defuel valve shall be provided with a dust cap to fit over the adapter opening. The dust cap shall be tethered to the fuel/defuel valve by means of a cable, chain, or other suitable means.

3.4.3 Sleeve and wire rope assembly. The sleeve and wire rope assembly shall have a breaking strength of not less than 12,000 pounds.

3.5 Physical characteristics.

3.5.1 Permeability of fluid. The permeability rate of fluid through the drum wall shall be not more than 0.10 fluid ounce per square foot per 24 hours (fl oz/sq ft/24 hrs) when tested in accordance with 4.5.2.1.1.

3.5.2 Unwashed gum. The existent (unwashed) gum content shall be no more than 20 mg/100 ml when tested in accordance with 4.5.2.1.2.

3.5.3 Existent gum. The heptane-washed existent gum content shall be no more than 5 mg/100 ml when tested in accordance with 4.5.2.1.3.

3.5.4 Puncture resistance. The drum wall (excluding the reinforced ends) shall withstand a force of not less than 200 pounds without being punctured when tested in accordance with 4.5.2.1.4.

3.5.5 Expansion dimensions. Drum dimensional changes shall be not more than the following, when subjected to a pressure of 30 pounds per square inch gage (psig) for 7 hours, when tested in accordance with 4.5.2.2.1.

- a. Overall length - 1 inch.
- b. Diameter - 6 inches.

3.5.6 Weight. The weight of the completely assembled drum when tested in accordance with 4.5.2.2.2 shall be not more than the following:

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Type I - 315 pounds maximum.
Type II - 275 pounds maximum.
Type III - 300 pounds maximum.

3.6 Performance.

3.6.1 Ultimate hydrostatic pressure. The drum shall withstand an ultimate hydrostatic pressure of 45 psig, without any visual evidence of leakage, external or internal component layer separation, delamination, or blistering.

3.6.2 Proof pressure. Each drum shall withstand a hydrostatic pressure of 30 psig without any visual evidence of leaking.

3.6.3 Fuel storage. The drum shall withstand the 72 hour fuel storage test without any visual evidence of leakage, inner liner separation, cracks, splits, or deterioration.

3.6.4 Airdrop. The drum shall withstand three successive airdrops from a height of not less than 12 feet 6 inches without any visual evidence of leakage, broken cables or hardware, or separation of component layers of the drum body.

3.6.5 Towing, ground. The drum shall be capable of being towed as a wheel for 10 miles over paved road without any visual evidence of leakage.

3.6.6 Low temperature collapsibility. The drum shall be collapsible and capable of being emptied at $-30^{\circ}\text{ F } +2^{\circ}\text{ F}$ ($-34^{\circ}\text{ C } +1^{\circ}\text{ C}$), with not more than 20 gallons of gasoline remaining in the emptied drum. The drum shall show no visual evidence of leakage, blistering, delamination, splits, or cracks, chipping, or sloughing.

3.6.7 Ambient temperature collapsibility. The drum shall be filled and emptied through 75 cycles, without any visual evidence of leakage, external or internal blistering, delamination, splits, cracks, or chipping.

3.6.8 Deceleration. The completely assembled drum shall withstand an average deceleration force of 8 times the force of gravity (g's) for a period of 0.1 second when tested as specified in 4.5.2.2.9 without any visual evidence of leakage, distortion, or fracture of hardware components.

3.6.9 Leakage. The drum shall withstand the leakage test specified in 4.5.2.2.10 without any visual evidence of leakage.

3.7 Finish.

3.7.1 Anodic coating. All aluminum surfaces shall have rough and sharp edges and scale removed. These surfaces shall be cleaned, anodized, and dyed in accordance with MIL-A-8625, type II, class 2, to a minimum thickness of 0.0007 inch (18 m). The color shall be dark, nonvivid, and nonreflective.

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3.7.2 Body, drum. After complete fabrication and prior to assembly of the drum, the inside and outside shall be cleaned of all foreign material. The color of the outer surface shall be black.

3.8 Marking for identification. Marking shall be as shown on drawings D13216E9169 and D13216E9171 and shall be marked in accordance with MIL-STD-130.

3.9 Workmanship. All metal parts shall be cleaned and free of sand, dirt, scale, and flux. Surfaces shall be smooth with edges rounded or beveled. The inside and outside of the drum shall be clean and free of foreign materials.

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Component and material inspection. The contractor is responsible for insuring that components and materials used are manufactured, examined, and tested in accordance with referenced specifications, standards, and drawings, as applicable.

4.1.2 Disassembly inspection. Failure of any examination or test by the first article shall be cause for disassembly, in the presence of a Government representative, of the first article to the extent necessary to determine the cause of the failure. Each disassembled part shall be examined in detail for compliance with this specification and referenced drawings in regard to materials, dimensions, tolerances, and workmanship. Parts not complying with such requirements shall be rejected and shall be cause for rejection of the first article. Reassembly with replacement parts and retesting shall be the responsibility of the contractor.

4.1.3 Parts and components. Parts and components detailed on the drawings shall be inspected in accordance with the quality assurance provisions (QAP) shown on the drawings. The drawings specify the characteristics requiring QAP inspection, the sampling plan, and the basis for acceptance and rejection (see 6.7 and 6.8).

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).
- c. Inspection of packaging (see 4.6).

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4.3 First article inspection.

4.3.1 Examination. The first article drums shall be examined as specified in 4.1. Presence of one or more defects shall be cause for rejection or for performing the disassembly inspection specified in 4.1.2.

4.3.2 Tests. The first article drums and material samples shall be subjected to tests marked "X" in column 1 of table I. Every test specified in 4.5.2.2, except 4.5.2.2.4 and 4.5.2.2.10, shall be conducted on one of three drums so that approximately one-third of the tests shall be performed on each drum. Tests specified in 4.5.2.2.4 and 4.5.2.2.10 shall be conducted on each of three drums. All tests specified in 4.5.2.1 shall be performed on the material samples. The material samples shall be representative of materials used to fabricate the drum body. Failure of any test shall be cause for rejection or for performing the inspection specified in 4.1.2.

4.4 Quality conformance inspection.

4.4.1 Lot. A lot shall consist of not more than 300 drums or one month's production of the same type, each drum having successfully passed the tests specified in 4.4.4.1.

4.4.2 Sampling for examination and tests.

4.4.2.1 Drums. Three drums shall be selected at random from each lot for tests.

4.4.2.2 Drum body. One sample of drum body material approximately 1-foot square and of the approximate thickness of the drum body shall be prepared from the rubber compounds and cord or fabric used in fabricating the drums of the lot. The drum body sample shall be cured equivalent to the drums.

4.4.3 Examination. All three drums selected (see 4.4.2.1) shall be examined as specified in 4.5.1.

4.4.4 Tests.

4.4.4.1 Individual. Each drum shall be subjected to the tests marked "X" in column 2 of table I. Failure of either test shall be cause for rejection of the drum.

4.4.4.2 Samples.

4.4.4.2.1 Drums. Drums selected in accordance with 4.4.2 shall be subjected to tests marked "X" in column 3 of table I as follows: One of the drums, regardless of the type, shall be tested as specified in 4.5.2.2.2 and 4.5.2.2.3. The sleeve and wire rope assembly shall be removed from the drum and tested as specified in 4.5.2.2.11. In addition to the above tests, the type I drum shall be tested as specified in 4.5.2.2.12. The remaining two drums,

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regardless of type, shall be tested as specified in 4.5.2.2.5 and 4.5.2.2.1. Failure of any test shall be cause for rejection of the represented lot of drums.

4.4.4.2.2. Drum material samples. Samples selected in accordance with 4.4.2 shall be tested as specified in 4.5.2.1.1 through 4.5.2.1.4. Failure of any test shall be cause for rejection of the represented drums.

4.5 Inspection procedure.

4.5.1 Examination. The drum shall be examined as specified herein for the following defects:

101. Any part (or component) not in accordance with the QAP requirements as shown on the drawings.
102. Dimensions not as specified.
103. Materials are not resistant to corrosion or deterioration or treated to be made resistant to corrosion or deterioration for the applicable storage and operating environment.
104. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.
105. Documentation unavailable for identification of material, material finishes or treatments.
106. Used, rebuilt or remanufactured components, pieces and parts incorporated in the drum.
107. Inner liner rubber compound not as specified.
108. Outer cover rubber compound not as specified.
109. Cord or fabric rubber compound not as specified.
110. Thread sealing compound not as specified.
111. Drum body not as specified.
112. Fittings not as specified.
113. Finish of fittings not as specified.
114. Fittings not located as specified.
115. Color not as specified.
116. Components fractured, split, sprung, malformed, or missing.
117. Identification label and marking not as specified.
118. Workmanship not as specified.

4.5.2 Tests.

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TABLE I. Test schedule.

First article	Quality conformance		Test	Test paragraph	Requirement paragraph
	Individual	Sample			
1	2	3	4	5	6
X	X	X	Permeability.	4.5.2.1.1	3.5.1
X		X	Unwashed gum.	4.5.2.1.2	3.5.2
X		X	Existent gum.	4.5.2.1.3	3.5.3
X		X	Puncture resistance.	4.5.2.1.4	3.5.4
X		X	Expansion test.	4.5.2.2.1	3.5.5
X		X	Weight.	4.5.2.2.2	3.5.6
X		X	Ultimate pressure.	4.5.2.2.3	3.6.1
X		X	Proof pressure.	4.5.2.2.4	3.6.2
X		X	Fuel storage.	4.5.2.2.5.1	3.6.3
X		X	Airdrop.	4.5.2.2.5.2	3.6.4
X			Rolling tow.	4.5.2.2.6	3.6.5
X			Low temperature collapsibility.	4.5.2.2.7	3.6.6
X			Ambient temperature collapsibility.	4.5.2.2.8	3.6.7
X	X		Deceleration.	4.5.2.2.9	3.6.8
X		X	Leakage.	4.5.2.2.10	3.6.9
X		X	Sleeve and wire rope assembly.	4.5.2.2.11	3.4.3
X		X	Fuel/defuel valve.	4.5.2.2.12	3.4.2

4.5.2.1 Drum material sample. The drum material sample shall be tested as follows:

4.5.2.1.1 Permeability test. The permeability test shall be conducted in accordance with ASTM D 814, except that the sample shall be identical in construction and material to the total cross section of the drum and of the thickness of the drum wall. This test may be performed using an aluminum cup with a suitable clamping device in lieu of the permeability jar specified in ASTM D 814. The test liquid shall be ASTM D 471, reference fuel B. If aluminum cups are used, it is suggested that a nylon solution (Elvamide 8061) be used to seal the edges. The average of three determinations shall be reported. Nonconformance to 3.5.1 shall constitute failure of this test.

4.5.2.1.2 Unwashed gum. Cut a 5 gram specimen from the drum interior coating compound into 0.0625 inch squares and place in a flask containing 250 ml of ASTM D 471 reference fuel B and allow to stand for 48 hours at 73° \pm 3° F.

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Decant and filter the contaminated fluid through Whatmen 41H filter paper, or equal. Determine the unwashed gum in accordance with section 10 of ASTM D 381 using the air jet vaporizing medium and an evaporation time of 45 minutes. The average of three determinations shall be reported. Nonconformance to 3.5.2 shall constitute failure of this test.

4.5.2.1.3 Existent gum. Samples from 4.5.2.1.2 may be used to determine the heptane-washed existent gum in accordance with section 10 of ASTM D 381. The average of three determinations shall be reported. Nonconformance to 3.5.3 shall constitute failure of this test.

4.5.2.1.4 Puncture resistance test. The drum wall (excluding the reinforced ends) shall be puncture tested as specified in MIL-T-6396, except that the force required shall be 200 pounds. Nonconformance to 3.5.4 shall constitute failure of this test.

4.5.2.2 Drums.

4.5.2.2.1 Expansion test. The drum shall be filled with water to a pressure of 30 psig. The length and diameter shall be measured within 15 minutes. The length shall be measured by placing a 90 degree square upright at each end and measuring the distance between squares. The diameter shall be similarly measured by placing the square upright against each side at the center of the drum and measuring the distance between squares. These measurements shall be the original dimensions. The drum shall be maintained at 30 psig for 7 hours; at the end of the 7 hours the measurements of length and diameter shall be repeated as described above. The difference between these final measurements and the original measurements shall be regarded as the changes in dimensions. Nonconformance to 3.5.5 shall constitute failure of this test.

4.5.2.2.2 Weight test. The emptied drum with hardware shall be weighed. Nonconformance to 3.5.6 shall constitute failure of this test.

4.5.2.2.3 Ultimate pressure test. The drum shall be subjected to a hydrostatic pressure of 45 psig and allowed to stand for 30 minutes to determine compliance with 3.6.1. At the end of 5 minutes, the pressure shall be readjusted to 45 psig if the pressure has dropped due to expansion of the drum. After the hydrostatic test, the drum shall be emptied and visually examined, both externally and internally. Nonconformance to 3.6.1 shall constitute failure of this test.

4.5.2.2.4 Proof pressure test. Each drum shall be subjected to a hydrostatic pressure of 30 psig and allowed to stand for 30 minutes. At the end of 5 minutes, the pressure shall be readjusted to 30 psig if the pressure has dropped due to expansion of the drum. Nonconformance to 3.6.2 shall constitute failure of this test.

4.5.2.2.5 Fuel storage and airdrop test.

4.5.2.2.5.1 Fuel storage test. The drum shall be filled with a minimum of 450 gallons of gasoline conforming to MIL-G-46015, type I and allowed to stand

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for a period of 72 hours at ambient temperature ($40^{\circ}\text{F} - 90^{\circ}\text{F}$). At the end of each 24 hour period the drum shall be rotated 180 degrees and then examined for leakage. After completion of the 72 hour period the drum shall be emptied and the hardware shall be removed for visual examination of the inner liner. Nonconformance to 3.6.3 shall constitute failure of this test. The gasoline will be analyzed for existent and unwashed gum levels both before and after the storage and the results reported.

4.5.2.2.5.2 Airdrop test. After completion of the fuel storage test the drum shall be reassembled and refilled with a minimum of 450 gallons of fluid having a specific gravity of between 0.72 and 1.00. The drum shall then be lifted by the two anchor shackles on the fill end until the opposite end has a minimum ground clearance of 12 feet, 6 inches. The drum shall then free fall onto unprepared ground such as grass, sand, or bare earth. The soil shall not contain excessive water to form a viscous liquid. After three free falls, the drum shall be visually examined for leaks; then emptied and visually examined, internally and externally, for evidence of broken hardware and separation of component layers of the drum body. The time between draining the fluid and completion of the free fall tests shall not exceed 3 hours. Nonconformance to 3.6.4 shall constitute failure of these tests.

4.5.2.2.6 Rolling tow test. The drum shall be filled with a minimum of 350 gallons of water. A suitable towbar shall be attached to the lugs, and the drum shall be towed as a wheel for not less than 10 miles over a paved road. The rate of speed of towing shall be between 5 to 10 miles per hour (mph). Nonconformance to 3.6.5 shall constitute failure of this test.

4.5.2.2.7 Low temperature collapsibility test. The emptied drum shall be cooled to $-30^{\circ}\text{F} \pm 2^{\circ}\text{F}$ ($-34^{\circ}\text{C} \pm 1^{\circ}\text{C}$) and filled with a measured 460 gallons of gasoline conforming to MIL-G-46015, type I which has been cooled to $-30^{\circ}\text{F} \pm 2^{\circ}\text{F}$ ($-34^{\circ}\text{C} \pm 1^{\circ}\text{C}$). The drum shall be cold soaked for 24 hours at $-30^{\circ}\text{F} \pm 2^{\circ}\text{F}$ ($-34^{\circ}\text{C} \pm 1^{\circ}\text{C}$). The drum shall then be emptied of not less than 440 gallons of gasoline using a suitable pump and subjected to a minimum vacuum of 12 inches of mercury (Hg). This test shall be conducted at $-30^{\circ}\text{F} \pm 2^{\circ}\text{F}$ ($-30^{\circ}\text{C} \pm 1^{\circ}\text{C}$) with the drum in a horizontal position. Nonconformance to 3.6.6 shall constitute failure of this test.

4.5.2.2.8 Ambient temperature collapsibility test. The emptied drum shall be filled with a measured 460 gallons of gasoline conforming to MIL-G-46015, type I. The drum shall then be emptied of not less than 435 gallons of gasoline using a suitable pump and subjecting the drum to a minimum vacuum of 12 inches Hg. This test shall be conducted at an ambient temperature with the drum in a horizontal position. The drum shall be filled and emptied through 75 cycles, with each filling and emptying constituting one cycle. The drum hardware shall be disassembled for examination of the drum internal carcass. Nonconformance to 3.6.7 shall constitute failure of this test.

4.5.2.2.9 Deceleration test. The drum shall be filled with liquid having a specific gravity between 0.72 and 1.00 to a hydrostatic pressure of 4.5 ± 0.5 psig. The drum shall be mounted on a simulated aircraft cargo floor including

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standard 20-inch grid tiedown shackles. The drum shall be restrained by a new set of 10,000 pound pull chains fastened between drum shackles and simulated cargo floor. Two 10,000 pound pull chains conforming to MIL-T-25959 shall be secured to one drum shackle and the other ends of the chains shall be secured to two tiedown rings toward the rear of the simulated cargo floor at a distance of 50 inches ± 1 inch for type I and 58 inches ± 1 inch for type II or type III from the longitudinal axis of the drum; the two tiedown rings shall be 20 inches ± 1 inch apart. One 10,000 pound pull chain shall be secured to the other drum shackle and the other end of the chain secured to a forward tiedown ring on the simulated cargo floor at a distance of 30 inches ± 1 inch for type I, and 35 inches ± 1 inch for type II or III from the longitudinal axis of the drum. These chains as specified shall be connected to the drum shackle on both ends of the drum. This test assembly shall be subjected to an average 8g deceleration force for a period of not less than 0.1 second. The drum shall be examined for leakage and the drum hardware shall be removed for visual examination. Water may be used in this test. When water is utilized, a reduction of "g" force consistent with the increased weight will be permitted (5.7g). Nonconformance to 3.6.8 shall constitute failure of this test.

4.5.2.2.10 Leakage test. Each drum shall be inflated with air to approximately 6 psig, and sprayed with soap or detergent sudsing solution over the entire surface to determine compliance with 3.6.9. Leakage shall be determined by observing areas for fizzing or bubbling of soap or detergent sudsing. If any evidence of Fizzing or bubbling is observed, a Freon test shall be made on the drum. Inflate drum to 2 psig with air, add Freon to bring pressure of 4 psig and add additional air to bring the drum up to 6 psig and allow to stand for 15 minutes. At the end of the 15 minutes, use a Halogen leak detector to determine if the drum is defective. Evidence of leakage determined by the Freon test shall constitute failure of this test.

4.5.2.2.11 Sleeve and wire rope assembly test. The sleeve and wire rope assembly shall be tested in accordance with ASTM E 8. Nonconformance to 3.4.3 shall constitute failure of this test.

4.5.2.2.12 Fuel/defuel valve test (type I drum). This test shall be performed by installing the fuel/defuel valve in a representative drum. One fuel/defuel cycle shall consist of the following. The drum shall be filled to capacity at a flow rate of 200 gallons per minute (gpm) minimum and line pressure of 55 to 60 psig at the nozzle inlet by means of a D-1 nozzle. Upon completion of filling, the pressure within the drum shall be observed to determine compliance with 3.4.2. The drum shall then be defueled by means of the D-1 nozzle to determine proper opening of the valve. Nonconformance to 3.4.2 shall constitute failure of this test.

4.6 Inspection of packaging.

4.6.1 Quality conformance inspection of pack.

4.6.1.1 Unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit of product.

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4.6.1.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

4.6.1.3 Examination. Samples selected in accordance with 4.6.1.2 shall be examined for the following defects. AQL shall be 2.5 percent defective.

- 119. Drum not thoroughly drained and dried as specified for level A.
- 120. Shackles not wrapped and wrap not secured as specified for level A.
- 121. Drum not collapsed and folded as specified for level A.
- 122. Technical manual not preserved as specified.
- 123. Coupler valves not wrapped and wrap secured as specified for level A.
- 124. Coupler valve and technical manual not placed in the bag specified and the bag not secured as specified for level A.
- 125. Shipping container not as specified for level A and B.
- 126. Strapping not as specified.
- 127. Marking missing, illegible, incorrect, or incomplete for level A, B, or commercial.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or commercial, as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Drum. Each drum shall be thoroughly drained and the interior and exterior shall be dried prior to packaging. Each shackle shall be wrapped with corrugated, single faced paperboard material conforming to PPP-P-291, type I, style 1, which shall be secured with tape conforming to PPP-T-60, type IV. Each drum shall be collapsed and compactly folded so that one swivel plate is on the interior of the bundle and the other is on the top exterior of the bundle.

5.1.1.2 Components. The technical manual shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3. The coupler valve shall be wrapped with cushioning material conforming to PPP-C-795, class I, having a thickness classified as thick. Cushioning material shall be secured with tape conforming to PPP-T-60, type IV. The technical manual and the cushioned coupler valve shall be placed in a bag conforming to PPP-B-35, type I or II, size as appropriate. The bag shall be secured with tie cord or wire to a lug on the exposed end swivel plate of the drum.

5.1.2 Commercial. Each drum complete with required components shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or commercial, as specified (see 6.2).

5.2.1 Level A. Each drum with its components, prepared as specified in 5.1, shall be packed in a close-fitting box conforming to PPP-B-601, overseas type,

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style A or I. When style A is used the cleats on the top panel shall be placed on the inside to preclude formation of a water reservoir on the box top. Strapping shall conform to QQ-S-781, class 1, type I or IV, finish B.

5.2.2 Level B. Each drum with its components, prepared as specified in 5.1, shall be packed as specified in 5.2.1, except boxes shall be domestic type, style optional; as an alternate, boxes conforming to PPP-B-640, class 2, style A, B, C, or D, may be used. Strapping shall be finish A.

5.2.3 Commercial. Each drum, complete with required components, shall be individually packed in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Military. Marking for levels A and B shall be in accordance with MIL-STD-129.

5.3.2 Commercial. Marking for commercial packaging shall be in accordance with ASTM D 3951. Additionally, weight and cube data shall be marked on each shipping container.

6. NOTES

6.1 Intended use. The 500 gallon collapsible drum is intended for the following:

- a. Storage of liquid fuel.
- b. Transporting liquid fuel by:
 - (1) Truck.
 - (2) Aircraft.
 - (3) Helicopter.
 - (4) Airdrop from fixed wing aircraft.
 - (5) Towing as a wheel.

6.2 Ordering data: Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type of drum required (see 1.2).
- c. Date of issue of DoDISS applicable and exceptions thereto (see 2.1.1).
- d. Time frame required for submission of first article and number of drums required (see 3.2).
- e. When the Government will conduct any or all of the preproduction model examination and tests. When the Government will conduct some but not all of the first article examination and tests, the contracting officer should specify which examination and tests will be conducted by the Government and which examination and tests shall be conducted by the contractor (see 3.2).
- f. Degree of preservation and degree of packing required (see 5.1 and 5.2).

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6.3 First article. When a first article inspection is required, the items should be a preproduction model. The first article should consist of three units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, tests and approval of the first article test results and disposition of the documents' first article.

6.4 Data requirements. The contracting officer should include requirements for such data as technical publications, instructional materials, illustrated parts lists, and contractor's maintenance and operation manual to be furnished with each drum.

6.5 Provisioning. The contracting officer should include provisioning requirements for repair parts and maintenance tools as necessary (including any special tools), and instructions regarding shipment of drums.

6.6 Information figures. Figure 1 shows a type of drum which has been found acceptable; however, the figure is included for illustration only and is not intended to preclude the furnishing of another drum which conforms to this specification.

6.7 Quality assurance provisions (QAP). The contracting officer should require the contractor to maintain records of all QAP inspections. A suggested paragraph is as follows:

"The contractor shall maintain complete records of all examinations and tests performed to verify the requirements of classified QAP characteristics. The records shall include, as a minimum, lot size, sample size, drawing requirements, actual measurements, number and type of deficiencies found, quantity approved, quantity rejected, and corrective action taken when applicable."

6.8 Definition.

6.8.1 Quality assurance provisions (QAP). A QAP is a contractual requirement that supplements section 4 of the specification. QAP's indicate the minimum requirements which must be inspected on the product drawings to verify the design objectives of the product and assure interchangeability of repair parts.

6.9 Classification change. Type I, class 1 and class 2 have been deleted as no longer required.

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Custodians:

Army - ME

Navy - SA

Air Force - 69

Preparing activity:

Army - ME

Project 8110-0273

Review activities:

Army - AT

Air Force - 43

DLA - GS

User activities:

Army - GL

Navy - MC

Air Force - 99

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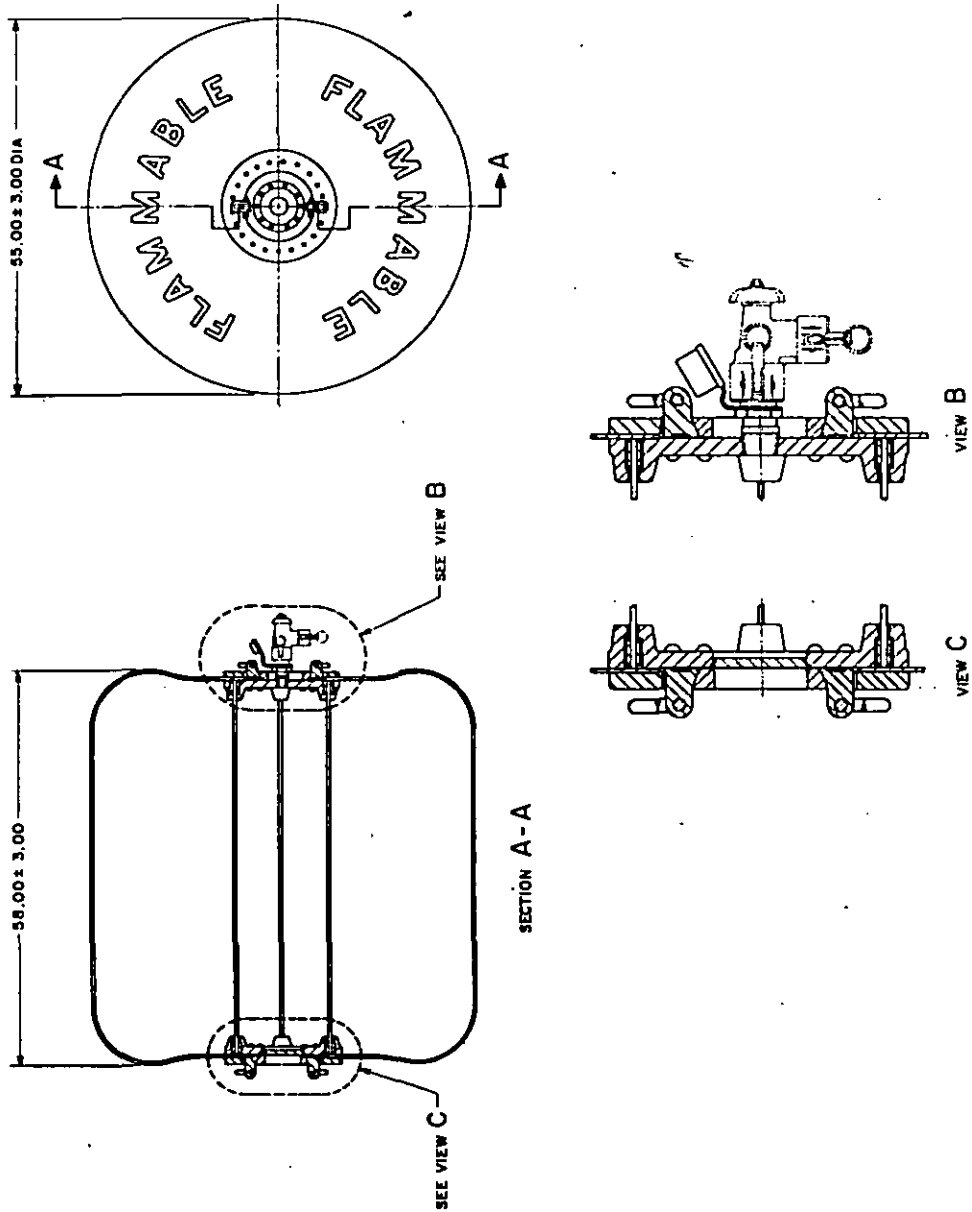


FIGURE 1. Drum, fabric, collapsible, liquid fuel, cylindrical,
500 gallon capacity, Type II (shortie).

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