

INCH-POUND

MIL-T-52983G  
11 May 1994  
SUPERSEDING  
MIL-T-52983F  
16 October 1991

## MILITARY SPECIFICATION

TANKS, FABRIC, COLLAPSIBLE: 3,000, 10,000,  
20,000, AND 50,000 GALLON, FUEL

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

### 1. SCOPE

1.1 Scope. This specification covers collapsible fuel tanks: 3,000, 10,000, 20,000, and 50,000 gallon, complete with fittings, berm liners, accessories, and repair items packed in a box.

1.2 Classification. Tanks are of the following capacities as specified (see 6.2):

3,000 gallon  
10,000 gallon  
20,000 gallon  
50,000 gallon

### 2. APPLICABLE DOCUMENTS

#### 2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and 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: US ARMY BELVOIR RDE CTR, ATTN SATBE TSE, 10101 GRIDLEY RD STE 104, FT BELVOIR VA 22060-5818 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5430

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## SPECIFICATIONS

## FEDERAL

- |            |  |
|------------|--|
| A-A-2027   | - Strapping, Nonmetallic (Nylon, Flat and Connectors).                                     |
| A-A-55057  | - Panels, Wood/Wood Based, Construction and Decorative.                                    |
| L-P-378    | - Plastic Sheet and Strip, Thin Gauge, Polyolefin.   |
| FF-B-561   | - Bolts, (Screws), Lag.  |
| FF-B-584   | - Bolts, Square Neck, and Tee Head.  |
| FF-N-836   | - Nut: Square, Hexagon, Cap, Slotted, Castle, Knurled, Welding and Single Ball Seat.       |
| FF-W-92    | - Washer, Flat (Plain).  |
| RR-C-271   | - Chains and Attachments, Welded and Weldless.   |
| VV-F-800   | - Fuel Oil, Diesel.  |
| WW-V-35    | - Valve, Ball.   |
| PPP-B-601  | - Boxes, Wood, Cleated-Plywood.  |
| PPP-B-636  | - Boxes, Shipping, Fiberboard.   |
| PPP-C-1797 | - Cushioning Material, Packaging, Resilient, Low Density, Unicellular, Polypropylene Foam. |

## MILITARY

- |             |   |
|-------------|---|
| MIL-P-116   | - Preservation, Methods of.   |
| MIL-H-370   | - Hose and Hose Assemblies, Nonmetallic: Rubber, Liquid Fuel.                           |
| MIL-C-5541  | - Chemical Conversion Coatings on Aluminum and Aluminum Alloys.                         |
| MIL-T-5624  | - Turbine Fuel, Aviation, Grades JP-4, JP-5 and JP-5/JP-8 ST.                           |
| MIL-A-8625  | - Anodic Coatings, for Aluminum and Aluminum Alloys.                                    |
| MIL-B-26195 | - Boxes, Wood-Cleated, Skidded, Load-Bearing Base.                                      |
| MIL-T-27730 | - Tape, Antiseize, Polytetrafluoroethylene, with Dispenser.                             |
| MIL-F-46162 | - Fuel, Diesel, Referee Grade.  |
| MIL-R-52255 | - Repair Kit and Repair Kit Components, for Collapsible Fabric Tanks, Drums, and Boats. |
| MIL-B-53081 | - Berm Liner Assemblies.  |
| MIL-V-58039 | - Valves, Gate, Rising Stem, Double Acting, Aluminum.                                   |
| MIL-T-83133 | - Turbine Fuels, Aviation, Kerosene Types, NATO F-34 (JP-8) and NATO F-35 (Jet A-1).    |

## STANDARDS

## FEDERAL

- |             |  |
|-------------|--|
| FED-STD-191 | - Textile Test Methods.                  |
| FED-STD-595 | - Colors Used in Government Procurement. |

## MILITARY

- |             |  |
|-------------|--|
| MIL-STD-105 | - Sampling Procedures and Tables for Inspection by Attributes. |
| MIL-STD-129 | - Marking for Shipment and Storage.                            |
| MIL-STD-130 | - Identification Marking of US Military Property.              |
| MIL-STD-731 | - Quality of Wood Members for Containers and Pallets.          |
| MS9021      | - Packing, Preformed "O" Ring.                                 |

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MS27021	- Coupling Half, Quick Disconnect, Cam-Locking Type, Male, Hose Shank, Type II.
MS27022	- Coupling Half, Quick Disconnect, Cam-Locking Type, Male External Pipe Thread, Type II.
MS27023	- Coupling Half, Quick Disconnect, Cam-Locking Type, Male, Flanged, Type IV.
MS27024	- Coupling Half, Quick Disconnect, Cam-Locking Type, Female, Internal Pipe Thread, Type V.
MS27025	- Coupling Half, Quick Disconnect, Cam-Locking Type, Female, Hose Shank, Type VI.
MS27026	- Coupling Assembly, Quick Disconnect, Cam-Locking, Female, External, Pipe Thread, Type VII.
MS27027	- Coupling Half, Quick Disconnect, Cam-Locking Type, Female, Flanged, Type VIII.
MS27028	- Coupling Half, Quick Disconnect, Cam-Locking Type, Cap, Dust, Type IX.
MS27029	- Coupling Half, Quick Disconnect, Cam-Locking Type, Plug, Dust, Type X.
MS27030	- Gasket-Coupling Half, Quick Disconnect, Cam-Locking Type.
MS29513	- Packing, Preformed, Hydrocarbon Fuel Resistant, "O" Ring.
MS51504	- Elbow, Pipe to Tube, 90°, Male Pipe End, 37° Flared.
MS51532	- Fittings, Hydraulic Tube, Flared 37° and Flareless, Steel: Cap, Tube, 37° Flared.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from: STDZN DCMNT ORDER DESK, BLDG 4D, 700 ROBBINS AVE, PHILADELPHIA PA 19111-5094.)

**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).

**AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)**

B 16.15	- Cast Bronze Threaded Fittings.
B 18.2.1	- Square and Bolts and Screws (Inch Series).
B 18.2.2	- Square and Hex Nuts (Inch Series).
B 18.21.1	- Lock Washers (Inch Series).
B 18.22.1	- Plain Washers.
H 35.1	- Aluminum, Alloy and Temper Designation Systems.

(Application for copies should be addressed to: AMERCN NATL STANDS INST, 1430 BROADWAY, NEW YORK NY 10018.)

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

A 153	- Zinc-Coating (Hot Dip) on Iron and Steel Hardware.
B 26	- Aluminum-Alloy Sand Castings.
B 85	- Aluminum-Alloy Die Castings.
B 108	- Aluminum-Alloy Permanent Mold Castings.
B 209	- Aluminum and Aluminum-Alloy Sheet and Plate.

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- B 633 - Zinc on Iron and Steel, Electrodeposited Coatings, of.
- D 381 - Existent Gum in Fuels by Jet Evaporation.
- D 412 - Vulcanized Rubber and Thermoplastic Rubber and Thermoplastic Elastomers - Tension
- D 413 - Rubber Property - Adhesion to Flexible Substrate.
- D 429 - Rubber Property - Adhesion to Rigid Substrate.
- D 471 - Rubber Property - Effect of Liquids.
- D 750 - Rubber Deterioration in Carbon-Arc or Weathering Apparatus RECM.
- D 751 - Testing Coated Fabrics.
- D 1149 - Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimen).
- D 1330 - Rubber Sheet Gaskets.
- D 1729 - Visual Evaluation of Color Differences of Opaque Materials.
- D 2000 - Rubber Products in Automotive Applications.
- D 2565 - Operating Xenon Arc - Type (Water Cooled) Light - Exposure Apparatus With and Without Water for Exposure of Plastics, Standard Practice for.
- D 3953 - Strapping, Flat Steel and Seals.
- D 4675 - Selection and Use of Flat Strapping Materials.

(Application for copies should be addressed to: AMERCN SCTY FOR TEST & MTRLS, 1916 RACE STRET, 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 Description.** The collapsible fabric tank shall consist of an elastomeric coated fabric tank with attached handles and fittings, repair items, accessories and berm liner (see 6.2 for ordering options).

**3.2 First article.** When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3 through 4.3.2.

**3.2.1 Samples for submission.** The contractor shall furnish with the first article test report samples of coated fabric and samples of seams. The coated fabric samples shall be a minimum of one square yard. The seam sample shall be a minimum of 36 inches of seam with a minimum of 6 inches of coated fabric on either side of the seam. Samples shall be fabricated using production personnel and techniques. The samples shall be sent to: US ARMY BELVOIR RDE CTR, ATTN SATBE FSH, 10101 GRIDLEY RD STE 104, FT BELVOIR VA 22060-5818. Samples shall be marked with the appropriate contract number.

**3.3 Materials.** Materials shall be as specified herein and as shown on figures. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. Tanks shall not be made with materials

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that fail to meet the requirements of tables I through IV; however, conformance with these requirements shall not be construed as justification for failure to meet other performance requirements of this specification.

3.3.1 Material deterioration prevention and control. The tank shall be fabricated from compatible materials or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the operating and storage environments to which the tanks may be exposed.

3.3.2 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 metal components, pieces and parts incorporated in the tanks may be newly fabricated from recovered materials to the maximum extent practicable, provided the tank produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the tanks.

3.3.3 Cloth. When tested as specified in 4.5.2.8, the cloth of the coated fabric shall have a retained breaking strength that is not less than 50 percent of its initial breaking strength, warp and fill.

3.3.4 Coatings. The coatings shall conform to table I and shall be suitable for use with hydrocarbon fuels conforming to MIL-T-5624, MIL-F-46162, VV-F-800, and MIL-T-83133. The coatings shall be resistant to weathering, ozone, ultraviolet light, use temperatures to 130 °F, high humidity, and storage temperatures up to 160 °F.

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TABLE I. Characteristics of coatings. 1/

Test Property	Requirements (all tank sizes)	Test Paragraph and ASTM Test Methods	Internal or External Coating
Original properties: ● Tensile strength (initial) ● Ultimate elongation	1500 psi (min) 300 % (min)	D 412 D 412	Internal & External
Properties after fuel immersion in test fluid 2/ at 160 °F for 14 days:  ● Tensile strength retained ● Elongation retention ● Volume swell	  80 % (min) 80 % (min) 10 % (max)	D 471 (10.1, 14.1 & 14.2)	External
Properties after fuel extraction, dried, and then immersed in distilled water at 160 °F for the following durations: 3/  14 days ● Tensile strength retention ● Elongation retention ● Volume swell  42 days ● Tensile strength retention ● Elongation retention ● Volume swell	  75 % (min) 80 % (min) 10 % (max)  70 % (min) 75 % (min) 10 % (max)	D 471 (10.1, 14.1 & 14.2) & 4.5.2.23	Int. & Ext.
Resistance to light after 1500 hours accelerated weathering at 10 % elongation: 4/  ● Tensile strength retention	  80 % (min)	D 750 6/ or  D 2565 7/	External
Fuel contamination: 5/  ● Unwashed gum ● Existent gum	  20mg/100mL (max) 5mg/100mL (max)	  4.5.2.10 4.5.2.10	Internal
Ozone resistance	No cracks under 7x lens	D 1149 8/	Int. & Ext.

1/ Properties of coating shall be identical in composition to the coatings used on the coated fabric.

2/ Immersion test fluid shall be referee fuel conforming to MIL-F-46162, type I.

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- 3/ JP-5/JP-8 ST fuel conforming to MIL-T-5624 shall be used as the extraction media. If JP-5/JP-8 ST is unavailable at a reasonable cost and within time constraints the manufacturer can use JP-8 with enough BTX added to ensure that aromatics equal or exceed 23 percent.
- 4/ Applicable to all exterior coating compounds. That is, all coating compounds between the cloth and outside of the tank. (This requirement may be met by certification from the material manufacturer that the material provided has been subjected to, and passed the specified weather resistance test, and providing those test results for inclusion in the first article test report.)
- 5/ Applicable to all interior coating compounds and seam covering materials. That is, coating compounds between the cloth (including any coatings or seam covering tapes) and the inside of the tank.
- 6/ Alternate Corex D filters in place.
- 7/ ASTM D 2565, Xenon Light, procedure A, inner and outer borosilicate filters; deionized water ( $20 \pm 3$  °C); cycle: 690 minutes light exposure, 30 minutes light and gray; black panel temperature  $63 \pm 3$  °C; relative humidity ( $45 \pm 5$  percent).
- 8/ Test method A specimen shall be conditioned for 14 days at a temperature of  $104 \pm 3.6$  °F ( $40 \pm 2$  °C) having a partial pressure of ozone of 50 milipascals.

3.3.5 Coated fabric. The coated fabric shall be free from blisters, holidays, or pinholes (see 6.8) and shall show no signs of coating delamination. The coated fabric shall withstand the effects of humidity, high service temperature (130 °F), ozone, and weather elements without damage, deterioration, or failure of meeting performance requirements specified herein. The coated fabric shall conform to the requirements of table II.



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TABLE II. Characteristics of coated fabric.

Test Property	Requirements Tank Capacity (Gallons)				Test Paragraph, Test Method of FED-STD-191 or ASTM Test Method
	3,000	10,000	20,000	50,000	
Weight: (oz/sq yd)	30 minimum/62 maximum				5041
Diffusion rate $\frac{1}{2}$ : (fl oz/sq ft/24 hr, max.)	0.12	0.12	0.12	0.12	4.5.2.22
Tear strength: (warp & fill lb., min.)	30	30	40	40	5134
Breaking strength: (warp & fill, lb/in, min.)	400	400	550	550	5102
Puncture resistance: (lbs., min.)	225	225	225	225	5120 4.5.2.12
Weather resistance $\frac{3}{4}$ : 1500 hrs exposure & 5% elongation, warp & fill: Breaking strength Retention, % min.	80	80	80	80	5804 $\frac{4}{5}$ , D 2565 5/ and 5102
Low temperature crease resistance: Appearance	No cracking, peeling or delamination under 7X lens.				4.5.2.13
Diffusion Rate $\frac{1}{2}$ (fl oz/sq ft/24 hrs, max.)					4.5.2.22
Blocking:	Separate within 5 sec.				4.5.2.14
Coating adhesion: Initial, (lb/in, min.)	30	30	30	30	4.5.2.15 & 4.5.2.15.1  D 471, 4.5.2.15 & 4.5.2.15.1  D 471, 4.5.2.15, 4.5.2.15.1 & 4.5.2.23
Coating adhesion: After fuel immersion $\frac{2}{3}$ for 14 days at 160 °F (lb/in, min.)	20	20	20	20	
Coating adhesion: After fuel extraction $\frac{1}{2}$ / dried, and immersion in water at 160 °F for:  14 days, (lb/in, min.) 42 days, (lb/in, min.)	20 15	20 15	20 15	20 15	



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- 1/ JP-5/JP-8 ST fuel conforming to MIL-T-5624 will be used for diffusion, low temperature crease resistance and extraction. If this isn't available at a reasonable cost and within time constraints, the manufacturer can use JP-8 with enough BTX added to ensure that aromatics equal or exceed 23 percent.
- 2/ Immersion test fluid shall be referee fuel conforming to MIL-F-46162 type I.
- 3/ This requirement may be met by certification from the material manufacturer that the material provided has been subjected to, and passed the specified weather resistance test, and providing those test results for inclusion in the first article test report.
- 4/ Alternate Corex D filters in place. Coated fabric specimens shall have exterior coating (outside of tank) facing the carbon arc.
- 5/ ASTM D 2565, Xenon Light, procedure A, inner and outer borosilicate filters; deionized water ( $20 \pm 3$  °C); 690 minutes light exposure, 30 minutes light and gray; black panel temperature  $63 \pm 3$  °C; relative humidity ( $45 \pm 5$  percent). Coated fabric specimens shall have exterior coating (outside of tank) facing the light.

3.4 Tank construction. The tank shall be fabricated from coated fabric as specified herein. The configuration and dimensions of the tank and the location of the fittings and handles shall be as shown in figures 1 through 4. Seams shall not coincide with tank fittings. The longitudinal seams of the tank top shall not coincide with the seams of the tank bottom at each end closure. Coated fabric panels may be spliced together; however, all splices shall be located on the bottom of the tank. All splices shall conform to requirements for seams as specified in 3.4.1. Splices in adjacent panels shall not coincide. On both the interior and exterior of the tank, all coated fabric, edges of seams, fabric flanges of fittings, and splices shall be covered to a thickness of not less than 10 mils with coating compound. All tank fittings shall be located a minimum of 8 inches away from any seam or splice.

3.4.1 Seams. All tank seams including end closures, handle patches, and fabric flanges of fittings shall conform to the requirements of table III.

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TABLE III. Characteristics of seams.

Test Property	Requirements Tank Capacity (Gallons)				Test Paragraph and ASTM Test Method
	3,000	10,000	20,000	50,000	
Breaking strength, <u>1</u> / Initial, (lb/in, min.)	400	400	550	550	D 751 method B & 4.5.2.16
Breaking strength, <u>1</u> / After immersion in fuel <u>2</u> / at 160 °F for 14 days (lb/in, min.)	290	290	400	400	D 751 method B, 4.5.2.16, & D 471 (15.2)
Breaking strength, <u>1</u> / After fuel extraction <u>3</u> / dried, and immersion in distilled water at 160 °F for:					D 751 method B, 4.5.2.16, 4.5.2.23 & D 471 (15.2)
14 days, (lb/in, min.)	325	325	450	450	
42 days, (lb/in, min.)	290	290	400	400	
Dead load shear resistance under 50 lb/in stress at 180 °F for 8 hours	0.125 in slippage (max)				4.5.2.17
Seam peel adhesion ● Initial, (lb/in, min.)	30	30	30	30	D 413 machine method & 4.5.2.16
Seam peel adhesion ● After fuel immersion <u>2</u> / for 14 days at 160 °F (lb/in, min.)	20	20	20	20	D 413 machine method, 4.5.2.16 & D 471 (15.2)
Seam peel adhesion ● Seam peel adhesion after fuel extraction <u>3</u> / dried, and immersion in distilled water at 160 °F for:					D 413 machine method, 4.5.2.16, D 471 (15.2) & 4.5.2.23
14 days, (lb/in, min.)	20	20	20	20	
42 days, (lb/in, min.)	15	15	15	15	

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- 1/ All specimens must break in the coated fabric. Failure of any specimen in a seam area shall constitute failure of this test.
- 2/ Immersion test fluid shall be referee fuel conforming to MIL-F-46162, type I.
- 3/ JP-5/JP-8 ST fuel conforming to MIL-T-5624 shall be used as the extraction media. If this isn't available at a reasonable cost and within time constraints, the manufacturer can use JP-8 with enough BTX added to ensure that aromatics equal or exceed 23 percent.

3.4.1.1 Lap joints and butt joints. Lap joints or butt joints shall be used to fabricate seams between adjacent panels and splices. Lap joints shall have a minimum overlap length of 1.5 inches. Lap joints shall have a gum strip or adhesive barrier centered over the inner and outer exposed coated fabric edge to prevent wicking through the fabric. Butt joints shall have a 2-inch (minimum) wide patch centered over the butted joint on both sides of the coated fabric.

3.4.2 Handles. The handles shall be 1.25  $\pm$  .25 inch wide, fabricated from nylon webbing or cloth and fastened to a coated fabric patch similar to the tank body material. The two ends of each strap shall be attached to each patch at points 12  $\pm$  1 inch apart. The length of the strap between the two points of attachment shall be 16  $\pm$  1 inch. The patch and strap assembly shall be bonded to the bottom of the tank just below the peripheral fold line. Handles shall be located a minimum of 1 inch away from the seams. The bonds between each handle patch assembly and the tank fabric shall be capable of withstanding perpendicular loads of 1,500 pounds without damage to the tank. The number of handles and the position of each handle shall be as shown in figures 1 through 4, as applicable.

3.4.2.1 Lifting slings. Each tank shall be furnished with two nylon webbing or cloth lifting slings. Each sling shall be a minimum of 2 inches in width and a length equivalent to the circumference of the folded up tank plus 5 feet, and have a 500-pound minimum tensile strength. The ends of each sling shall have a loop to facilitate the lifting of the tank from its container.

3.4.3 Chafing patches. The interior and exterior of the tank, opposite the location of each fitting shall be provided with bonded coated fabric chafing patches as shown in figures 1 through 4. The chafing patches shall be the same coated fabric used to fabricate the tank.

#### 3.4.4 Fittings.

3.4.4.1 Fitting type. The access door fitting and the vent and drain flange attachment shall be bonded to the coated fabric flange and shall be as specified herein and shall conform to the requirements of table IV. Fittings shall be compression type and shall be as shown in figures 6 and 10. The oval closure plate shall be as shown in figure 7.

3.4.4.2 Fitting assemblies. Unless otherwise specified (see 6.2), each tank shall be furnished with the following fitting assemblies located as shown in figures 1, 2, 3, and 4. The filler/discharge assembly shall be as shown in figure 5. The drain fitting assembly shall be as shown in figure 12. The vent fitting assembly shall be as shown in figure 9. The pressure relief cap of the vent assembly shall be open when subjected to an internal pressure of 3 inches of water. The recommended torque for all fitting bolts shall be either stamped onto the fitting flange plates or stenciled on the tank fabric adjacent to the respective fittings. Keeper chains shall be attached to all dust covers (caps and

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plugs) and their adjacent fittings such that the dust cover may be removed without detaching the keeper chain at either of its ends. The keeper chains shall be in accordance with RR-C-271, type II, class 3, bronze, nonreflective. All 1/4-inch bolts shall be torqued to 15 ft lb and all 3/8-inch bolts shall be torqued to 30 ft lb.

TABLE IV. Characteristics of bonded fittings.

Test Property	Requirements Tank Capacity (Gallons)				Test Paragraph Test Method of FED-STD-191, or ASTM Test Method
	3,000	10,000	20,000	50,000	
Aluminum to coated fabric bond, breaking strength:					
● Initial, (lb/in, min)	400	400	550	550	4.5.2.18 & 4.5.2.18.1
● After fuel immersion 1/ for 14 days at 160 °F (lb/in, min.)	290	290	400	400	D 471 (15.2) 4.5.2.18 & 4.5.2.18.2
● After fuel extraction 2/ dried, and immersion in distilled water at 160 °F for:					
14 days, (lb/in, min.)	325	325	450	450	D 471 (15.2) 4.5.2.18,
42 days, (lb/in, min.)	290	290	400	400	4.5.2.18.2 & 4.5.2.23
Dead load shear resistance under 60 lb/in stress at 180 °F for 8 hours:	0.125 in slippage (max)				4.5.2.17 & 4.5.2.18.3
Peel adhesion of aluminum strip to coated fabric:					
● Initial, (lb/in, min.)	30	30	30	30	D 429 method B & 4.5.2.19
● After fuel immersion 1/ for 14 days at 160 °F (lb/in, min.)	20	20	20	20	D 471 (15.2), D 429, method B, 4.5.2.19, & 4.5.2.19.1
● After fuel extraction 2/ dried, and immersion in distilled water at 160 °F for:					
14 days, (lb/in., min.)	20	20	20	20	D 471 (15.2), D 429, method B,
42 days, (lb/in., min.)	15	15	15	15	4.5.2.19, & 4.5.2.23

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- 1/ Immersion test fluid shall be referee fuel conforming to MIL-F-46162, type I.
- 2/ JP-5/JP-8 ST fuel conforming to MIL-T-5624 will be used as extraction media. If this isn't available at a reasonable cost and within time constraints, the manufacturer can use JP-8 with enough BTX added to ensure that aromatics equal or exceed 23 percent.

3.4.4.3 Aluminum alloys of tank fittings. Alloy and temper designations of wrought aluminum shall be in accordance with ANSI H35.1. Cast aluminum alloy shall conform to ASTM B 85, UNS A14130, UNS A13600, or UNS A05180 for die castings; ASTM B 108, UNS A03560-T6 for permanent mold castings, or ASTM B 26, UNS A13560-T6 or UNS A07120-T5 for sand castings.

3.4.4.4 Protective coatings. The contractor shall provide certification that the minimum coating thickness for castings is 0.004 inches and 0.0007 inches for wrought aluminum alloy fittings.

3.4.4.5 Thread seal. Antiseize tape conforming to MIL-T-27730, size II, shall be applied to mating pipe threads prior to assembly.

3.5 Tank performance. The tank and components shall withstand folded storage at ambient temperatures from +160 to -30 °F without damage or leakage when subsequently filled with fuel. The tank and components shall be suitable for operational use at ambient temperatures from +130 to -25 °F. The tank shall not be damaged during service life when exposed to fungi growth or relative humidity up to 100 percent such as is encountered in tropical climates. The tank shall be suitable for use in continuous contact with rainwater, ground water, or water associated with fuel stored in the tank. There shall be no evidence of leakage or seepage when the tank is filled for 90 days to its rated capacity of diesel fuel or jet fuel. The tank shall have a 10 percent minimum over-capacity of fuel without rupture or evidence of weakened areas and without leakage or seepage of fuel. The tank shall be capable of withstanding an internal air pressure of 0.50 pound per square inch (psi) without evidence of leakage. The filler assembly elbow shall withstand a hydrostatic pressure of not less than 15 psi without leakage.

3.6 Berm liner. Unless otherwise specified (see 6.2), a berm liner shall be furnished with each tank. The berm liner shall conform to the applicable sizes shown in 1.2 of MIL-B-53081 size 1, 2, 3, or 4.

3.7 Repair items. The following repair items shall be furnished with each tank:

<u>Item</u>	<u>Quantity</u>
Repair kit and repair kit components conforming to MIL-R-52255, type II	1 ea
O-Ring MS9021-383	2 ea
O-Ring MS29513-250	2 ea
Gasket, quick disconnect coupling MS27030-6	3 ea
Gasket, quick disconnect coupling MS27030-9	4 ea
Gasket, 4-inch flange, figure 14	2 ea
Tape, Antiseize, MIL-T-27730, size II	1 ea
One square yard of coated fabric conforming to tables I and II	1 ea

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**3.8 Accessories.** Unless otherwise specified (see 6.2), each tank shall be provided with the accessories in the quantities shown in figures 25, 26, 27 and 28. When deployed, the accessories in figures 25 and 26 are attached to the tank at the drain fitting. When deployed, the accessories in figures 27 and 28 are attached to the tank at the filler/discharge fitting. All plugs and caps shall be attached to the assembly with keeper chains that meet the requirements of 3.4.4.2. Polytetrafluoroethylene tape in accordance with MIL-T-27730, size II, shall be applied to all EPT fittings before mating with IPT fittings.

**3.9 Identification marking.** The tank shall be identified in accordance with MIL-STD-130 by means of an identification label. The identification label shall be made of coatings as specified in 3.3.4 or coated fabric as specified in 3.3.5 and shall be bonded to the tank. The following information shall be molded, either recessed or in relief, using 0.50-inch (minimum) letters, on the tank identification label:

TANK, FABRIC, COLLAPSIBLE:  
 (Specify) GALLONS, FUEL  
 NSN: (Specify)  
 MFR: (Mfr name and location of plant)  
 SERIAL NO. (Specify)  
 MFG DATE: (Specify month (3 letters) and year)  
 WEIGHT EMPTY: (Specify approximate number of pounds)  
 CONTRACT OR ORDER NO.: (Specify)  
 LOT: (Specify)  
 (Part or Identifying Number (PIN) specified as in 6.5)  
 TWO YEAR USE LIFE-EXTENDABLE/TEN YEAR STORAGE LIFE-EXTENDABLE

**3.9.1 Tank caution label.** The caution label shall be made of coating compound as specified in 3.3.4 or coated fabric as specified in 3.3.5 and shall be bonded to the tank. The following information shall be molded, either recessed or in relief, using letters of the height indicated.

CAUTION (two inch-letters)  
 DO NOT OVERFILL (one-inch letters)

OVERFILLING MAY RESULT IN PERMANENT  
 DAMAGE AND FAILURE OF THE TANK

MAXIMUM CAPACITY: (specify) GALLONS

MAXIMUM TANK HEIGHT:  
 (specify) FEET (specify) INCHES  
 (specify) METERS

NOT RECOMMENDED FOR LONG TERM

GASOLINE STORAGE

**3.9.2 Valve labeling.** All valves shall be provided with double-ended arrows showing the direction of open and close.



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**3.9.3 Drain location label.** The chafing patch above the drain assembly shall be stenciled with the following message "Drain Fitting Is Under This Label", "Connect Drain Hose Before Filling Tank". The minimum letter size shall be 1-inch high.

**3.9.4 Filler/discharge label.** "Fill/Discharge" shall be stenciled above the filler/discharge assembly in 1-inch (minimum) high letters.

**3.10 Workmanship.** The fabric-reinforced flange-type fittings shall contain no gum voids, cracks or tears that could adversely affect the strength of the assembly. All metal parts shall be clean and free of sand, dirt, and scale, flux, burrs, sharp edges, corrosion, and shall not be broken or malformed. Metal surfaces shall be smooth with edges rounded or beveled. The inside and outside of the tank shall be clean and free of foreign materials (excluding talc). Any necessary rework shall meet all applicable requirements of this specification. The cemented surfaces of all spliced areas, fitting flanges, and patch-type repairs shall effect a bond that will result in strength of the cemented area not less than the strength of adjacent tank fabric. Fabric components shall be free of holes, cuts, or tears, thin, or weak areas, caused by abrasion or delamination, exposed fabric, blisters, tunnels, unadhered pockets, picks, loose edges, or any delamination of coating.

**3.11 Repair and rework of collapsible fabric tanks.** Any repair or rework of any tank shall be accomplished before inspection (quality conformance inspection or inspection of packaging, as applicable) with the exception of air leakage testing. Repair of seams shall be limited such that total repairs do not exceed five percent of total seam length in the tank. Defects subject to repair (other than those on seams) shall be limited to six inches in diameter, six inches in length, and six inches in width as applicable. The 6-inch criteria shall be the maximum dimension of the affected condition.

**3.12 Color.** When tested as specified in 4.5.2.20, the color of the tank exterior (the coating of the coated fabric, exposed fittings, handles, seams, and chafing patches), hose assemblies and berm liners shall match color 33446 of FED-STD-595.

#### 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, and unless disapproved by the Government, the contractor's own or any other facilities suitable for the performance of the inspection requirements specified herein, may be used. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

**4.1.1 Responsibility for compliance.** All items must 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



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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 acceptance of defective material.

4.2 Classification of inspection. 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).

4.2.1 Fabricated samples for inspection. Fabricated samples shall be produced by production personnel using the same materials, processes, and production equipment, etc., that are used in production of tanks. No laboratory samples shall be accepted, i.e., samples produced in a testing facility or by testing and quality control personnel using production equipment. Each production tank shall have a sufficient number of fabricated samples to conduct quality conformance tests in accordance with 4.4.1.2. The contractor shall ensure that the fabricated samples are representative of the corresponding production tank or first article tank.

4.3 First article inspection. Unless otherwise specified, the first article inspection shall be performed by the contractor. Acceptance of the first article tanks shall not exclude the remaining tanks from meeting all the requirements of this specification. In addition to the performance of first article inspections, the Government reserves the right to perform any and all inspections contained in this specification to assure compliance. Failure to meet any requirement of this specification shall constitute failure of first article inspection.

4.3.1 Examination. The first article tank shall be examined as specified in table V. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. Tests marked "X" in column 1 of table VI shall be conducted on a first article tank or samples cut from a first article tank. Tests marked "FS" in column 1 of table VI shall be conducted on fabricated samples prepared in accordance with 4.2.1. Failure of any test shall be cause for rejection.

#### 4.4 Quality conformance inspection.

4.4.1 Sampling for quality conformance inspection. Initially, each lot shall consist of 25 tanks. One tank and its corresponding fabricated samples shall be randomly selected from each lot and subjected to quality conformance inspection specified herein. Continuous successful completion of four tests cycles, may be cause for increasing the lot size with a corresponding decrease in test frequency. Increasing the lot size shall be subject to approval of the contracting officer. Rejection of any lot during the increased lot size shall require a return to the original lot size of 25 production tanks.

4.4.1.1 Examination. The production tank selected in accordance with 4.4.1 shall be examined as specified in table V. Any nonconformance revealed by the examination shall be cause for rejection of the tank and corresponding lot.

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4.4.1.2 Tests. A production tank shall be subjected to the test marked with an "X" in column 2 of table VI. Fabricated samples, prepared in accordance with 4.2.1, shall be subjected to the tests marked "FS" in column 2 of table VI. Failure of any test shall be cause for rejection.

4.5 Inspection procedure.

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

TABLE V. Examination schedule.

Number	Examination description	Requirement paragraph
101.	Materials not as specified.	3.3
102.	Materials are not resistant to deterioration or are not treated to be resistant to corrosion and deterioration for the applicable storage and operating environments.	3.3.1
103.	Used, rebuilt, or remanufactured components, pieces, or parts incorporated in the tanks.	3.3.2
104.	Evidence of coating delamination.	3.3.5
105.	Blisters, holidays, or pinholes, in coated fabric.	3.3.5
106.	Exterior color of tank not as specified.	3.12
107.	Dimension not as specified.	3.4.
108.	Edges of coated fabric not covered as specified.	3.4.
109.	Splices and seams coincident or seams coincident with tank fittings.	3.4.
110.	Lap joints or butt joints not as specified.	3.4.1.1
111.	Handles, chafing patches, or fittings not located as specified.	3.4.2, 3.4.3, 3.4.4.
112.	Fittings not as specified.	3.4.4.1 to 3.4.4.3

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TABLE V. Examination schedule - Continued.

Number	Examination description	Requirement paragraph
113.	Samples for submission not as specified (This applies to First Article Examination only)	3.2.1.
114.	Finish of fittings not as specified.	3.4.4.4
115.	Berm liner not as specified.	3.6
116.	Repair items missing or not as specified.	3.7
117.	Keeper chains not as specified.	3.4.4.2
118.	Recommended torque for bolts not listed on tank.	3.4.4.2
119.	Accessories not as specified.	3.8
120.	Identification label not as specified.	3.9
121.	O-rings not lubricated as specified.	Figures 5, 9, and 12
122.	Valve, drain and filler/discharge labels not as specified.	3.9.2, 3.9.3, 3.9.4
123.	Tank caution label missing or not as specified.	3.9.1.
124.	Workmanship not as specified.	3.10
125.	Extraneous material inside tank.	3.10

4.5.2 Tests.

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TABLE VI. Test schedule.

First article	QC Sample	Test	Test paragraph	Requirement paragraph
1	2	3	4	5
		<u>Tank and accessories 1/</u>		
X	X	Air-leakage.	4.5.2.1	3.5
X	-	Low temperature.	4.5.2.3	3.5
X	-	High temperature.	4.5.2.4	3.5
X	-	Fuel storage.	4.5.2.5	3.5
X	-	Overload.	4.5.2.6	3.5
X	-	Internal inspection.	4.5.2.6.1	3.5
X	-	Vent fitting assembly.	4.5.2.25	3.4.4.2
X	-	Hydrostatic.	4.5.2.2	3.5
X	-	Handle pull test.	4.5.2.7	3.4.2
		<u>Cloth</u>		
FS	-	Weathering resistance.	4.5.2.8	3.3.3
		<u>Coating compounds</u>		
FS	-	Tensile strength (orig).	4.5.2.9	3.3.4, table I
FS	-	Ultimate elongation(orig)	4.5.2.9	3.3.4, table I
FS	-	Tensile strength retained after 14 day fuel immersion.	4.5.2.9	3.3.4, table I
FS	-	Elongation retention after 14 day fuel immersion.	4.5.2.9	3.3.4, table I
FS	-	Volume swell after 14 day fuel immersion.	4.5.2.9	3.3.4, table I
FS	-	Properties after fuel extraction, dried, and then immersed in water for: 14 Days ● Tensile strength retention ● Elongation retention ● Volume swell 42 Days ● Tensile strength retention ● Elongation retention ● Volume swell	4.5.2.9	3.3.4, table I
FS	-	Resistance to light.	4.5.2.9	3.3.4, table I
FS	-	Existent gum.	4.5.2.10	3.3.4, table I
FS	-	Heptane washed gum.	4.5.2.10	3.3.4, table I
FS	-	Resistance to ozone.	4.5.2.21	3.3.4, table I

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TABLE VI. Test schedule. - Continued.

First article	QC Sample	Test	Test paragraph	Requirement paragraph
1	2	3	4	5
		<u>Coated fabric</u>		
X	FS	Diffusion rate.	4.5.2.22	3.3.5, table II
X	FS	Weight.	4.5.2.11	3.3.5, table II
X	FS	Tearing strength.	4.5.2.11	3.3.5, table II
X	FS	Breaking strength.	4.5.2.11	3.3.5, table II
X	-	Weathering resistance.	4.5.2.11	3.3.5, table II
X	FS	Puncture resistance.	4.5.2.12	3.3.5, table II
X	-	Low temperature crease resistance.	4.5.2.13	3.3.5, table II
X	FS	Blocking	4.5.2.14	3.3.5, table II
X	FS	Coating adhesion (initial).	4.5.2.15	3.3.5, table II
X	-	Coating adhesion after 14 day fuel/water immersion.	4.5.2.15	3.3.5, table II
X	-	Coating adhesion after fuel extraction, dried, & immersed in water for:	4.5.2.15 & 4.3.2.23	3.3.5, table II
X	-	14 Days		
X	-	42 Days		
		<u>Seams</u>		
X	FS	Breaking strength (initial).	4.5.2.16	3.4.1, table III
X	FS	Breaking strength after 14 day fuel immersion.	4.5.2.16	3.4.1, table III
X	FS	Breaking strength after fuel extraction and immersed in water for:	4.5.2.16 & 4.5.2.23	3.4.1, table III
X	FS	14 Days		
X	-	42 Days		
X	FS	Dead load shear resistance.	4.5.2.17	3.4.1, table III
X	FS	Peel adhesion (initial).	4.5.2.16	3.4.1, table III
X	FS	Peel adhesion after 14 day fuel immersion.	4.5.2.16	3.4.1, table III
X	FS	After fuel extraction, dried, & immersed in water for:	4.5.2.16 & 4.5.2.23	3.4.1, table III
X	FS	14 Days		
X	-	42 Days		

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TABLE VI. Test schedule. - Continued.

First article	QC Sample	Test	Test paragraph	Requirement paragraph
1	2	3	4	5
X	FS	<u>Bonded fittings</u> Bond strength (initial).	4.5.2.18 and 4.5.2.18.1	3.4.4.1, table IV
X	-	Bond strength after 14 day fuel immersion.	4.5.2.18.2	3.4.4.1, table IV
X	FS	Bond strength after fuel extraction, dried, and immersed in water for:	4.5.2.18.2 & 4.5.2.23	3.4.4.1, table IV
X	FS	14 Days		
X	-	42 Days		
X	FS	Dead load shear resistance.	4.5.2.18.3	3.4.4.1, table IV
X	FS	Peel adhesion of Aluminum strip (initial).	4.5.2.19 4.5.2.19.1	3.4.4.1, table IV
X	-	Peel adhesion after 14 day fuel immersion.	4.5.2.19.1	3.4.4.1, table IV
X	-	Peel adhesion after fuel extraction, dried and immersed in water for:	4.5.2.20 & 4.5.2.23	3.4.4.1, table IV
X	-	14 Days		
X	-	42 Days		
		<u>Color</u>		
X	-	Color.	4.5.2.20	3.12

1/ One tank assembly shall be tested in the order listed, starting with the air leakage test and ending with the handle pull test.

4.5.2.1 Air leakage. Pressurize each tank to a 0.50 psi,  $\pm 5$  percent, internal air pressure and allow to stand for 30 minutes. Then adjust the internal air pressure to 0.50 psi,  $\pm 5$  percent. Then using a soap and water solution examine all the tank fabric, fittings, and external seams for leakage. Any evidence of air leakage shall constitute failure of this test.

4.5.2.2 Hydrostatic. Subject the elbow filler assembly to a hydrostatic pressure of 15 psi for a period of not less than 10 seconds. The test fluid shall be water. Any evidence of leakage of the assembly shall constitute failure of this test.

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**4.5.2.3 Low temperature.** The tank shall be folded or rolled to a size suitable for placing in the shipping container, and then placed in a low temperature environment of  $-30 \pm 2$  °F, for a period of 24 hours. The environmental temperature shall then be increased to  $-25 \pm 2$  °F, for an additional 24 hours. At the end of this period while still at  $-25 \pm 2$  °F, the tank shall be slowly unfolded in not less than 15 minutes nor more than 30 minutes. Any flaking, cracking, or separation of the coated fabric, shall constitute failure of this test.

**4.5.2.4 High temperature.** The tank shall be folded or rolled to a size suitable for placing in the shipping container, then placed in a high temperature environment of  $160 \pm 5$  °F, for a period of 24 hours. At the end of this time, while still at  $160 \pm 5$  °F, the tank shall be slowly unfolded in not less than 15 minutes nor more than 30 minutes. Any flaking, cracking, delamination, or separation of the coated fabric shall constitute failure of this test.

**4.5.2.5 Fuel storage.** Fill the tank outdoors without any environmental protective covering with its rated capacity of diesel fuel (VV-F-800) and allow to stand for 90 days,  $\pm 2$  -0 days. During the test and at the end of this period, examine the tank for seepage and leakage. Immediately after the tank is emptied, the tank bottom shall be examined for leakage and seepage. Any evidence of leakage or seepage shall constitute failure of this test.

**4.5.2.6 Tank overload.** The tank shall be filled to its rated capacity  $\pm 10$  percent, -0 percent, of diesel fuel (VV-F-800) and allowed to stand for 4 hours in a dry location. The tank shall be located on a non-absorbent berm liner during this interval. Immediately after the tank is emptied, the tank bottom and berm liner shall be examined for leakage. Any evidence of rupture, weakened areas, leakage, or seepage shall constitute failure of this test.

**4.5.2.6.1 Internal inspection.** The tank shall be inspected internally after the overload test of 4.5.2.6. Any evidence of weakened areas, coating, or barrier delamination shall constitute failure of the overload test.

**4.5.2.7 Tank handle pull resistance.** The test sample shall consist of the handle, coated fabric patch, and a minimum of 1 foot of tank body fabric extending in all directions from the handle patch. The body fabric shall be tightly drawn and clamped between two flat oval rings or a base plate and an oval ring so that the handle of the patch is centrally located in the rings. The shape of the oval rings shall be such that all edges of the coated fabric patch are a minimum of 1-inch from the ring clamp. The rigidity, strength, and construction of the clamp shall be such that the tank body material shall not slip more than 0.50 inch at any point during the test. With the sample held securely, a tension shall be applied through a bar or pipe 1 inch in diameter inserted in the loop of the handle. The tension shall be slowly and smoothly applied in a direction perpendicular to the plane of the handle patch until the specified load of 1,500 pounds is reached. The 1,500-pound load shall be maintained for 1 minute. Any damage, permanent distortion, or separation of the handle patch, or tank material shall constitute failure of this test.

**4.5.2.8 Cloth.** Cloth properties shall be tested in accordance with FED-STD-191, method 5804 and 5104. Properties shall apply after heat setting. In method 5804 alternate Corex D filters shall be removed. Specimens shall be raveled for method 5104 after 100 hours of accelerated weathering. The breaking strength warp and fill (lbs. [min.]) shall conform to FED-STD-191, method 5104.



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The edges of the test specimen shall be coated by dipping or brushing with a solution or other adhesive or sealed by melting with heat sufficiently to preclude yarn slipping while under test. Breaking strength after accelerated weathering less than 50 percent of the initial breaking strength shall constitute failure of this test. Both initial and aged breaking strength samples shall be run in warp and fill directions.

**4.5.2.9 Coatings.** Coatings properties shall be tested in accordance with the test methods shown in table I. Samples for initial values shall be conditioned, prior to testing, in water at room temperature for 24 hours and tested within 3 minutes after taking out of water. Nonconformance to 3.3.4 or table I shall constitute failure of this test.

**4.5.2.10 Existent gum.** Cut a 5-gram specimen of each tank interior coating compound into approximately 0.0625-inch squares and place in a flask containing 250 ml of JP-5/JP-8 ST fuel conforming to note 3/ of table I and a flask containing MIL-F-46162 diesel fuel, and allow to stand for 48 hours at  $73 \pm 5$  °F. Decant and filter the contaminated fluid through Whatman 41H filter paper or equal. Determine the unwashed gum content of the filtrate in accordance with ASTM D 381, procedures 10.1 through 10.7 using the air jet or steam jet vaporizing medium (whichever is appropriate for the fuel) and an evaporation time of 45 minutes. Using the same samples after completing the unwashed gum content test above, determine the existent gum in accordance with ASTM D 381, procedures 10.8 through 10.12. A minimum of three specimens shall be used to report the average gum content. Nonconformance to 3.3.4 and table I shall constitute failure of this test.

**4.5.2.11 Coated fabric.** Coated fabric properties shall be tested in accordance with test methods shown in table II. Nonconformance to 3.3.5 and table II shall constitute failure of this test.

**4.5.2.12 Puncture resistance.** FED-STD-191, method 5120 applies except that the ring clamp mechanism shall have an internal diameter of 3.00 inch, and the ball shall be replaced by a piercing instrument shaped like a flared, flat-tip screwdriver, having a width of  $0.312 \pm 0.010$  inch and a thickness of  $0.031 \pm 0.004$  inch at the extreme tip. The piercing tip edges shall be rounded to a 0.010-inch radius. The piercing instrument shall be oriented to intercept the warp and fill threads at an angle of approximately 45 degrees. The average of three test specimens shall be reported. Nonconformance to 3.3.5 and table II shall constitute failure of this test.

**4.5.2.13 Low temperature crease resistance.** Immerse three coated fabric specimens, each 8 inches square, in JP-8 fuel conforming 3.3.5, and condition for 24 hours,  $\pm 1$  hour, at  $73 \pm 5$  °F. Remove specimens, place on a wire screen, and air dry with forced air movement at  $73 \pm 5$  °F, for 24 hours,  $\pm 1$  hour. Then fold the specimens in half in each direction so that a folded corner occurs in the center of each specimen. Place each folded specimen under a 4-pound load and condition at  $-25 \pm 2$  °F for 46 hours. At the end of the conditioning period, unfold the specimens while still at a temperature of  $-25$  °F and examine visually. Signs of cracking, peeling, or delamination of any coating material shall constitute failure of this test. If the specimen does not fail, then subject the specimen to the diffusion test specified in 4.5.2.22 except position the specimen in the

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diffusion cup in such a manner that the center of the previously folded specimen coincides with the center of the cup. Nonconformance to 3.3.5 and table II shall constitute failure of this test.

**4.5.2.14 Blocking.** Place three coated fabric specimens 6 inches by 1 inch in an oven on a smooth surface in such a manner that the ends are overlapped 1 inch. Place a 4-pound weight directly on the overlapped area. After conditioning at a temperature of  $158 \pm 2$  °F, for 4 hours, remove the weight and take the specimens from the oven and condition for 1 hour at  $73 \pm 5$  °F and  $65 \pm 2$  percent humidity. Attach one end of the specimen in a suitable clamping device allowing the free end to hang down. Suspend a 4-ounce load from the free end of the specimens. Inability of the strips to separate within 5 seconds under the 4-ounce load shall constitute failure of this test.

**4.5.2.15 Coating adhesion.** Samples of coated fabric shall be bonded face-to-face to provide specimens for determining adhesion between the cloth and exterior coating(s): between the cloth and interior coating(s), between laminations of interior coatings and barrier (if used), and between laminations of exterior coatings. In forming this bond the specimens shall be subjected to no heat or pressure other than that normally encountered in curing the coated fabric, except for minimal pressure necessary to ensure contact while the bond is setting. Samples shall undergo fuel extraction as described in 4.5.2.23 prior to coating adhesion test.

**4.5.2.15.1 Test procedure.** The adhesion shall be determined in accordance with ASTM D 413, machine method except that the specimens shall be 2 inches wide. The specimens shall be of sufficient length to conduct adhesion test for both initial values and after fuel or water immersions. The adhesion results obtained on each immersed specimen shall be compared with the initial adhesion of the same specimen to determine percentage of adhesion retained. The reported adhesion and percent retention shall be the average of not less than three specimens. Attempts shall be made to cut the coating back to the cloth and to determine the adhesion value at the coating-to-cloth interface. However, if a specimen separates at a plane other than the bond of the coating to cloth (such as between layers of coating materials or between barrier film and coating) the adhesion value and the plane of failure shall be recorded. Immersed specimens shall be conditioned in the test fluid at  $73 \pm 5$  °F, for 30 to 90 minutes before testing. Testing of immersed specimens shall be completed within 3 minutes after removal from the conditioning fluid. Immersion of specimens shall be in accordance with ASTM D 471. Nonconformance to 3.3.5 and table II shall constitute failure of this test. Any obvious bond failure evident after immersion but before stressing, even if the plane of failure is not sandwiched between the layers of fabric, shall constitute failure of this test.

**4.5.2.16 Seam tests.** The bonding together of any two or more pieces of coated fabric (such as lap joints, butt joints, and closures, chafing patches, coated fabric flanges of fittings, repairs, etc.) shall be considered as seams and shall be subjected to all seam tests specified herein, except chafing patches which shall only be tested for peel. The average breaking strength of five specimens for each type seam for each test shall be reported for conformance to table III. Breaking strength specimens shall be 2 inches wide (parallel to the seam) and shall extend (perpendicular to the seam) 3 inches beyond both edges of the seam. No part of the test specimens shall be coated or covered during the fuel or water immersion periods. Specimens shall be cooled in the immersion fluids at  $73 \pm 5$  °F,

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for 30 to 90 minutes before testing. Testing of immersed specimens shall be completed within 3 minutes after removal from the immersion fluids. The average peel adhesion strength of three specimens for each type seam shall be reported for conformance to table III. Peel adhesion specimens shall be of sufficient length to determine both the initial and after fuel or water adhesion values on the same specimen. If seam construction involves the use of binding thread, then the peel specimens shall be prepared with threads removed. Chafing patches shall be tested for peel only. Nonconformance to 3.4.1 and table III shall constitute failure of this test. Specimens to be immersed in distilled water shall be extracted and dried in accordance with 4.5.2.23 prior to immersion in the water.

**4.5.2.17 Dead load shear resistance.** The test specimens shall be 1.000 inch,  $\pm 0.020$ -inch wide, (parallel to the seam) and coated fabric shall extend a minimum of 3 inches (perpendicular to the seam) on each side of the seam. One index mark shall be scribed on each side of the seam to facilitate observation and measurement of slippage. Each specimen shall be subjected to a constant (dead load) tension force of  $50 \pm 0.50$  pound, at  $180 \pm 5$  °F. After 8 hours examine each specimen while still under tension for sign of slippage or separation. Three specimens shall be tested for each determination. Slippage, by any specimen, greater than specified in tables III and IV shall constitute failure of this test.

**4.5.2.18 Strength of bonded fittings.** Specimens shall be prepared by cutting through the aluminum flange such that parallel 1-inch wide sections are obtained from the straight portion of the oval fitting and 1-inch wedge shaped sections are obtained from the vent (or drain) and the curved portion of the oval fitting. The 1-inch shall be measured as a chord passing through the midpoint between the inside and outside diameters of the flange for the wedge shaped sections.

**4.5.2.18.1 Initial bond strength.** The coated fabric flanges shall be fastened together in one jaw of the test machine so that the jaw will be at least 1 inch from the nearest part of the aluminum flange. The aluminum flange shall be secured in the other jaw of the test machine and this jaw shall clamp only the aluminum and shall not compress the embedded part of the coated fabric flanges. The jaws shall be separated at a rate of 2 inches per minute at  $73 \pm 5$  °F and  $65 \pm 2$  percent humidity. The average of three test specimens shall be recorded as initial bond strength in pounds per inch of width. Nonconformance to 3.4.4.1 and table IV shall constitute failure of this test.

**4.5.2.18.2 Bond strength after fluid immersion.** Three test specimens shall be immersed for the appropriate durations in each test fluid specified in table IV. No part of the specimens shall be covered or coated during immersion. Specimens from both the oval and vent/drain fittings shall be included in each test fluid. The test specimens shall be cooled in the immersion fluid to  $73 \pm 5$  °F, for up to 60 minutes. The specimens shall be removed from the test fluid, one at a time and tested as in 4.5.2.18.1. Each test shall be completed within 3 minutes after removal from the test fluid. The average of three tests for each fluid shall be reported as bond strength after immersion in pounds per inch of width. Nonconformance to 3.4.4.1 and table IV shall constitute failure of this test. Specimens to be immersed in distilled water shall be extracted and dried in accordance with 4.5.2.23 prior to immersion in the water.

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**4.5.2.18.3 Dead load shear resistance aluminum to fabric bond.** Three specimens shall be clamped as in 4.5.2.18.1 and subjected to a constant (dead load) tension force of 60 pounds at  $180 \pm 5$  °F. At the end of 8 hours, the specimens shall be examined for slippage or separation while under tension. Nonconformance to 3.4.4.1 and table IV shall constitute failure of this test.

**4.5.2.19 Peel adhesion of aluminum to coated fabric.** Special test specimens shall be fabricated consisting of aluminum strips bonded to lengths of coated fabric. The aluminum strip shall be 12 inches long and shall be of the same alloy as that used in the aluminum fitting flanges. The coated fabric shall be 12 inches long (min.) by 2.000 inches,  $\pm 0.050$  inch wide, and shall be of the same composition (and of the same state of cure before bonding) as that used in the coated fabric flanges. The coated fabric strip shall be uniformly bonded to the aluminum strip. The bond shall be formed using identical techniques and bonding agents used to bond tank fittings and shall be cured identically (time, pressure, temperature, etc.) to the process used in bonding tank fittings.

**4.5.2.19.1 Test procedures.** Specimens shall be tested as per ASTM D 429, method B. Three or more specimens shall be averaged for each fluid immersion test. The same identical specimens shall be used to determine the initial peel strength and the strength after fluid immersion and when computing the percentage of initial adhesion retained. Nonconformance to 3.4.4.1 and table IV shall constitute failure of this test. Specimens to be immersed in distilled water shall be extracted and dried in accordance with 4.5.2.23 prior to immersion in the water.

**4.5.2.20 Color.** Color matching shall be in accordance with ASTM D 1729 for general match with color 33446 of FED-STD-595. Nonconformance to 3.12 shall constitute a failure of this test.

**4.5.2.21 Ozone Resistance.** Ozone resistance shall be tested as specified in ASTM D 1149. Nonconformance to table I requirements shall constitute failure of the test.

**4.5.2.22 Diffusion.** The test apparatus shall consist of a diffusion cup and ring, using figure 29 as a guide. Other cup designs are acceptable as long as the inside diameter of the cup and ring is maintained at 2 inches  $\pm 0.016$  inch and the cup is 1-inch deep (minimum). Cut a circular test disk of coated fabric to conform to the outside diameter of the cup flange. Punch holes in the disk to correspond to the flange bolt dimensions as needed. The cup shall be filled with approximately 40 ml of fuel conforming note 1/ of table II. A suitable solution (see 6.4), shall be used to seal the exposed fabric around the outer edge of the test disk and also for sealing the test disk to the diffusion cup flange. The test disk shall be placed over the cup with the tank "interior" side towards the fuel. The bolts shall be tightened securely. Place the diffusion cup in a suitable rack in a constant temperature of  $73.3 \pm 2$  °F, and a relative humidity of  $65 \pm 2$  percent. Allow 1 hour for the assembly to reach equilibrium, then weigh the cup to the nearest 0.005 gram and place in the rack face upward. Keep the cup at the above constant temperature and humidity for 24 hours. Then weigh and check for vapor loss. Retorque the bolts if necessary. Invert the cup (test disk down) in a rack that permits free access of air to the test disk. Weigh the cup daily. Defective films or leaks caused by faulty assembly are usually found when the cup is weighed on the third day. Continue to weigh the cup daily until the weight loss is constant to within 0.010 gram per day after two 24-hour periods. Then

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record daily weight loss for a continuous interval of 72 hours. The diffusion rate (D) in fluid ounces per square foot per 24 hours shall be the average of not less than three specimens when calculated from the following expression:

$$D = \frac{144 (\text{average daily loss in grams})}{(\text{Sp. Gr.}) (29.573)(3.122)(R^2)}$$

Where Sp. Gr. is the specific gravity of the test medium and R' is the inside radius of the test cup.

4.5.2.23 Fuel extraction. Test specimens shall be prepared in accordance with the tests to be performed in tables I through IV and then submitted to the following extraction procedure:

- a. Immerse the specimens in fuel as required in tables I through IV for 7 days at  $160 \pm 2$  °F.
- b. Remove specimens from fuel and blot with paper towels.
- c. Place specimens in a vacuum oven for drying  $16 \pm 2$  hours at  $120 \pm 2$  °F at 20 inches of mercury.
- d. Samples will then be immersed in distilled water as required in tables I through IV.

4.5.2.24 Repair/rework. Samples of all repair/rework procedures shall be subjected to the same tests and require the same performance as is required of all aspects of the tank.

4.5.2.25 Vent assembly. Subject the vent assembly to an internal pressure of 3 inches of water. Inability of the pressure relief cap to open at this pressure shall constitute failure of this test.

#### 4.6 Inspection of packaging.

4.6.1 First article packaging inspection. The first article pack shall be inspected as follows:

4.6.1.1 Examination. The first article pack shall be examined for the defects listed in 4.6.2.3. The presence of one or more defects shall be cause for rejection.

4.6.1.2 Tests. The first article pack shall be tested as follows:

4.6.1.2.1 Unpacking. The first article pack, for all levels of packing, shall be unpacked in the manner and sequence prescribed by the contractor. The first article pack shall have failed the test should the prescribed manner and sequence be ineffective, or should any of the contents fall free of the package.

4.6.1.2.2 Center of balance. The first article pack shall be lifted to a height of  $36 \pm 4$  inches at its lower end, with slings that have been centered over the marked center of balance and attached to the formed ends of the lifting bars. The lifted crate shall be examined for proper balance. Should the higher end of the crate exceed the height of the lower end by more than 24 inches, the first pack shall be considered to have failed the test.



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4.6.1.2.3 Slinging. The first article pack which has been lifted to the 36-inch height specified in 4.6.1.2.2 shall be rapidly raised to a height of 96 inches ( $\pm 6$  inches) at its lower end, abruptly stopped, and then rapidly lowered and rapidly stopped at the original height of 36 inches ( $\pm 4$  inches). This test shall be repeated 3 more times. Should there be any permanent deformation in the lifting devices; any crushing of the crate at a point where it contacts the lifting devices; any separation of lifting devices from the crate; or any damage to the crate in any other location, including the first article pack shall be considered to have failed this test.

#### 4.6.2 Quality conformance inspection of packaging.

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

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

4.6.2.3 Examination. Samples selected in accordance with 4.6.2.2 shall be examined for the following defects. Presence of one or more defects shall be cause for rejection.

PARAGRAPH				
No.	Defect	Level A	Level B	Level C
126.	Repair kit not preserved as specified.		5.2.2.1	
127.	Other repair items not preserved as specified.		5.2.2.2	
128.	Preserved repair items not combined together in pre-consolidation box as specified.		5.2.2.3	
129.	Pre-consolidation box not as specified.		5.2.2.3	
130.	Contents of pre-consolidation box not cushioned as specified.		5.2.2.3	
131.	Marking of pre-consolidation box not as specified.		5.2.2.3	
132.	Fittings not preserved as specified.		5.2.3	
133.	Hose assemblies not preserved as specified.	5.2.4.1		

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No.	Defect	PARAGRAPH		
		Level A	Level B	Level C
134.	Other accessories not preserved as specified.	5.2.4.2		
135.	Consolidation of all components not as specified.	5.2.6		
136.	Consolidation box not as specified.	5.2.6		
137.	Cushioning of consolidation box contents not as specified.	5.2.6		
138.	Openings into tank not protected as specified.	5.2.5		
139.	Tank not dusted with talc or other anti-sticking compound as specified.	5.2.5		
140.	Permanently attached tank fittings not preserved as specified.		5.2.3	
141.	Tank not folded or rolled into a compact bundle as specified.	5.2.5		
142.	Bundle not secured as specified.	5.2.5		
143.	Berm liner, when required, not preserved as specified.	5.2.7		
144.	Lumber and plywood not treated with preservative as specified.		5.3.1.1	
145.	Carriage bolts, lag screws, nuts and washers not as specified.		5.3.1.2	5.3.2
146.	Plywood not as specified.	5.3.1.2.1	5.3.2	
147.	Cleats not as specified.	5.3.1.2.2	5.3.2	



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No.	Defect	PARAGRAPH		
		Level A	Level B	Level C
148.	Skids and rubbing strips not as specified.	5.3.1.2.3	5.3.2	
149.	Fabrication of shipping container panels not as specified.	5.3.1.2.4	5.3.2	
150.	Anti-abrasion provisions not as specified.	5.3.1.2.5	5.3.2	5.3.3
151.	Consolidation containers not positioned and secured as specified.	5.3.1.2.6	5.3.2	5.3.3
152.	Hose assemblies not positioned and secured as specified.	5.3.1.2.7	5.3.2	5.3.3
153.	Containers with outside length dimension 96 inches or less, not as specified.	5.3.1.2.8	5.3.2	
154.	Strapping not as specified.	5.3.1.2.8.6.9	5.3.2	5.3.3
155.	Containers with outside length greater than 96 inches not as specified.	5.3.1.2.9	5.3.2	
156.	Shipping container for level C packing not as specified.			5.3.3
157.	Contents of shipping container not blocked and braced as specified.	5.4	5.4	5.4
156.	Marking not as specified.	5.5	5.5	5.5

## 5. PACKAGING

5.1 First article pack. The contractor shall furnish a first article pack for examination and tests within the time frame specified (see 6.2), to prove, prior to starting production packaging, that the applied preservation, packing and marking comply with the requirements of this specification. Examination and test shall be as specified in section 4 and shall be subject to surveillance and approval by the Government (see 6.3.1). The first article pack may be accomplished utilizing either the first article model or production model. If the

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first article model is utilized, and the Government requests a comparison between the first article model and production model, any preservation and packing shall be removed by the contractor at no expense to the Government.

5.2 Preservation. Preservation shall be level A or as specified (see 6.2).

5.2.1 Preservation, level A. Each complete tank shall be preserved in the following manner:

5.2.2 Repair items.

5.2.2.1 Repair kit. Each component of the repair kit shall be preserved in a bag in accordance with the level A requirements of MIL-R-52255.

5.2.2.2 Other repair items. The remaining repair items shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3 and items of like description for each tank shall be preserved together, in the quantities specified, in such a manner as to prevent damage or distortion.

5.2.2.3 Pre-consolidation. The preserved repair items, including the preserved repair kit components, shall be consolidated together in a close fitting fiberboard box conforming to PPP-B-636, class weather resistant, grade as applicable. Cushioning shall be positioned within the box to prevent free movement and damage to the contents. Box closure shall be in accordance with method IV of the appendix to the box specification. The box shall be legibly marked as follows:

REPAIR ITEMS  
FOR  
COLLAPSIBLE FUEL TANKS

5.2.3 Fittings. When provided (see 6.2), the filler/discharge 90 degrees elbow and vent stand pipe shall be separated from the tank. Each shall be wrapped with cushioning material conforming to PPP-C-1797. The cushioning material shall be secured in place with tape, and the wrapped fittings shall be marked for identification.

5.2.4 Accessories. When provided (see 6.2), the accessories shall be preserved as follows:

5.2.4.1 Hose assemblies. Each hose assembly shall be sealed with the respective plugs or caps provided for that purpose. The metal portions of all fittings securely wrapped with cushioning material as specified in 5.2.3.

5.2.4.2 Other accessories. The remaining accessories shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3 and accessories of like description for each tank shall be preserved together. All openings of the accessories shall be sealed with the respective plugs and caps provided for that purpose.

5.2.5 Tank. All openings into the tank shall be sealed with the respective plugs or caps provided for that purpose. Each tank shall be dusted with a talc or other antisticking compound or treatment to prevent adhesion to itself. Permanently attached fittings shall be protected with cushioning material conforming to and secured in place as specified in 5.2.3. The tank shall be laid

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flat, completely collapsed and then folded or rolled to form a neat compact bundle. The bundle shall be secured with web ties. The means of securing the bundle shall not subject the tank to the hazards of any sharp metal objects utilized either as a component of a securing device or as a tool for releasing the means.

5.2.5.1 Technical publications. When technical publications are required (see 6.2), they shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3.

5.2.5.6 Consolidation. The box which contains the tank shall have a 3/4-inch plywood divider placed at one end that is large enough to hold the repair items as specified in 5.2.2.3, the removed fittings as specified in 5.2.3, and the accessories (except for the wire-reinforced hose assemblies) as specified in 5.2.4. Cushioning shall be positioned within the box to prevent free movement and damage to the contents.

5.2.7 Berm liner. When provided (see 3.6 and 6.2), each berm liner shall be dusted, folded or rolled and secured as specified in 5.2.5 for the tank.

5.3 Packing. Each complete tank, and berm liner when required, preserved as specified in 5.2, shall be packed in accordance with the requirements for level A, B, or C as specified (see 6.2). The tank and berm liner shall be packed in a loose bundle. Nothing shall be placed on top of the loosely packed bundle.

5.3.1 Level A. When level A packing is specified (see 6.2) the following special consideration shall be afforded this product because of an anticipated extended period of storage under unfavorable environmental conditions.

5.3.1.1 Wood preservation (see 6.9). All lumber and plywood used in the construction of the exterior crates/boxes shall be treated with one of the following wood preservative solutions: 2 percent copper naphthenate, 3 percent zinc naphthenate, or 1.8 percent copper 8 quinolinolate.

5.3.1.2 Exterior containers/shipping containers. Unless otherwise specified, exterior containers/ shipping containers shall be snug-fitting boxes in accordance with the following requirements. The exterior containers/shipping containers shall accommodate a field repack of the tank, berm liner, and all other accessories and components originally packed with the tank. Carriage bolts, lag screws/bolts, nuts and washers shall conform to the following:

CARRIAGE BOLTS	=	FF-B-584, type I, class 1, style A
LAG SCREWS/BOLTS	=	FF-B-561, type I, grade B
NUTS	=	FF-N-836, type I or II, style 1 or 4
WASHERS	=	FF-W-92, type A, grade I, class A

5.3.1.2.1 Plywood. All plywood shall be in accordance with A-A-55057, type A, grade CD interior, bonded with exterior (waterproof) glue.

5.3.1.2.2 Cleats. All lumber for the cleats shall comply with the quality requirements of MIL-STD-731 for class 2 - Structural (members with moderate stress), except that wane is not acceptable. The cleat sizes shall be nominal 1 inch by 4 inches and nominal 2 inches by 4 inches with minimum dimensions for each as shown therein.

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5.3.1.2.3 Skids, and as applicable, rubbing strips. All lumber for the skids, and as applicable the rubbing strips, shall comply with the quality requirements of MIL-STD-731 for class 2 - structural (members with moderate stress), except that wane is not acceptable. Skids shall be nominal 4 inches by 4 inches; the rubbing strips, when required, shall be nominal 4 inches by 4 inches or nominal 4 inches by 5 inches with minimum dimensions for each as shown therein. Group I wood species shall not be used for the skid.

5.3.1.2.4 Fabrication. Each panel of the shipping container shall be double sheathed with plywood. The inside plywood shall, as specified, be either 0.25-inch thick or 0.375-inch thick and the outside plywood sheathing shall be 0.50-inch thick. The outside sheathing shall be attached to the applicable cleats with the fasteners driven through the C side of the plywood and clinched on the exposed side of the cleat. The inside sheathing shall then be attached to the panel with the fasteners driven through the wood parts in the sequence of the C side of the 0.25/0.375-inch plywood, to cleat, to 0.50-inch plywood. The sizes of the fasteners, the positioning of the fasteners and the clinching of the fasteners shall be as specified in PPP-B-601; however, care shall be exercised so that the positioning of such fasteners does not interfere with the lag screws/bolts and carriage bolts required to assemble the top sides, ends and bottom panels together. Clinching of the fasteners shall not be permitted on any inside surface of the container panels.

5.3.1.2.4.1 Side panels. The side panels shall utilize nominal 1-inch by 4-inch lumber for the cleats (see 5.3.1.2.2).

5.3.1.2.4.2 Top, end, and bottom panels. The top, end, and bottom panels shall utilize nominal 2-inch by 4-inch lumber for the cleats (see 5.3.1.2.2).

5.3.1.2.5 Anti-abrasion provisions. To prevent abrasion, all interior surfaces of the shipping container that will contact the tank, and as applicable the berm liner, including any applicable outer surface of the consolidation container(s), shall be lined with a layer of scrap tank fabric, cushioning material conforming to PPP-C-1797, or polyolefin film conforming to L-P-378, type I, class 1, with a minimum thickness of 6 mils. The material shall be applied in such a manner that it does not interfere with the removal of the container top, sides and ends as a joined one-piece assembly or as individual panels. The means of attaching the material shall not create a hazard within the container that could possibly damage the contents. As an alternative, each tank, and berm liner, when required, preserved as required in 5.2.5 through 5.2.7, shall be individually loosely wrapped with the anti-abrasion material. The manner of wrapping shall provide a minimum of one layer of material around the tank, and berm liner when required, to prevent direct contact with other components and the inside surfaces of the shipping container.

5.3.1.2.6 Filled consolidation container(s). The filled consolidation container(s) shall be positioned within the shipping container in a manner to prevent movement. The positioning method shall utilize the shipping container bottom only; it shall not be dependent upon the application of devices of the sides, top, or ends of the container.

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5.3.1.2.7 Hose assemblies. The hose assemblies, preserved as specified in 5.2.4.1, shall be positioned and secured within the shipping container in such a manner to assure that the top, sides, and ends of a shipping container may be removed from the container bottom while the hoses remain secured in place without damage to the tank, and as applicable, the berm liner.

5.3.1.2.8 Containers with an outside length dimension of 96 inches or less. (Normally this box will be used for the 3000 gallon tank and berm liners.) Containers with an outside length dimension of 96 inches or less shall conform to PPP-B-601, overseas type, style A, un-nailed closure. Type 3 load, except that each panel shall be double sheathed with the cleats sandwiched between two sheets of plywood (see 5.3.1.2.4) The floor shall be 0.75-inch plywood. The inside plywood shall be 0.25-inch thick and the outside plywood shall be 0.50-inch thick. Other exceptions are as follows:

5.3.1.2.8.1 Side panels. The positioning of the edge cleats, and intermediate cleats when required, shall be as specified for the sides in PPP-B-601. The size of the side panel shall be such that its length (the longest dimension) is the same as the outside length of the box. The width of the side panels shall be such that it is the same as the inside depth of the box plus the thickness of the double sheathed bottom panel (see figure 14).

5.3.1.2.8.2 Top panel. The positioning of the edge cleats, and intermediate cleats when required, shall be as specified for the top in PPP-B-601. The size of the top panel shall be as specified therein for style A, that is, the length and width of the top shall be the same as the outside length and outside width of the box (see figures 14, 15 and 16).

5.3.1.2.8.3 End panels. The positioning of the edge cleats, and intermediate cleats when required, shall be as specified for the ends in PPP-B-601. The size of the end panel shall be the same as specified therein for style A; that is, the length and width shall be the same as the inside width and inside depth of the box (see figure 14).

5.3.1.2.8.4 Bottom panel. The positioning of the edge cleats, and intermediate cleats when required, shall be as specified for the bottom in PPP-B-601 except that the thru-edge cleats shall run parallel with the box length and such cleats shall be the same length as the outside length of the box. The size of the bottom panel shall be as specified therein for style A except that the width of the bottom panel shall be the same as the inside width of the box (see figure 17).

5.3.1.2.8.5 Skids. Skids (see 5.3.1.2.3), shall be applied to the bottom panel of each box, running parallel with and extending the full outside width of the box. A bevel 45 degrees ( $\pm 5$  degrees) shall be applied to the bottom third portion of the skid ends. The skids shall be set back from the end of the box a distance of not less than 3 inches or more than one-sixth of the box length. Each box shall be provided with a minimum of 2 skids with additional skids being provided when the distance between the inside edges of the skids exceed 48 inches. The positioning of the additional skids shall divide the area between the end skids into units of equal space. Additional intermediate cleats shall be incorporated into the bottom panel at time of fabrication to assist in the attachment of the skids and to offer full support to the skids. Each skid shall be fastened to the bottom panel with 0.375-inch diameter carriage bolts that are 5.25 inches long (+0.00 inch, -0.25 inch). The bottom panel shall be positioned so that it is set



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back from the ends of the skids a distance that is equal to the thickness of the box side panels. The holes for the carriage bolts shall be the exact diameter of the bolt. Each hole shall be counterbored on the underside of the skid so that 3 full thread (+3 -0) extend beyond the washer and nut when the nut has been properly tightened. The nut shall be tightened so that the bolt head is drawn into the plywood and cleat to prevent the bolt head from becoming a snagging hazard on the inside of the box; however, no portion shall extend beyond the bottom of the skid when tightened. After tightening the nuts, the threads of the bolt extending beyond the nut shall be painted with a suitable metal primer or similar material. The bolts shall be centered at 6.50 inches ( $\pm 0.25$  inch) from each end of the skid with additional bolts positioned in a staggered pattern, as practicable, so that the distance between their centerlines shall be no more than 16 inches ( $\pm 0.25$  inch) and not less than 8 inches ( $\pm 0.25$  inch), (see figure 17). Each skid shall be slotted/notched sufficiently to provide clearance for strapping. Figures 14, 15 and 17 give details of skid application.

**5.3.1.2.8.6 Assembly.** The box panels shall be joined together with lag screws/bolts and flat washers. Entry holes and lead holes shall be provided in each box panel for proper assembly as follows:

**5.3.1.2.8.6.1 Entry holes.** Entry holes, the same size as the lag screws, shall be provided through each applicable flat panel surface. The holes shall be set back from the edges of that flat surface to provide the edge distance necessary for the lag screws to be centered on the nominal 1-inch, or as applicable, the nominal 2-inch cleat thickness of the joining panel. The entry holes for the 0.25-inch diameter lag screw for joining a panel to a nominal 1-inch thick cleat shall be centered at 0.875 inch from the edge of the flat panel. The entry holes for the 0.375-inch diameter lag screw for joining a panel to a nominal 2-inch thick cleat shall be centered at 1.25 inches from the edge of the flat surface (see figures 14, 15, 16 and 17).

**5.3.1.2.8.6.2 Lead holes.** Lead holes for the threaded portion of the lag screw shall be provided in each applicable panel edge. The holes shall be drilled only to the depth necessary to accommodate the penetration of the threaded portion of the lag screw. The lead holes for the 0.25-inch diameter lag screw shall be 0.1875-inch in diameter. The lead holes for the 0.375-inch diameter lag screws shall be 0.25-inch in diameter. The lead holes shall provide the same edge distance as specified in 5.3.1.2.8.6.1 for the entry holes.

**5.3.1.2.8.6.3 Lag screw application.** The lag screws shall be turned in their holes the full length of the screw. They shall not be driven in by hammer or by any other similar means. If for any reason the thread in the wood is stripped when the lag screws are placed, the lag screw shall be removed and placed in a new hole near the old position. Flat washers shall be used under the head of each screw.

**5.3.1.2.8.6.4 Fastening bottom assembly to end panels.** The bottom assembly shall be fastened to each end panel with a minimum of 4 lag screws 0.375-inch in diameter by 5 inches in length. The positioning of each screw shall be as shown in figure 14.

**5.3.1.2.8.6.5 Fastening side panels to end panels.** The side panels shall be fastened to the end panels with 0.375-inch diameter lag screws that are 4 inches long. The screws shall be positioned as shown in figure 15.

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5.3.1.2.8.6.6 Fastening of side panels to bottom assembly. The side panels shall be fastened to the bottom assembly with 0.375-inch diameter lag screws that are 4 inches long. The screws shall be positioned as shown in figure 15.

5.3.1.2.8.6.7 Fastening top panel to side panels. The top panel shall be fastened to the side panels with 0.25-inch diameter lag screws that are 5 inches long. The screws shall be positioned as shown in figure 16.

5.3.1.2.8.6.8 Fastening top panel to end panels. The top panel shall be fastened to the end panels with 0.375-inch diameter lag screws that are 5 inches long. The screws shall be positioned as shown in figure 16.

5.3.1.2.8.6.9 Strapping. Strapping of the assembled box shall be in accordance with A-A-2027.

5.3.1.2.9 Container with an outside dimension greater than 96 inches. Containers with an outside length dimension greater than 96 inches shall be a box conforming to MIL-B-26195, type II, style A, class 1 with full plywood panels for the base, except that each panel of the box shall be double sheathed with the cleats sandwiched between two sheets of plywood (see 5.3.1.2.4). The outside plywood shall be 0.50 inch in thickness. The inside plywood shall be 0.25-inch thick for the sides and ends, and shall be 0.375-inch thick for the top and bottom. Other exceptions are as follows:

5.3.1.2.9.1 Side panels. The positioning of the edge cleats and intermediate cleats shall be as specified for the sides in MIL-B-26195; that is, the length of the thru edge cleats shall be the same as the outside length of the box. The outside plywood sheathing shall extend above the upper thru edge cleat a distance equal to the thickness of the cleats and inside plywood sheathing of the top panel (see figure 18 for end view of box and figure 22 for assembly method).

5.3.1.2.9.2 Top panel. Thru-edge cleats and thru-intermediate cleats shall run parallel with the width of the box. The size of the outside plywood shall be the same as the outside length dimension and the outside width dimension of the box. The inside plywood shall have the same length as the outside length of the box but shall have a width that is one inch less than the outside box width. The length of the thru-edge cleats and thru-intermediate cleats shall be the same as the width of the inside plywood and shall be so positioned to be flush with the edges of the inside plywood. Filler edge cleats shall run parallel with the box length and shall be positioned flush with the side edges of the inside plywood (see figures 18, 19, 22 and 24).

5.3.1.2.9.3 End panels. The positioning of the cleats shall be as specified in MIL-B-26195.

5.3.1.2.9.4 Base. The base shall consist of a deck assembly to which the skids and rubbing strips shall be attached. The deck shall be double sheathed with 0.375-inch thick plywood as the upper (inner) side and 0.50-inch thick plywood as the outside. The headers and load-bearing members shall be nominal 2-inch by 4-inch lumber and shall be utilized as thru-edge cleats and thru-intermediate cleats positioned to run parallel with the box width dimension. The filler edge cleats shall run parallel with the box length, shall be positioned between the thru-cleats flush with the edge of the plywood and shall be nominal 2-inch by 4-inch lumber. However, filler cleats shall not be required to those spaces where



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the distance between thru-cleats is 4 inches or less. The deck assembly shall be attached to the skids with either of two lengths of carriage bolts. The shorter length shall attach the deck assembly to the skid only. The longer length shall attach the deck assembly to the skids and rubbing strips with a minimum of 2 fasteners extending through the two longer rubbing strips. The short, 16-inch long, center rubbing strip shall be attached to the deck assembly with a total of two of the longer carriage bolts. When an intermediate skid is required, additional filler cleats shall be positioned above that skid between the thru-edge cleats and the thru-intermediate cleats. Carriage bolts shall be utilized to attach the intermediate skid and rubbing strips to the deck assembly in the manner specified for the outer skids. The length of the deck assembly shall be the same as the inside width of the box. Figures 18, 21, 23 and 24 give details of the base.

**5.3.1.2.9.4.1 Skids.** A minimum of two skids of nominal 4-inch by 4-inch lumber shall be attached to the underside of the deck assembly in direct contact with the 0.50-inch thick plywood sheathing. An intermediate skid of the same size and species of lumber, shall be required on all boxes with an outside width in excess of 36 inches. The skids shall be positioned as specified in MIL-B-26195. The 45-degree bevel shall not be cut into the ends of the skid. The bottom, inside corner of each outside skid shall be chamfered full length at a 60 degree angle ( $\pm 5$  degrees) to eliminate a potential snag when attempting to lift from the end with a forklift-truck (see figure 18 and 24). Intermediate skids shall not be chamfered.

**5.3.1.2.9.4.2 Rubbing strips.** Rubbing strips shall be nominal 4-inch by 5-inch for the outside skids and, when required, a nominal 4-inch by 4-inch for the intermediate skid. The rubbing strips shall be beveled full depth at an angle of 45 degrees ( $\pm 5$  degrees) at sling and forklift-truck openings. The rubbing strips shall be positioned on each skid to provide two, 14-inch wide openings for fork-lift-truck access. Such openings shall be spaced 28 inches apart, center to center, and shall be positioned to straddle the center of balance of the loaded box. The sling openings at the ends of each skid shall be 8 inches in length. Each nominal 4-inch by 5-inch rubbing strip shall be attached to the base in a manner to provide a ledge for supporting the full thickness of the box side panel (see figures 18 and 22).

**5.3.1.2.9.4.3 Base fabrication.** The skids and rubbing strips shall be attached to the deck assembly as specified in 5.3.1.2.9.4.1 and 5.3.1.2.9.4.2, and as shown in figures 21, 22, 23 and 24. The thru-edge cleats and the thru-intermediate cleats of the deck assembly shall be positioned as shown in figure 24. Such cleats shall be utilized as headers and load-bearing-floor boards, shall serve as the means for locating the carriage bolts and shall be positioned as shown in figure 24. The carriage bolts shall be 0.375-inch in diameter and the exposed threads after tightening shall be painted as specified in 5.3.1.2.8.5. Flat washers shall be required under the nut for each carriage bolt. The holes for the carriage bolts shall be the exact diameter of the bolt. Each hole shall be counterbored on the under side of the rubbing strips and, as applicable, the skids so that 3 full threads (+3, -0) extend beyond the washer and nut when properly tightened. The nut shall be tightened to satisfy the requirements of 5.3.1.2.8.5.

**5.3.1.2.9.5 Assembly.** The box panels and base shall be joined together with lag screws. A flat washer shall be required under the head of each screw.

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5.3.1.2.9.5.1 Entry holes. Entry holes, the same size as the lag screw, shall be provided through each applicable flat panel surface. The holes shall be set back from the edges of that flat surface to provide the edge distance necessary for the lag screws to be centered on the nominal cleat thickness of the joining panel (see figure 18, 19 and 20).

5.3.1.2.9.5.2 Lead holes. Lead holes, 0.25 inches in diameter, shall be provided for the threaded portion of each lag screw. The holes shall be drilled only to the depth necessary to accommodate the penetration of the threaded portion of the lag screw. The holes shall be positioned as shown in figures 18, 19 and 20.

5.3.1.2.9.5.3 Lag screw application. Lag screw application shall be as specified in 5.3.1.2.8.6.3.

5.3.1.2.9.5.4 Fastening end panels to base. The end panels shall be fastened to the base with 0.375-inch diameter lag screws that are 5 inches long. The positioning and quantity of the screws shall be as shown in figure 18.

5.3.1.2.9.5.5 Fastening of side panels to base and end panels. The side panels shall be fastened to the base and end panels with 0.375-inch diameter lag screws that are 4 inches long. The positioning and quantity of the screws shall be as shown in figure 19.

5.3.1.2.9.5.6 Fastening of side panels to top panel. The side panels shall be fastened to the top panel with 0.375-inch diameter lag screws that are 3 inches in length. The positioning and quantity of the screws shall be as shown in figure 19.

5.3.1.2.9.5.7 Fastening of top panel to end panels. The top panel shall be fastened to the end panels with 0.375-inch diameter lag screws that are 5 inches long. The positioning and quantity of the screws shall be as shown in figure 20.

5.3.1.2.9.5.8 Strapping. Strapping of the assembled box shall be in accordance with A-A-2027.

5.3.2 Level B. Each complete tank (and berm liner when specified), preserved as specified in 5.2, shall be packed for level B in the same manner as specified for level A in 5.3.1 except that the lumber and plywood preservation requirements of 5.3.1.1 shall be omitted, and the strapping shall be zinc-coated.

5.3.3 Level C. Each complete tank (and berm liner when specified), preserved as specified in 5.2, shall be packed in a box conforming to, as applicable to the weight of the contents, PPP-B-601, domestic type for type 3 load, or MIL-B-26195, type I, style C with plywood panels, class 1 with full panel deck and rubbing strips. The box shall accommodate a field repack of the tank, berm liner, and all other accessories and components originally packed with the tank. The contents shall be protected against abrasion as specified in 5.3.1.2.5, the filled consolidation container(s) shall be positioned as specified in 5.3.1.2.6 and the wire-reinforced hose assemblies shall be positioned and secured as specified in 5.3.1.2.7. Box closure shall be as specified in the applicable box specification or the appendix thereto except that strapping shall be in accordance with ASTM D 3953, type 1 or 2, shall not be zinc-coated, size as applicable and ASTM D 4675.

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5.4 Anchoring of tank. The anchoring of the rolled up tank to the bottom/base of the box shall not be required; however, all contents of the box shall be blocked and braced within the box in a manner to prevent longitudinal movement.

5.5 Marking. In addition to the special markings specified in 5.5.1 and any special or identification markings required by the contract or purchase/delivery order (see 6.2), each container shall be marked in accordance with MIL-STD-129, including all appendices, and as applicable to overseas shipments. Special care must be exercised to assure the following:

- a. That interior and exterior packing lists are applied as specified.
- b. That marking surfaces are prepared as specified.
- c. That all markings are overcoated with water-proof coating as specified.
- d. That when the tanks are to be included as part of a set, assembly, or module, each container is marked as specified.

5.5.1 Additional special markings. Additional special markings shall be applied to the outside of the box as follows:

5.5.1.1 Marking for unpacking. Additional special markings shall be applied to the outside of the box to show the "FLOW DIRECTION" of the deployed tank relative to the folded and rolled up tank as it is positioned within the box. Additionally, markings shall be applied to the outside of the box listing in sequence, the operations required to properly remove the top, sides and ends from the base as individual components, or as a one piece assembly. Alternatively, such unpacking instruction may be as preprinted matter to be included with the packing list in the exterior packing list envelope. When the unpacking instructions are placed in the envelope, a suitable area immediately adjacent to the envelope shall be marked with the words "UNPACKING INSTRUCTIONS INSIDE PACKING LIST ENVELOPE", with an arrow pointing to that envelope. Any code utilized in the instructions to identify critical locations on the box, shall be marked on the outside of the box at that location with the corresponding code.

Special Note: The design of the box with an outside length of 96 inches or less for level A and level B is such that the proper manner for removing the end panels from the base or bottom is by removing the lag screw from the underside of the box (see 1 in figure 14).

## 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 collapsible tanks are intended for use as fuel storage containers for diesel and jet fuels when temporary facilities that can be quickly emplaced are needed. It is intended that the collapsible tank provide a ten-year shelf life (extendable) and two-year use life (extendable).

6.2 Acquisition requirements. Acquisition documents shall specify the following:

- a. Title, number, and date of the specification.
- b. Capacity of tank required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).

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- d. When a first article is not required for inspection and approval and when additional first article samples are not required (see 3.2 and 3.2.1).
- e. When filler/discharge, vent and drain fittings are not required (see 3.4.4.2).
- f. When berm liner is not required (see 3.6).
- g. When accessories are not required (see 3.8).
- h. Part or identifying number (PIN) not marked on the tank (see 6.5).
- i. Level of preservation and packing required (see 5.2 and 5.3). Storage chest in accordance with TL-13225E9210 can be used for 20,000 gallon and 50,000 gallon tanks in lieu of the packing crate as specified within this document.
- j. Any special marking (see 5.5).
- l. When Technical Publications are required (see 5.2.5.1.).

6.3 First article. When a first article inspection is required, the item should be an initial production item. The first article should consist of two units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of the first article test results and disposition of the first articles. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.3.1 First article pack. Any changes or deviations of production packs from the approved first article pack will be subject to the approval of the contracting officer. Approval of the first article pack will not relieve the contractor's obligation to preserve, pack and mark the tanks in accordance with this specification.

6.4 Nylon solution. The nylon material Elvamide 8061, manufacturer's code 18873, was found to meet the performance requirements and is suggested for use as a guide only. The Government assumes no responsibility for material or solution thereof.

6.5 Part or identifying number (PIN). The PIN corresponds to the specification number and capacity designator of the tank covered by this specification and defines the requirements of the options presented under this specification. The PIN is a definitive part number which is formed by combining the military specification symbol (M52983 for MIL-T-52983) with a dash after it; and a capacity designator symbol as follows:

	M		52983	-	XX
Prefix	└─┘		└─┘		└─┘
Specification number			└─┘		└─┘
Capacity designator (see table VII)					└─┘

Example: M52983-03 means 3,000 gallon fuel tank.

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6.5.1 Capacity designator. The capacity designator is a two position field used to designate the required tank capacity (see table VII).

TABLE VII. Capacity designator.

Capacity Designator	Capacity
03	3,000 gallon
10	10,000 gallon
20	20,000 gallon
50	50,000 gallon

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

6.7 Subject term (key word) listing.

Containers, collapsible, fuel  
Tanks, collapsible, fuel  
Tanks, fabric, collapsible, fuel

6.8 Definitions.

6.8.1 Blister. A blister is a void or hole, which causes protrusion on surface when hot, may not show on surface when cold, and may be covered or open.

6.8.2 Holiday. A holiday in coated fabrics, shall be defined as a place not covered by coating compound.

6.8.3 Pinhole. A pinhole shall be defined as a minute circular void or solvent blow hole.

6.8.4 Rework. Rework shall be defined as an operation performed during a production operation due to an inadequacy or error during that operation.

6.8.5 Repair. Repair shall be defined as a corrective operation which is required because of an omission of a step or incorrect performance of a step or process during a previously completed manufacturing operation.

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

Custodians:

Army - ME  
Navy - YD  
Air Force - 99

Preparing activity:

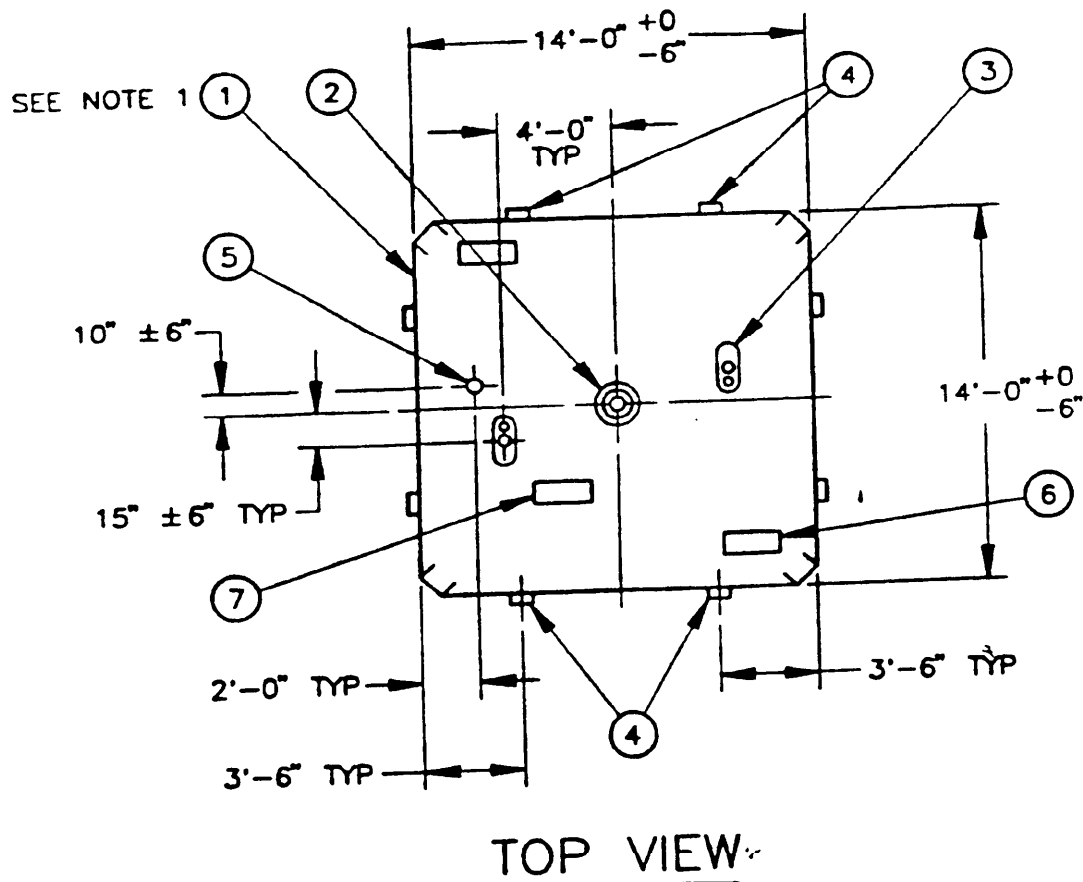
Army - ME

Project 5430-0232

Review activities:

Navy - MC  
Air Force - 82  
DLA - CS

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## NOTES:

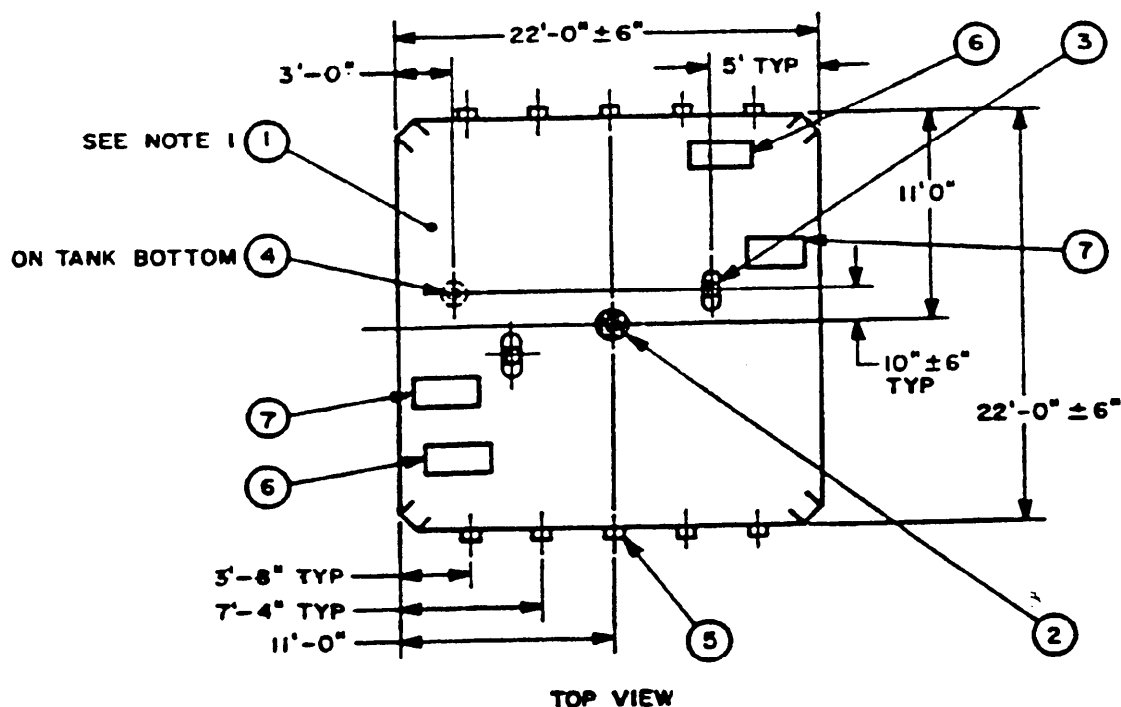
1. TANK IN EMPTY CONFIGURATION.
2. APPROXIMATE DIMENSIONS OF FILLED TANK:  
12'-6" X 12'-6" X 4'-0" HIGH.
3. SHAPE OF TANK CORNERS OPTIONAL.
4. FOLLOWING SIZE CHAFING PATCHES SHALL BE BONDED INSIDE AND OUTSIDE THE TANK.  
OPPOSITE ITEM 2 -18  $\pm$  4 IN. DIA OR SQ.  
OPPOSITE ITEM 3 -36  $\pm$  4 IN. DIA OR SQ.  
OPPOSITE ITEM 5 -18  $\pm$  4 IN. DIA OR SQ.
5. ALL TOLERANCES  $\pm$  1 FOOT UNLESS OTHERWISE NOTED.
6. GENERAL LOCATION OF LABELS IS SHOWN. EXACT ORIENTATION IS AT MANUFACTURER'S DISCRETION.

ITEM	QTY	DESCRIPTION
1	1	TANK, FABRIC, COLLAPSIBLE, 3,000 GAL.
2	1	VENT FITTING ASSEMBLY.
3	2	TANK FILLER/DISCHARGE ASSEMBLY.
4	8	TANK HANDLES.
5	1	DRAIN FITTING.
6	2	ID LABELS.
7	1	CAUTION LABEL.

FIGURE 1. Tank fabric, collapsible, 3,000 gal.



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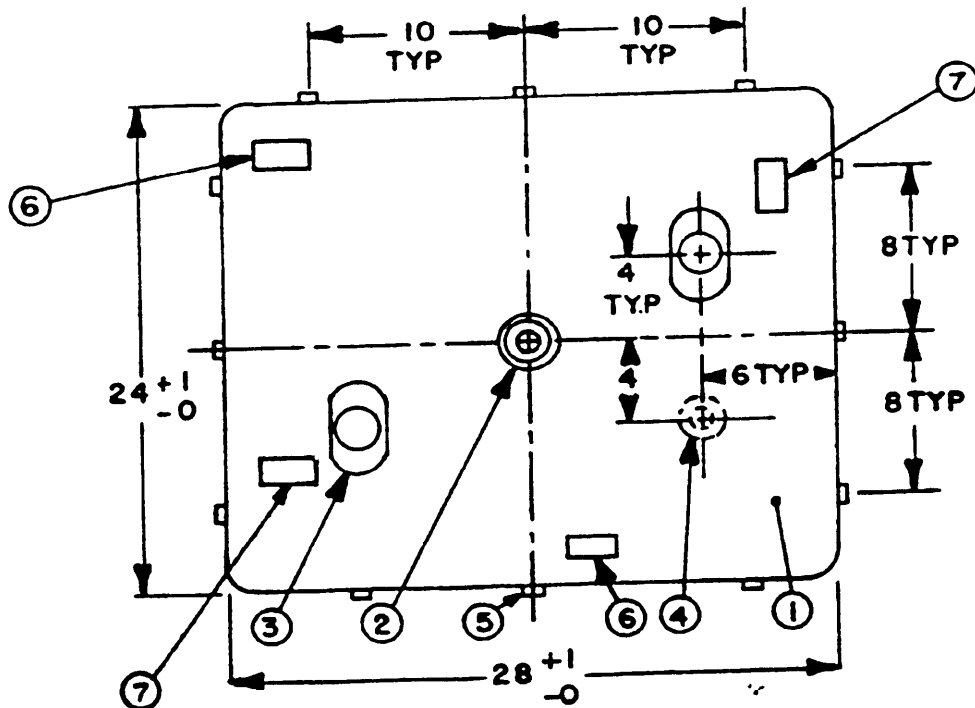
## NOTES:

	ITEM	QTY	DESCRIPTION
1. TANK IN EMPTY CONFIGURATION.	1	1	TANK, FABRIC, COLLAPSIBLE 10,000 GAL.
2. APPROXIMATE DIMENSIONS OF FILLED TANK: 20'-6" X 20'-6" X 4'-0" HIGH.	2	1	VENT FITTING ASSEMBLY
3. SHAPE OF TANK CORNERS OPTIONAL.	3	2	TANK FILLER/DISCHARGE ASSEMBLY, OVAL
4. FOLLOWING SIZE CHAFING PATCHES SHALL BE BONDED INSIDE AND OUTSIDE THE TANK:	4	1	DRAIN FITTING ASSEMBLY
OPPOSITE ITEM 2 -18±4 IN. DIA OR SQ.	5	10	TANK HANDLE
OPPOSITE ITEM 3 -36±4 IN. DIA OR SQ.	6	2	ID LABEL
OPPOSITE ITEM 4 -18±4 IN. DIA OR SQ.	7	2	CAUTION LABEL
5. ALL TOLERANCES ±1 FOOT UNLESS OTHERWISE NOTED.			
6. GENERAL LOCATION OF LABELS IS SHOWN. EXACT ORIENTATION IS AT MANUFACTURER'S DISCRETION.			

**FIGURE 2. Tank, fabric, collapsible, 10,000  
gallon.**

X-III4N

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REQUIRED DIMENSIONS OF EMPTY TANK

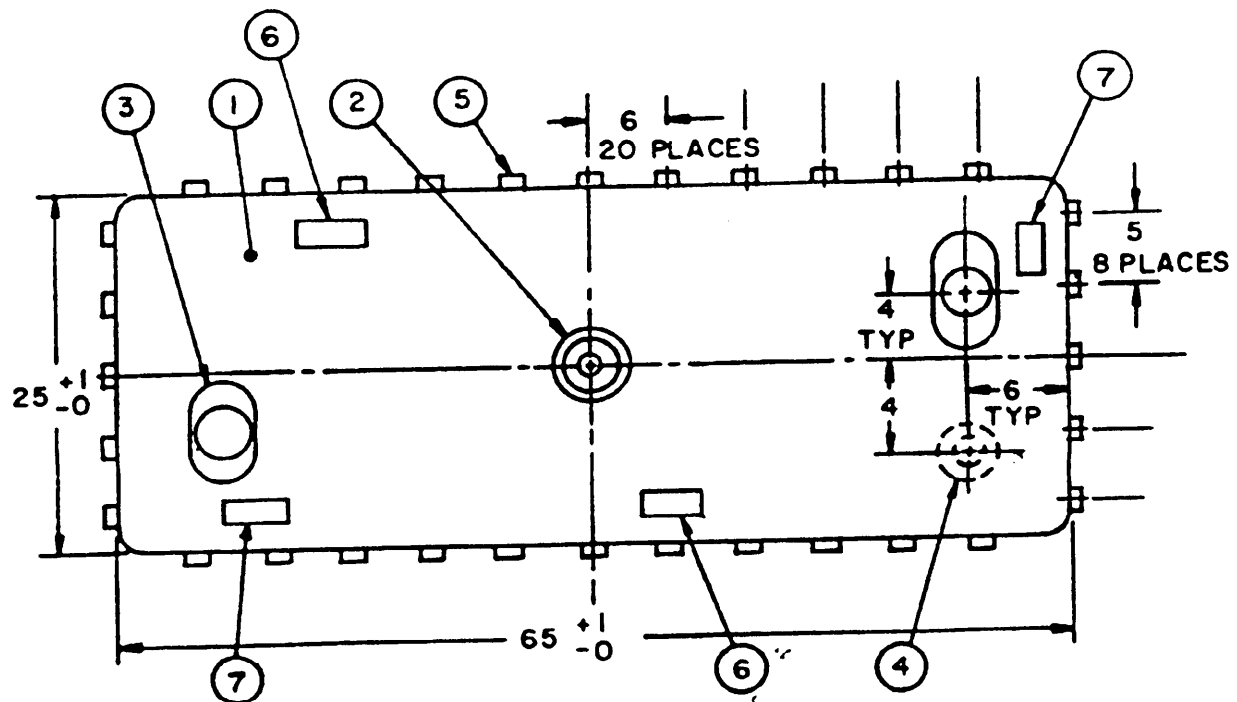
## NOTES:

1. ALL DIMENSIONS IN FEET.
2. ALL TOLERANCES  $\pm 1$  FOOT UNLESS OTHERWISE NOTED.
3. SHAPE OF CORNERS OPTIONAL.
4. THE FOLLOWING SIZE CHAFING PATCHES SHALL BE BONDED INSIDE AND OUTSIDE THE TANK OPPOSITE EACH FITTING:  
 2 VENT -  $18 \pm 4$  IN. DIA. OR SQUARE  
 3 FILL-DISCH -  $36 \pm 4$  IN. DIA OR SQUARE.  
 4 DRAIN -  $18 \pm 4$  IN. DIA OR SQUARE
5. GENERAL LOCATION OF LABELS IS SHOWN. EXACT ORIENTATION IS AT MANUFACTURER'S DISCRETION.

ITEM	QTY	DESCRIPTION
1	1	TANK 20,000 GAL.
2	1	VENT FITTING ASSEMBLY.
3	2	FILLER-DISCHARGE ASSEMBLY.
4	1	DRAIN FITTING ASSEMBLY.
5	12	HANDLE
6	2	I.D. LABEL.
7	2	CAUTION LABEL

FIGURE 3. Tank, fabric collapsible, 20,000 gal.

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## REQUIRED DIMENSIONS OF EMPTY TANK

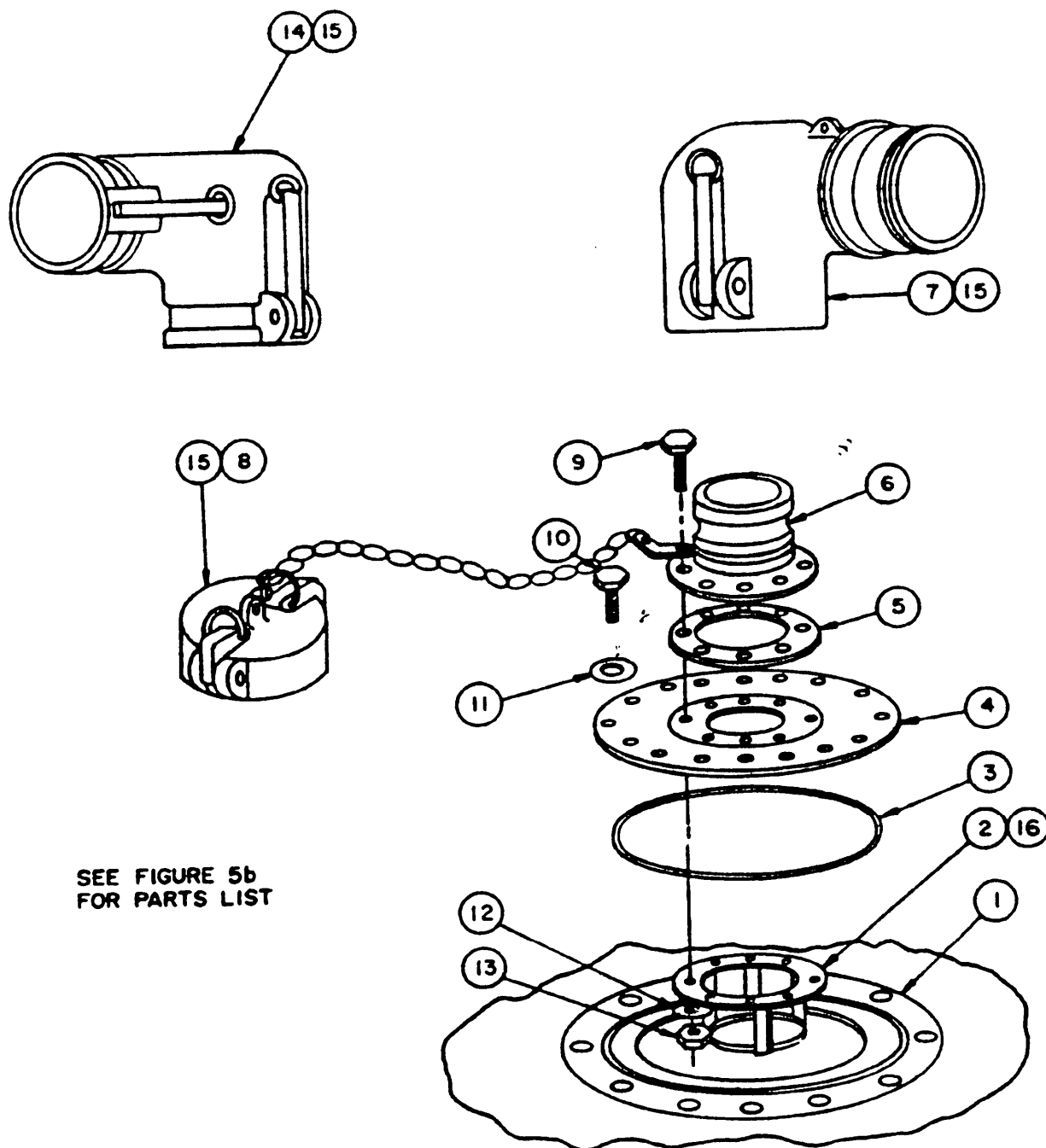
## NOTES:

1. ALL DIMENSIONS IN FEET.
2. ALL TOLERANCES  $\pm 1$  FOOT UNLESS OTHERWISE NOTED.
3. SHAPE OF CORNERS OPTIONAL.
4. THE FOLLOWING SIZE CHAFING PATCHES SHALL BE BONDED INSIDE AND OUTSIDE THE TANK OPPOSITE EACH FITTING:  
 2 VENT -  $18 \pm 4$  IN. DIA OR SQUARE  
 3 FILL-DISCH -  $36 \pm 4$  IN. DIA OR SQUARE  
 4 DRAIN -  $18 \pm 4$  IN. DIA OR SQUARE
5. GENERAL LOCATION OF LABELS IS SHOWN. EXACT ORIENTATION IS AT MANUFACTURER'S DISCRETION.

ITEM	QTY	DESCRIPTION
1	1	TANK 50,000 GAL.
2	1	VENT FITTING ASSEMBLY
3	2	FILLER-DISCHARGE ASSEMBLY.
4	1	DRAIN FITTING ASSEMBLY.
5	32	HANDLE
6	2	I.D. LABEL
7	2	CAUTION LABEL

FIGURE 4. Tank, fabric collapsible, 50,000 gal.

MIL-T-52983C



**FIGURE 5a. Filler/discharge assembly, 3,000, 10,000, 20,000 and 50,000 gal tanks.**

X-3322J

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FIND NO.	PART NO. IDENTIFICATION NO.	QTY FILLER FITTING ASSY	QTY DISCHARGE FITTING ASSY	DESCRIPTION	SPECIFICATION	MATERIAL
1	FIGURE 6	1	1	ACCESS DOOR FITTING COMP. TYPE		
2	FIGURE 8	1	1	SUCTION STUB 4 INCH		AL ALY, ANODIZED
3	MS 9021-383	1	1	"O" RING GASKET		SYN RUBBER
4	FIGURE 7	1	1	OVAL CLOSURE PLATE COMP. FITTING		AL ALY, ANODIZED
5	FIGURE 11	1	1	GASKET		RUBBER
6	MS 27023-17	1	1	COUPLING HALF, FLANGED 4 IN. SIZE		AL ALY, ANODIZED
7	81718/633 K-4	-	1	ELBOW FEMALE TO MALE 4 IN. X 90° SIZE	OPW OR EQUAL	AL ALY, ANODIZED
8	MS 27028-17	1	1	DUST CAP 4 IN W/ GASKET AND SECURITY CHAIN		AL ALY CAP, ANODIZED
9	B1821BH038C150N	8	8	BOLT HEX HD, GR 8, .375-16 UNC 2A X 1.50 L	ANSI B18.2.1	STL, ZINC COATED
10	B1821BH025C100N	20	20	BOLT, HEX HD, GR 8, .250-20 UNC-2A X 1.00 L	ANSI B18.2.1	STL, ZINC COATED
11		20	20	WASHER, PLAIN .281 ID	ANSI B18.22.1	STL, ZINC COATED
12		8	8	WASHER, LOCK MECHANICAL .375 SIZE	ANSI B18.21.1	STL, ZINC COATED
13		8	8	NUT, HEX MACH SCREW, GR 8, .375-16 UNC-2B	ANSI B18.2.2	STL, ZINC COATED
14	81718/633 KB-4	1	-	ELBOW, FEMALE TO FEMALE 4 IN. X 90° SIZE	OPW OR EQUAL	AL ALY, ANODIZED
15	MS 27030-9	3	2	GASKET-COUPLING HALF, 4 IN. SIZE		RUBBER
16		8	8	THREAD SEAL, .375 SIZE	PARKER #7500 .375 OR EQ.	

## NOTES:

1. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
2. LUBRICATE GASKETS, FIND NO. 3, 5 AND 15, WITH LUBRICANT BEFORE ASSEMBLING HARDWARE.
3. UNLESS OTHERWISE SPECIFIED, ANODIZED ALUMINUM SHALL BE IN ACCORDANCE WITH MIL-A-8625, TYPE II, CLASS 2.
4. ZINC COATING SHALL BE IN ACCORDANCE WITH ASTM A153, CLASS D.

**FIGURE 5b. Filler/discharge assembly, 3,000, 10,000, 20,000 and 50,000 gal tanks parts list.**

MIL-T-52983G

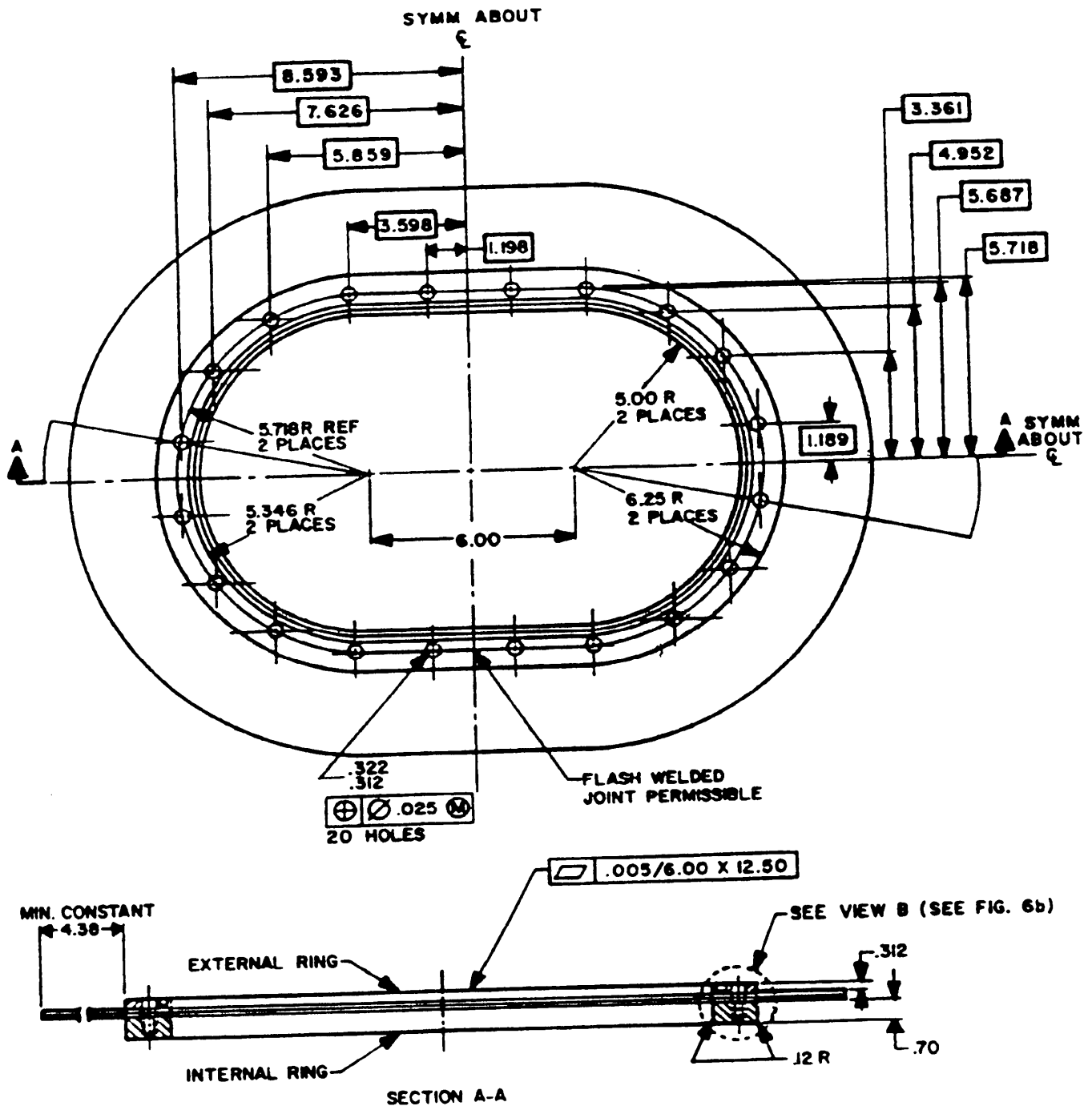
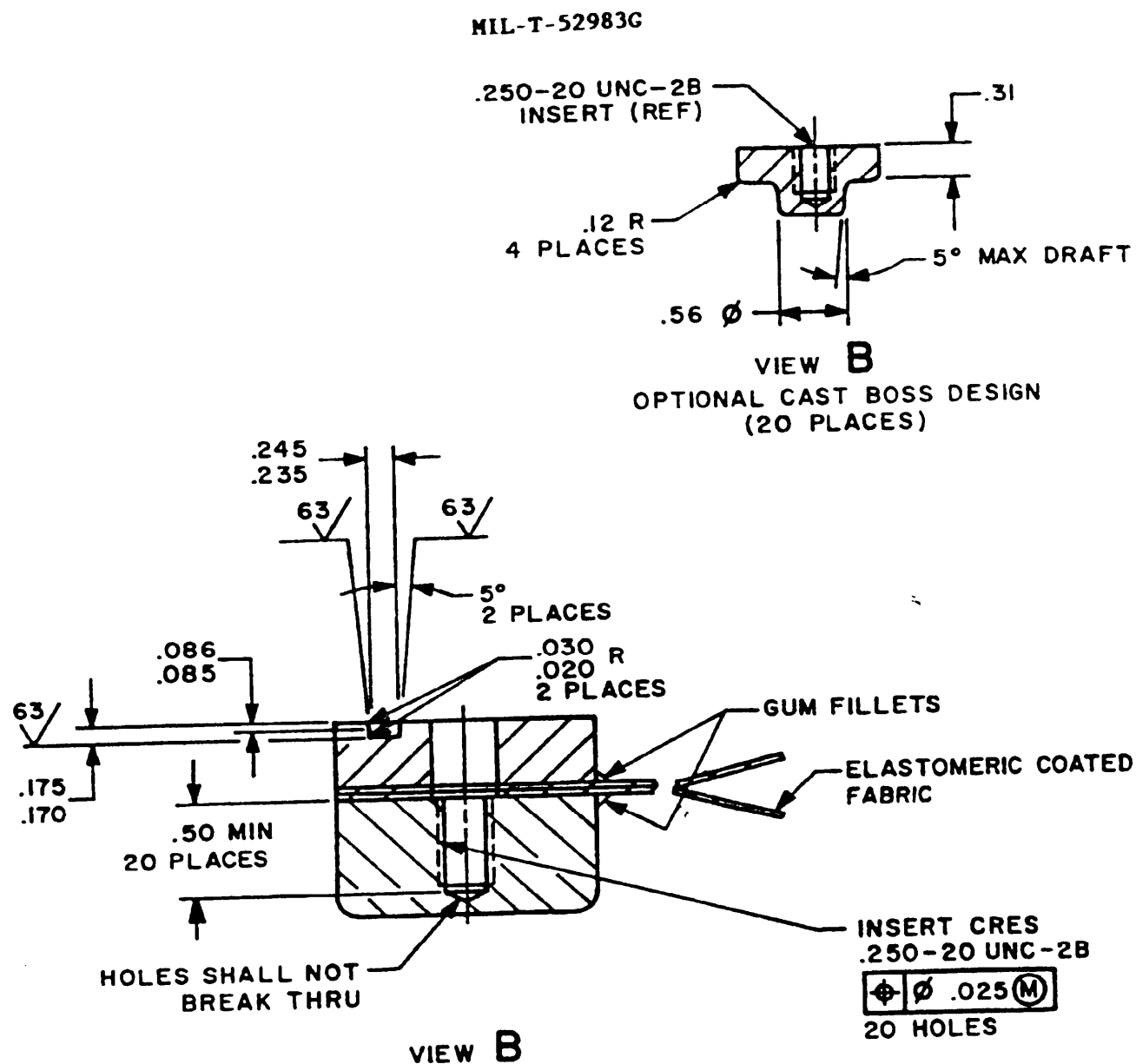


FIGURE 6a. Access door fitting-compression type.

X-3323K



## NOTES:

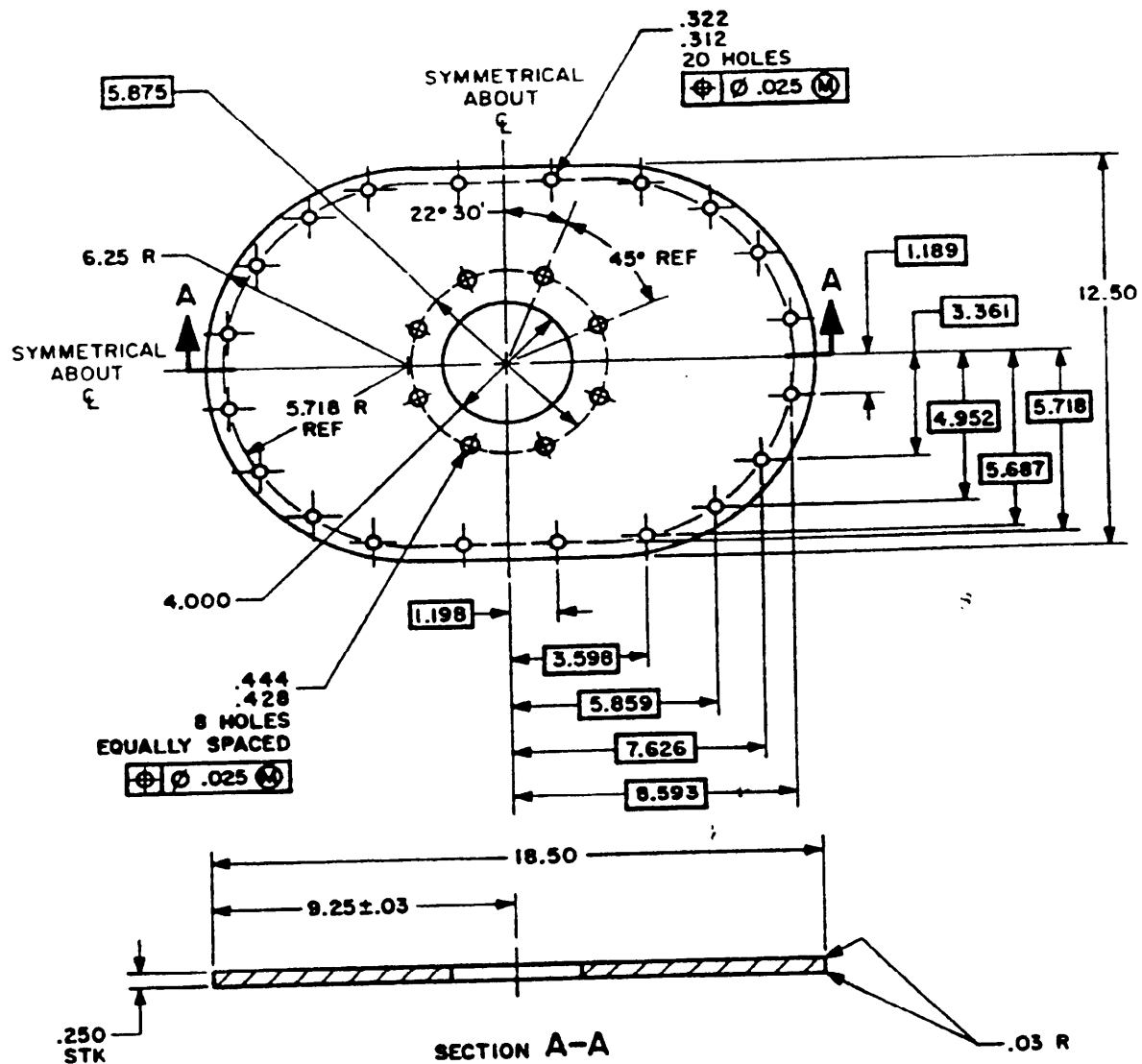
1. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.  
TOLERANCES: .XX =  $\pm .06$   
.XXX =  $\pm .015$   
ANGLES =  $\pm 2^\circ$
2. ALUMINUM PARTS SHALL BE ANODIZED IN ACCORDANCE WITH MIL-A-8625,  
TYPE II, CLASS 2.
3. ADHESIVE BOND FABRIC AND RINGS.

FIGURE 6b. Access door fitting-compression  
type views.

**X-4960B**



MIL-T-52983G



## NOTES:

1. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

TOLERANCES: .XX ± .06

.XXX ± .015

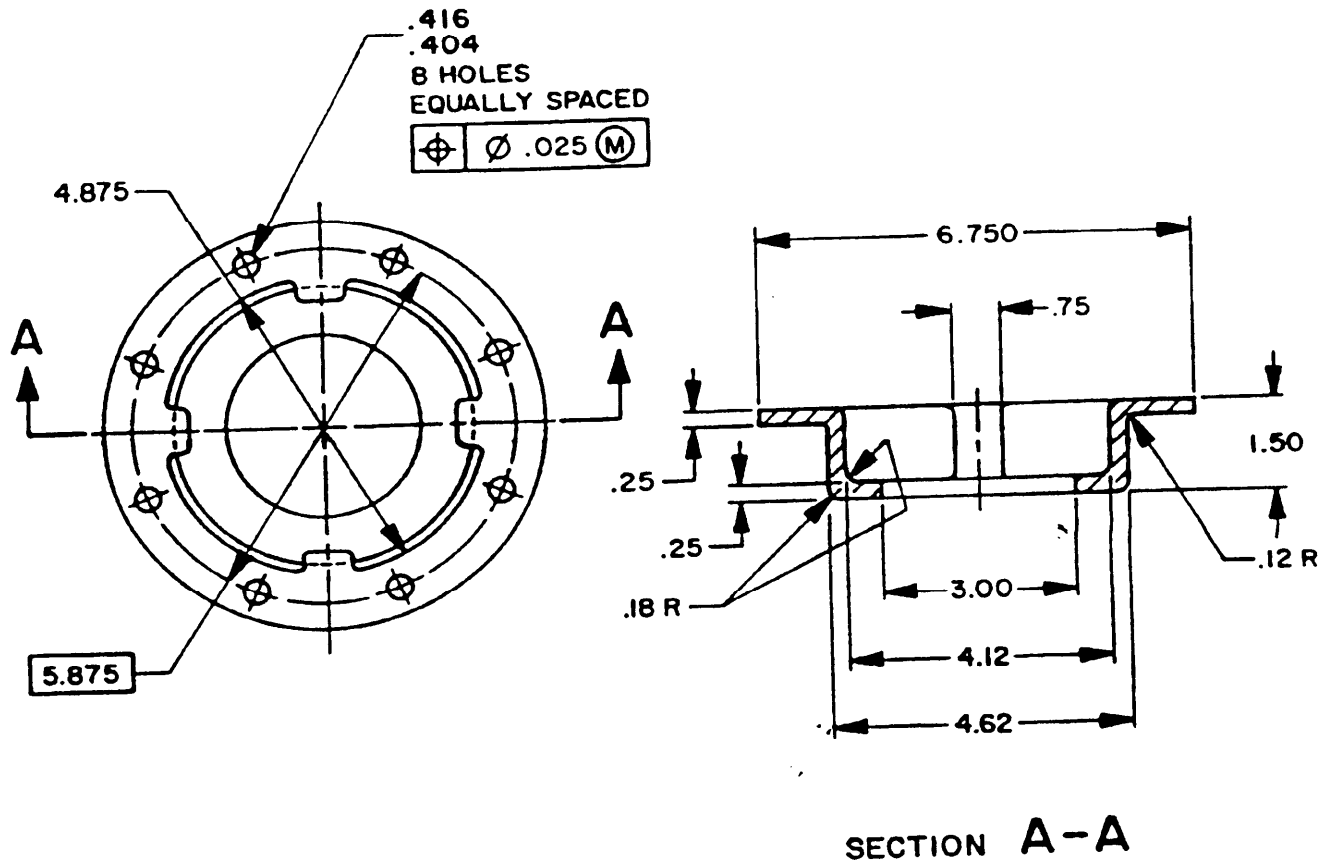
ANGLES ± 2° 0'

2. MATERIAL: AL ALLOY.

3. ANODIZE AND DYE IN ACCORDANCE WITH MIL-A-8625, TYPE II, CLASS 2, OR CHEMICAL CONVERSION COATED IN ACCORDANCE WITH MIL-C-5541, CLASS 1A. COLOR SHALL APPROXIMATE COLOR OF TANK FABRIC.

**FIGURE 7. Oval closure plate-compression fitting,  
3,000, 10,000, 20,000 and 50,000 gal.**

MIL-T-52983C



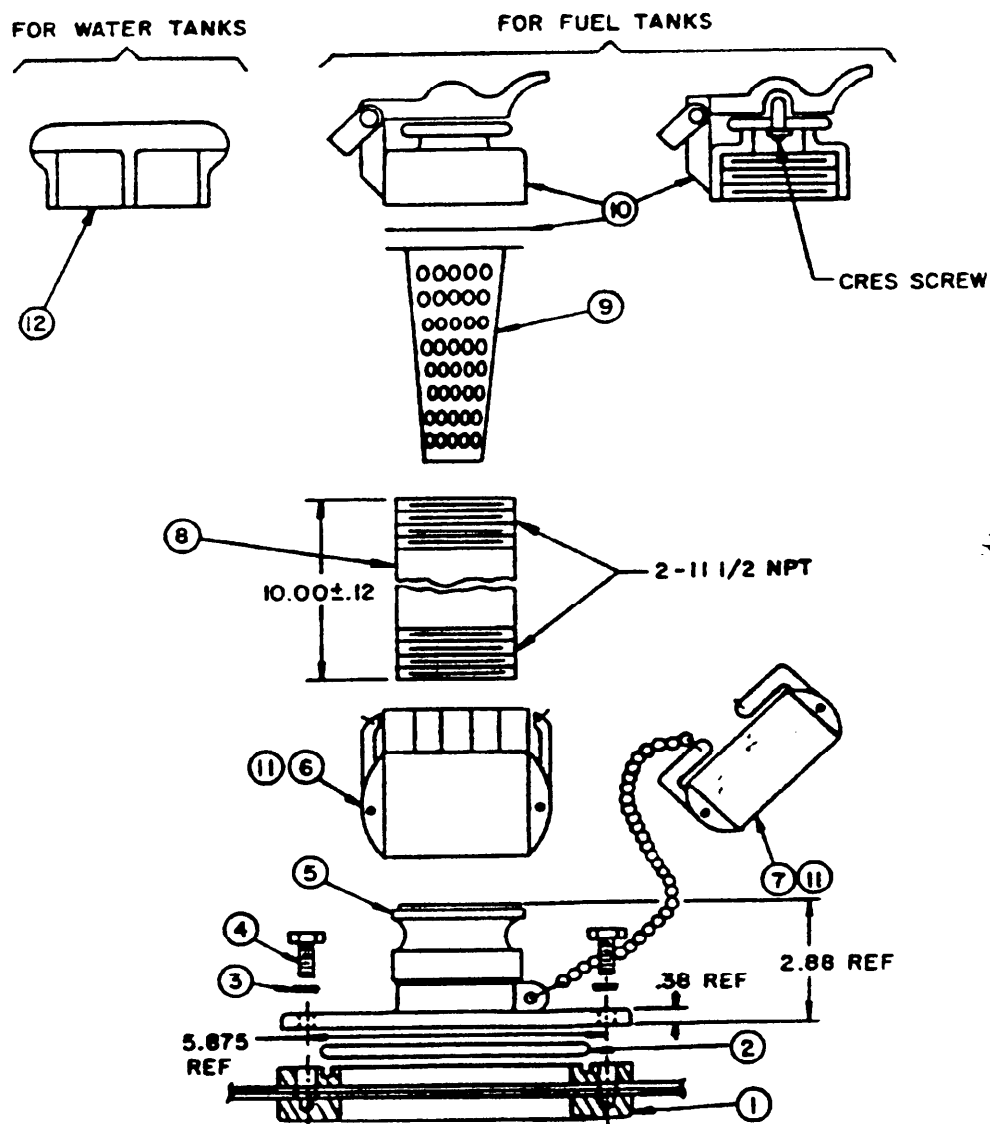
## NOTES:

1. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
2. TOLERANCES: .XX =  $\pm .03$   
.XXX =  $\pm .015$   
DRAFT ANGLES = 3° MAX
3. MATERIAL: ALUMINUM ALLOY, ANODIZED IN ACCORDANCE WITH MIL-A-8625, TYPE II, CLASS 2 OR CHEMICAL CONVERSION COATED IN ACCORDANCE WITH MIL-C-5541, CLASS 1A.

FIGURE 8. Suction stub.

X-3324F

MIL-T-52983C



SEE FIGURE 9b FOR PARTS LIST

FIGURE 9a. Vent fitting assembly.

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## NOTES:

1. LUBRICATE GASKET, FIND NO. 2 AND FIND NO. 11, WITH LUBRICANT BEFORE ASSEMBLING HARDWARE.
2. UNLESS OTHERWISE SPECIFIED, ANODIZED ALUMINUM SHALL BE IN ACCORDANCE WITH MIL-A-8625, TYPE II, CLASS 2.
3. ZINC COATING SHALL BE IN ACCORDANCE WITH ASTM A153, CLASS D.
4. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.
5. CONNECT DUST CAP KEEPER CHAIN TO INTEGRAL ATTACHMENT POINT.
6. FOR WATER TANKS DELETE FIND NO. 9 AND 10. REPLACE WITH FIND NO. 12.

FIND NO.	PART NO. OR IDENT NO.	QTY	DESCRIPTION	SPECIFICATION	
1.	FIGURE 10	1	VENT AND DRAIN FITTING-COMPRESSION TYPE		
2.	MS29513-250	1	"0" RING GASKET		SYN RUBBER
3.		8	WASHER, FLAIN, .281 ID	ANSI B18.22.1	STL, ZINC COATED. .003 THK
4.	B1821BH025 C100N	8	BOLT, HEX HD, GR 8 .250-20 UNC-2A X 1.0 L	ANSI B18.2.1	
5.	MS27023-21	1	COUPLING HALF, QUICK DISCONNECT CAMLOCKING TYPE, MALE FLANGED		AL ALLOY, ANODIZED
6.	MS27024-11	1	COUPLING HALF, QUICK DISCONNECT CAMLOCKING TYPE, FEMALE, THREADED		AL ALLOY, ANODIZED
7.	MS27028-11	1	DUST CAP, 2" WITH 12 INCH LG SECURITY CHAIN STYLE B		AL ALLOY, ANODIZED
8.		1	PIPE, 2 INCH NOM, SCHEDULE 40		AL ALLOY, ANODIZED
9.		1	FLAME ARRESTOR		AL ALLOY ANODIZED
10.		1	RELIEF CAP WITH GASKET	PROTECTO SEAL # EX1333-2" OR EQUAL	AL ALLOY, ANODIZED
11.	MS27030-6	2	GASKET-COUPLING HALF, 2" SIZE		RUBBER
12.	72423/6170	1	MUSHROOM TYPE VENT WITH SCREEN NO. 30 MESH - SIZE 2 IN. NPT		BODY-IRON, GALV SCREEN-BRASS

**FIGURE 9b. Vent fitting assembly parts list.**

MIL-T-52983G

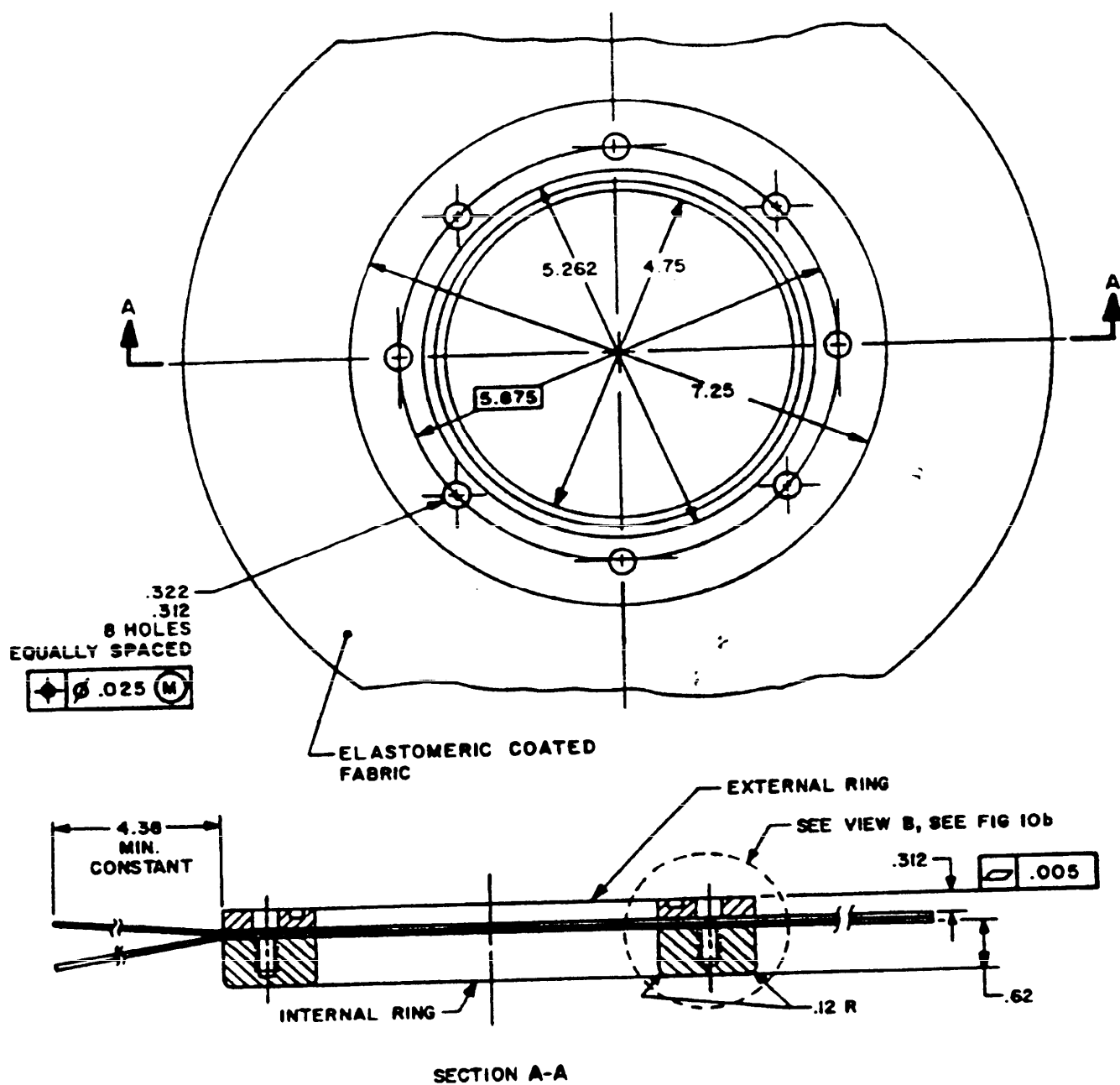


FIGURE 10a. Vent and drain fitting-compression type.

X-3326J

MIL-T-52983C

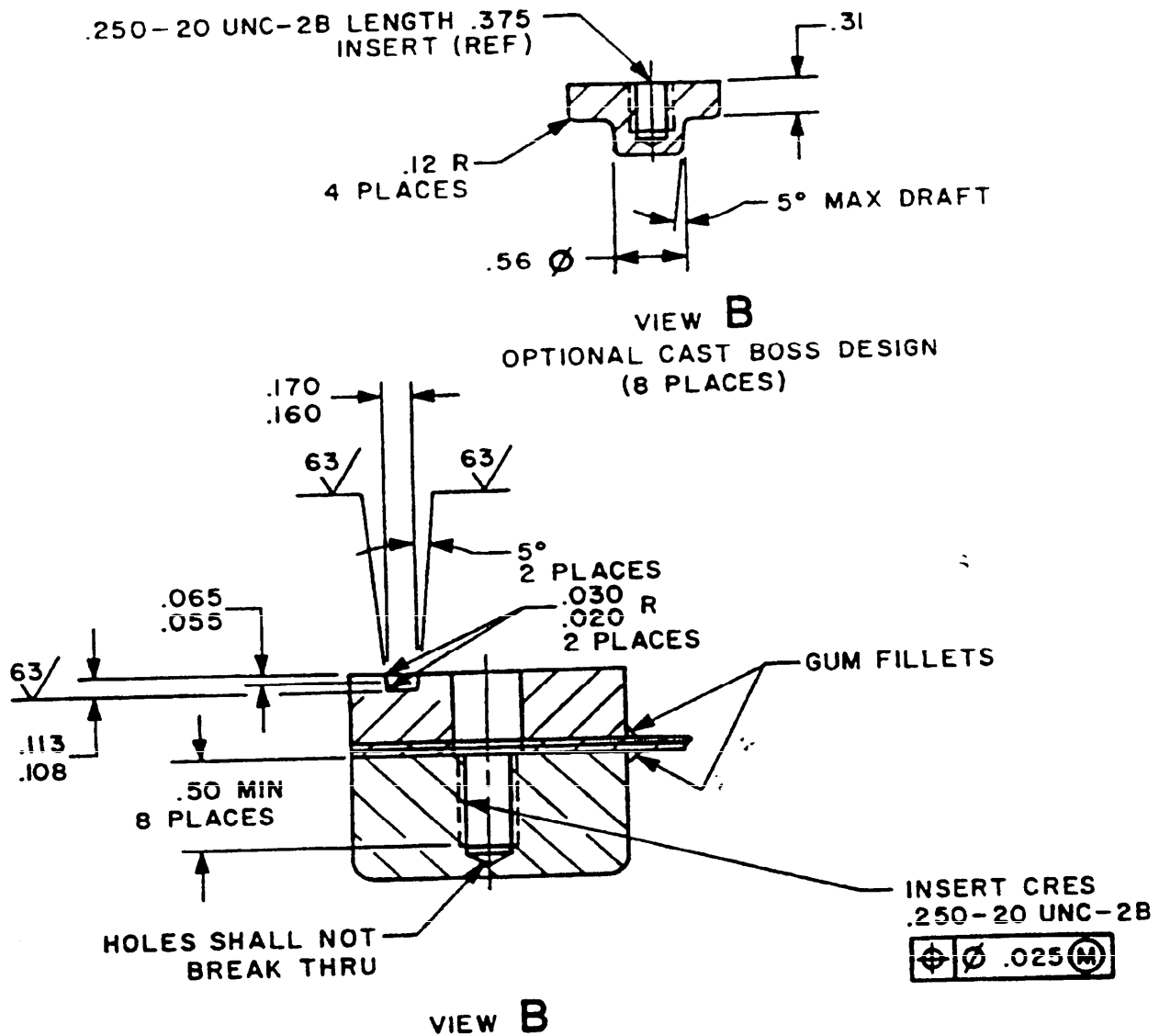
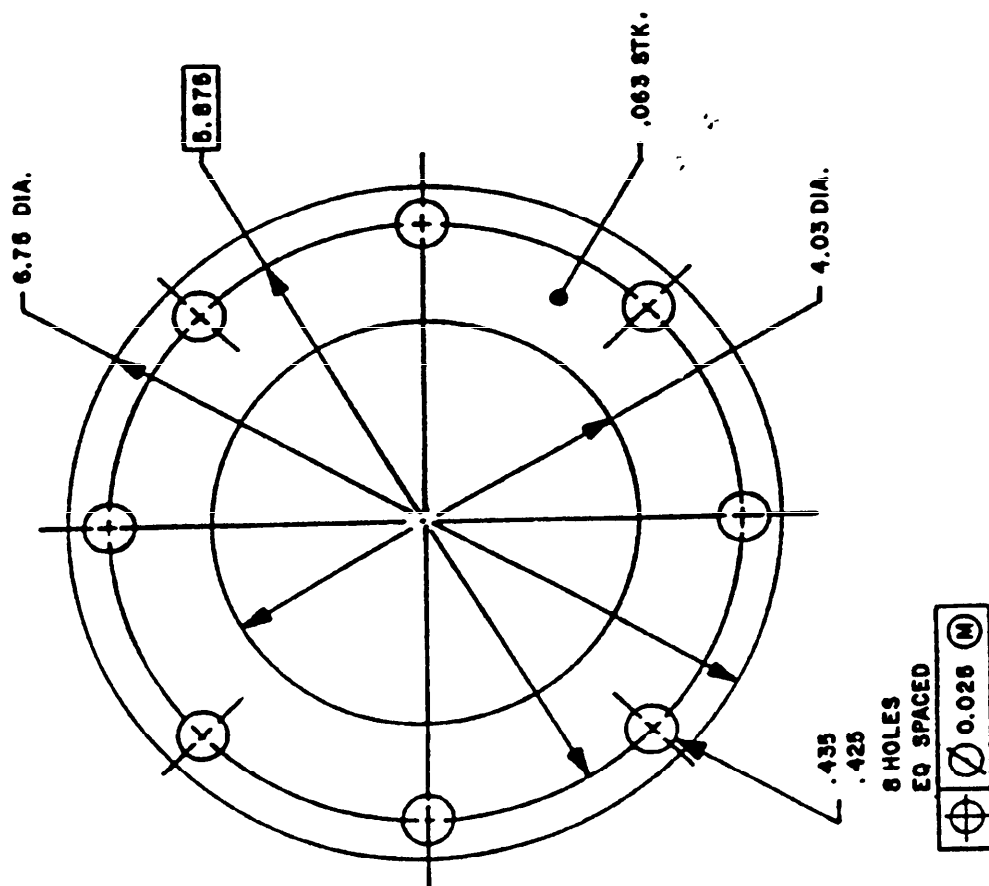


FIGURE 10b. Vent and drain fitting-compression type views.

X-4961B

MIL-T-52983G

X-3330E



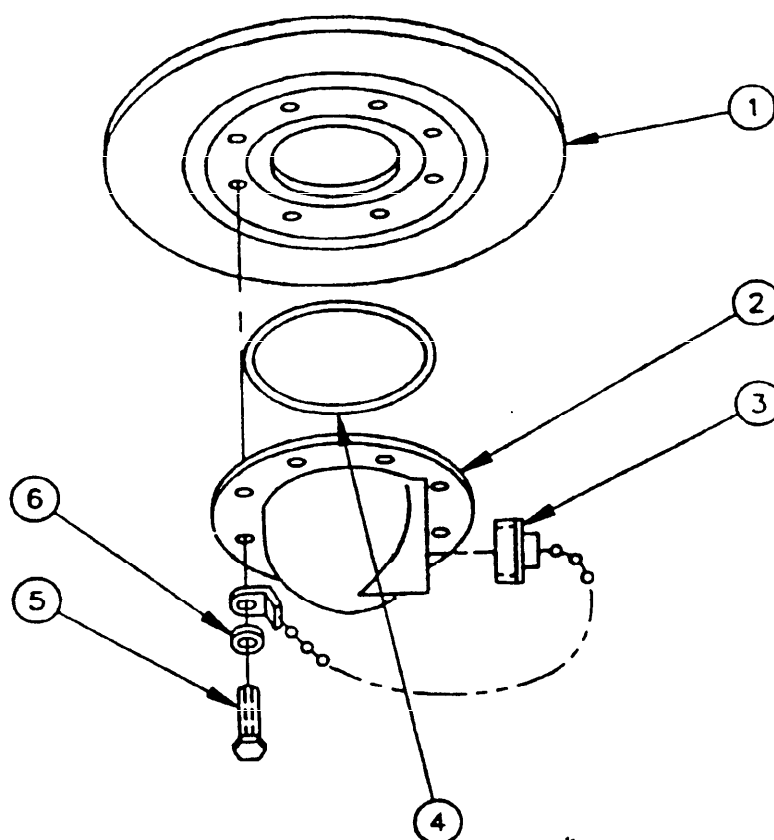
NOTES:

1. FOR FUEL TANKS -  
MATERIAL: RUBBER, ASTM D2000  
M4AG8IOA13EO4
2. FOR WATER TANKS - MATERIAL:  
BLACK RUBBER PER ASTM D 1330,  
GRADE I OR II, COLOR OPTIONAL
3. UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN INCHES.  
TOLERANCES: .XX ± .03

FIGURE 11. Gasket, for 4-inch tank truck round flange, 3,000, 10,000, 20,000, 50,000 and 210,000 gal. tanks.



MIL-T-52983G



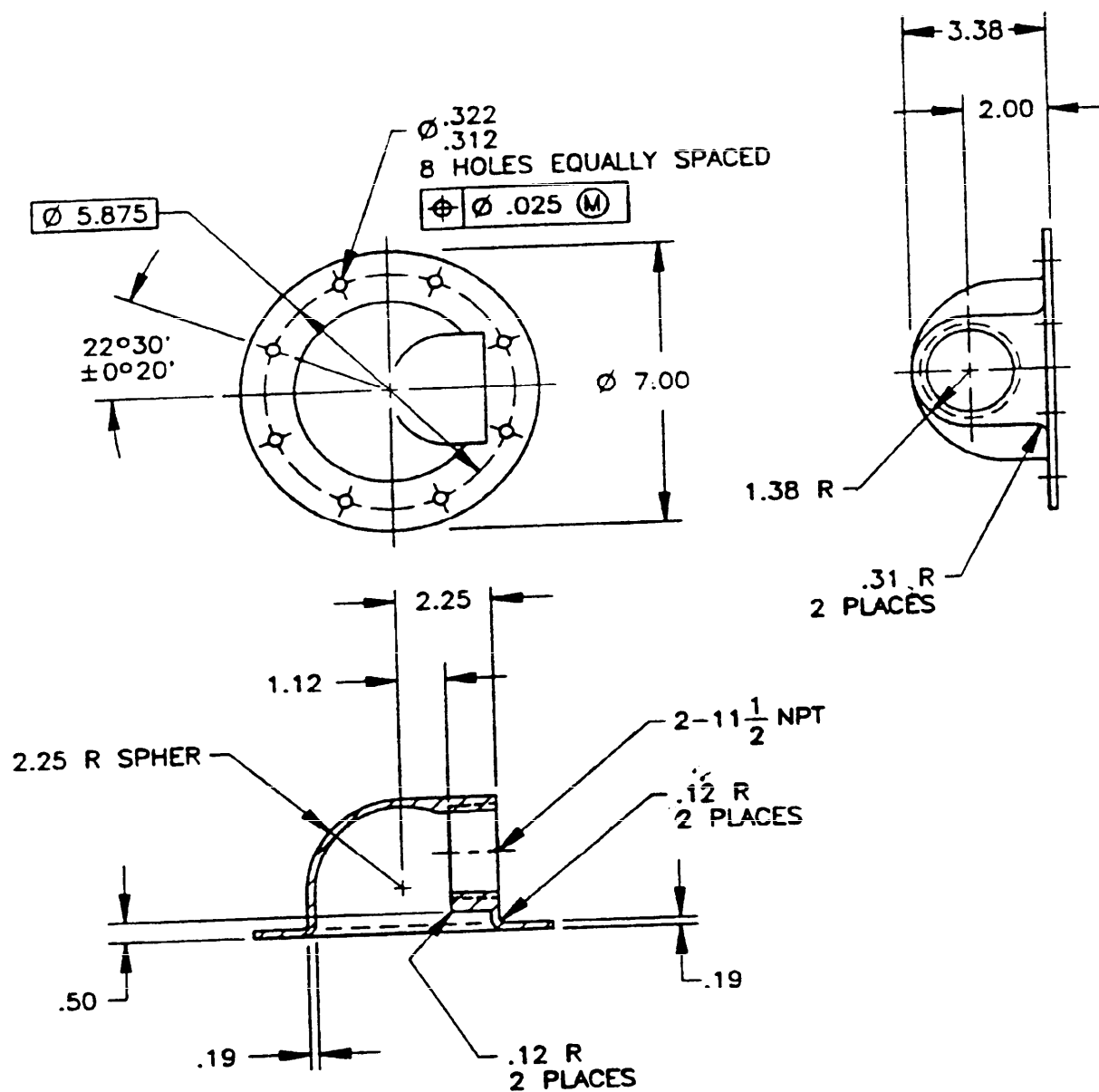
FIND NO.	PART NO. OR IDENT NO.	QTY	DESCRIPTION	SPECIFICATION
1	FIGURE 10	1	VENT DRAIN FITTING—COMPRESSION TYPE	
2	FIGURE 13	1	DRAIN FITTING	
3		1	PIPE PLUG, 2-INCH, CLASS 125	ANSI B16.14
4	M25988/1-250	1	O-RING	MIL-R-25988/1
5		8	BOLT, HEX HD, 1/4-20 UNC-2A X 1.00 INCH LONG, STL, ZINC COATED, .003 IN. THK	ANSI B18.2.1
6		8	WASHER, PLAIN, .281 ID STL, ZINC COATED, .003 IN. THK	ANSI B18.22.1

## NOTES:

1. LUBRICATE O-RING, FIND NO. 4, WITH LUBRICANT BEFORE ASSEMBLING HARDWARE.

FIGURE 12. Drain fitting assembly.

MIL-T-52983G

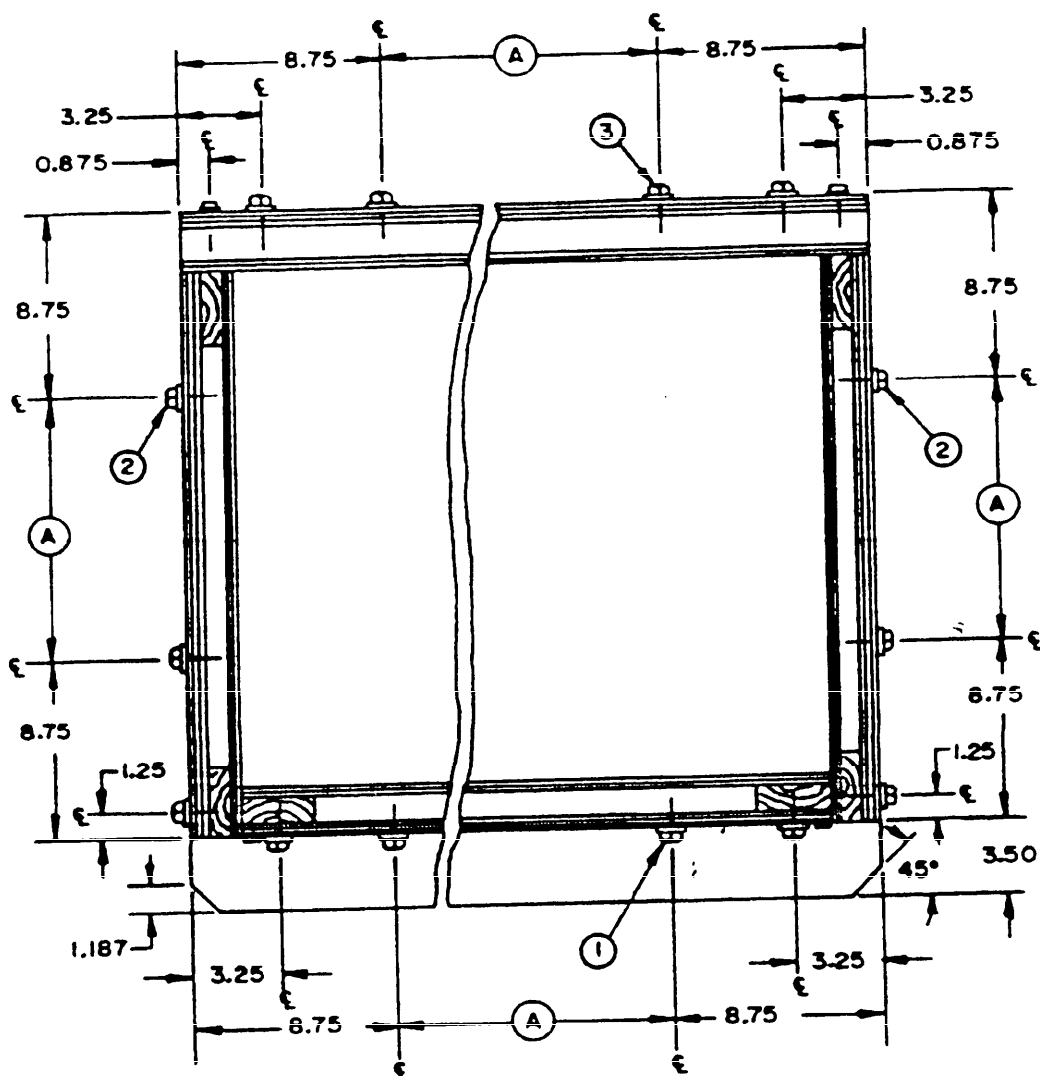


## NOTES:

1. MATERIAL: AL ALLOY IN ACCORDANCE WITH ASTM B 26, UNS A13560-T6.
2. UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.  
TOLERANCES:  $.XX \pm .06$   
DRAFT ANGLES =  $3^{\circ}$  MAX
3. ALUMINUM ALLOY PART SHALL BE ANODIZED IN ACCORDANCE WITH MIL-A-8625, TYPE II.

FIGURE 13. Drain fitting.

MIL-T-52983C

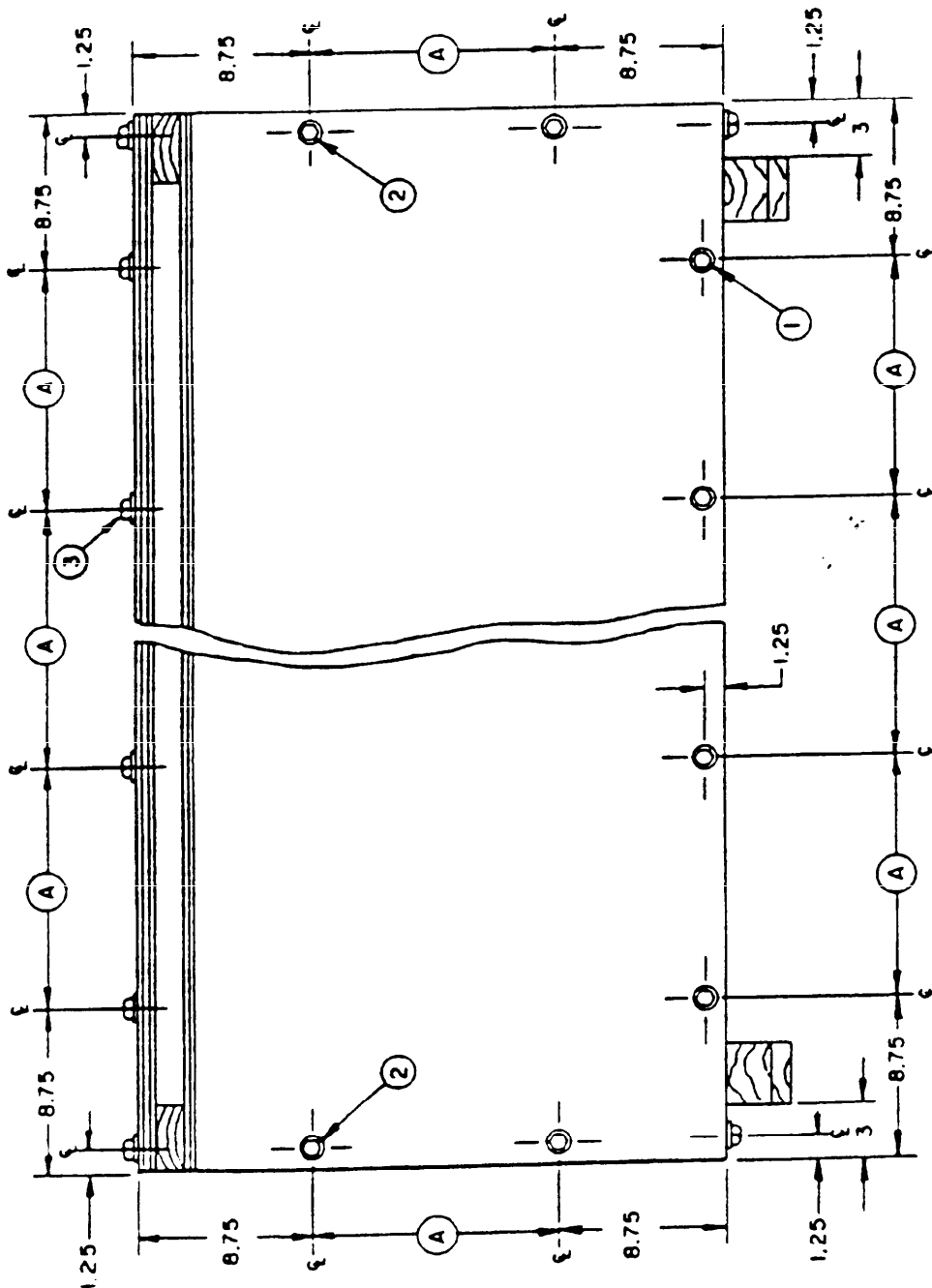


## NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS **(A)** BETWEEN INTERMEDIATE LAG SCREWS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:
  - ① BOTTOM ASSEMBLY TO END PANEL.
  - ② SIDE PANEL TO END PANEL.
  - ③ TOP PANEL TO END PANEL.

FIGURE 14. End View of Box

MIL-T-52983G



NOTES:

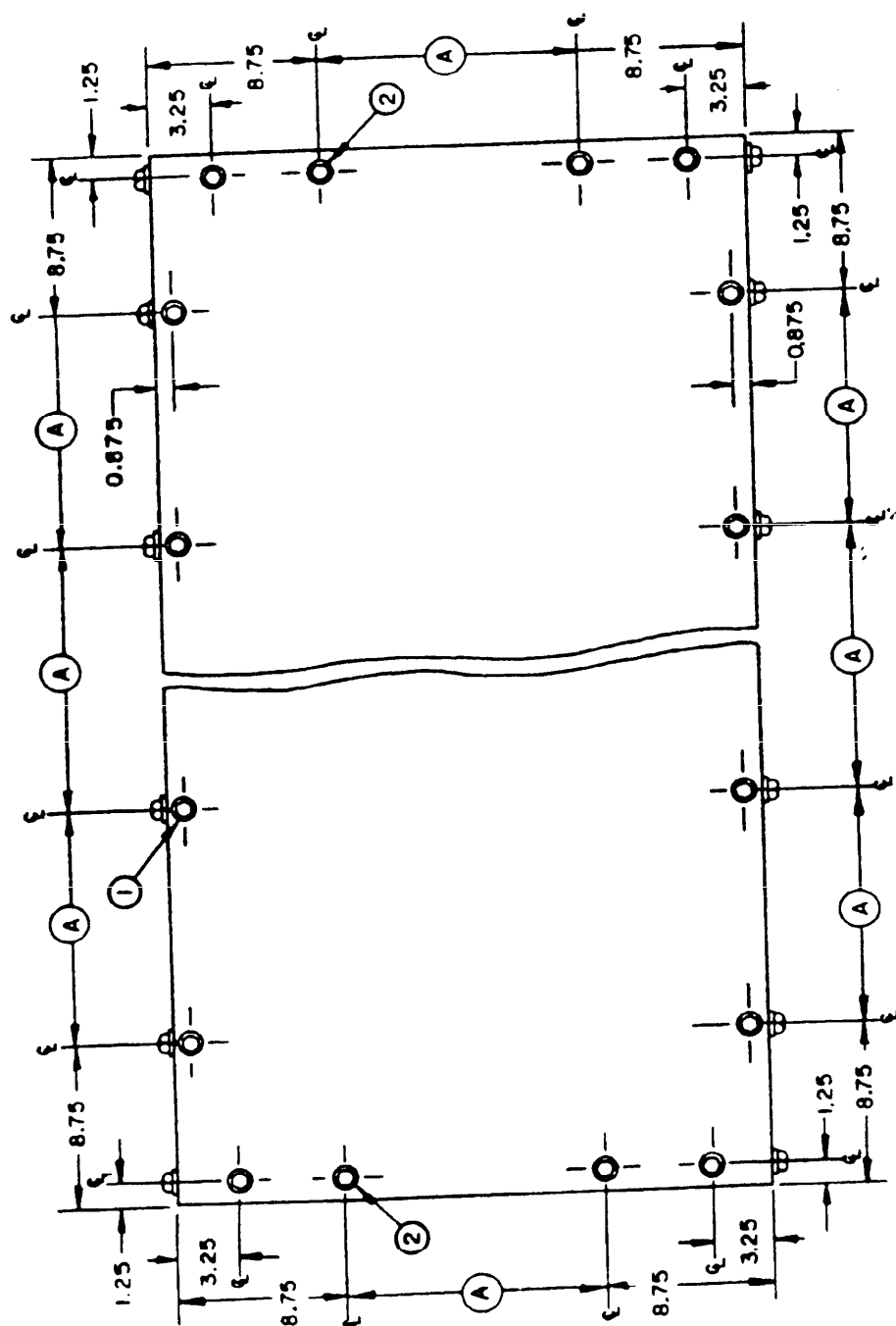
1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS (A) BETWEEN INTERMEDIATE LAG SCREWS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:

- ① SIDE PANEL TO BOTTOM PANEL.
- ② SIDE PANEL TO END PANEL.
- ③ TOP PANEL TO SIDE PANEL.

FIGURE 15. Side View of Box

X-4708C

**MIL-T-52983G**



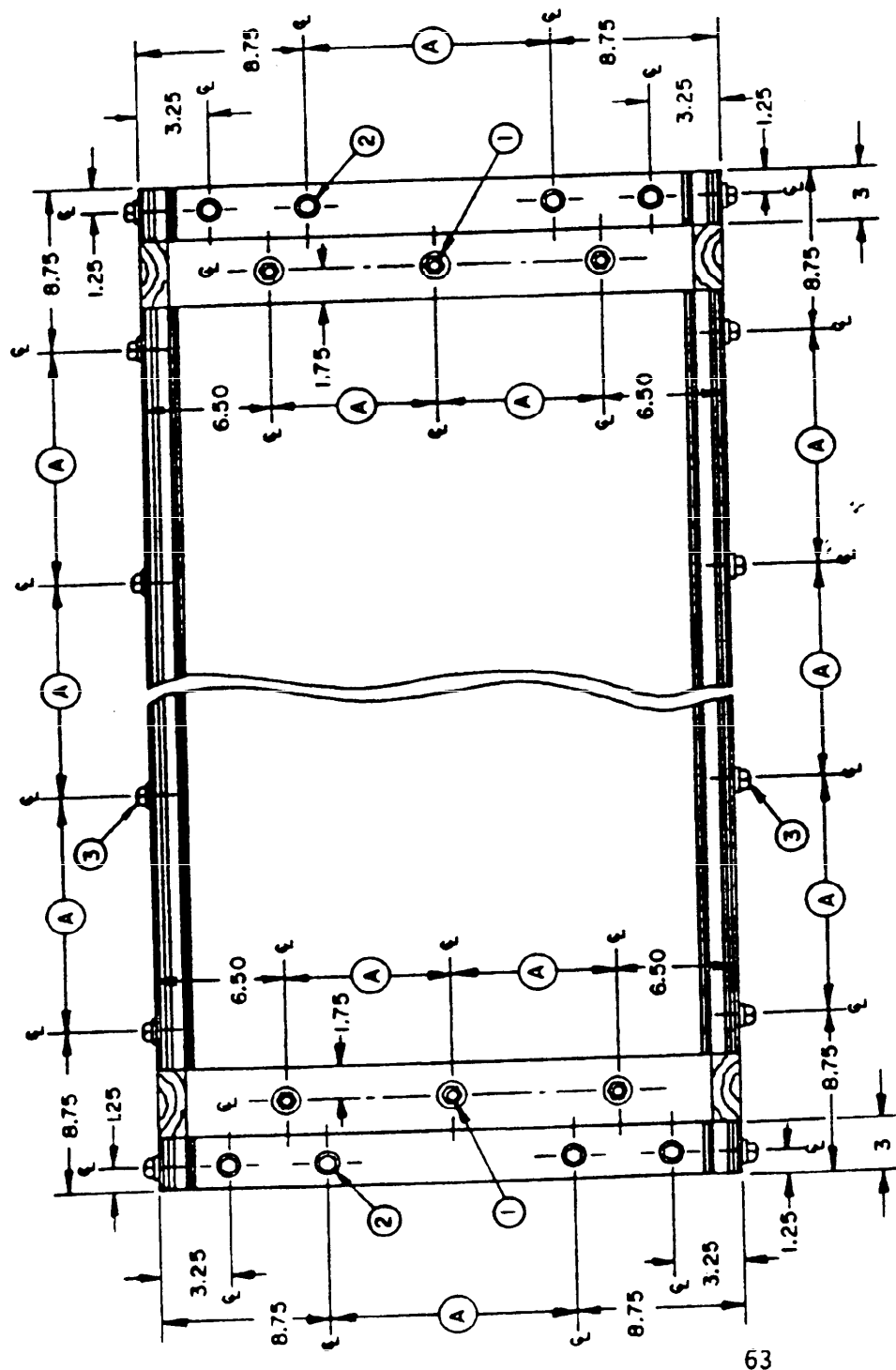
**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS (A) BETWEEN INTERMEDIATE LAG SCREWS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:
  - ① TOP PANEL TO SIDE PANEL.
  - ② TOP PANEL TO END PANEL.

**FIGURE 16. Top View of Box**

X-4709B

MIL-T-52983C



NOTES:

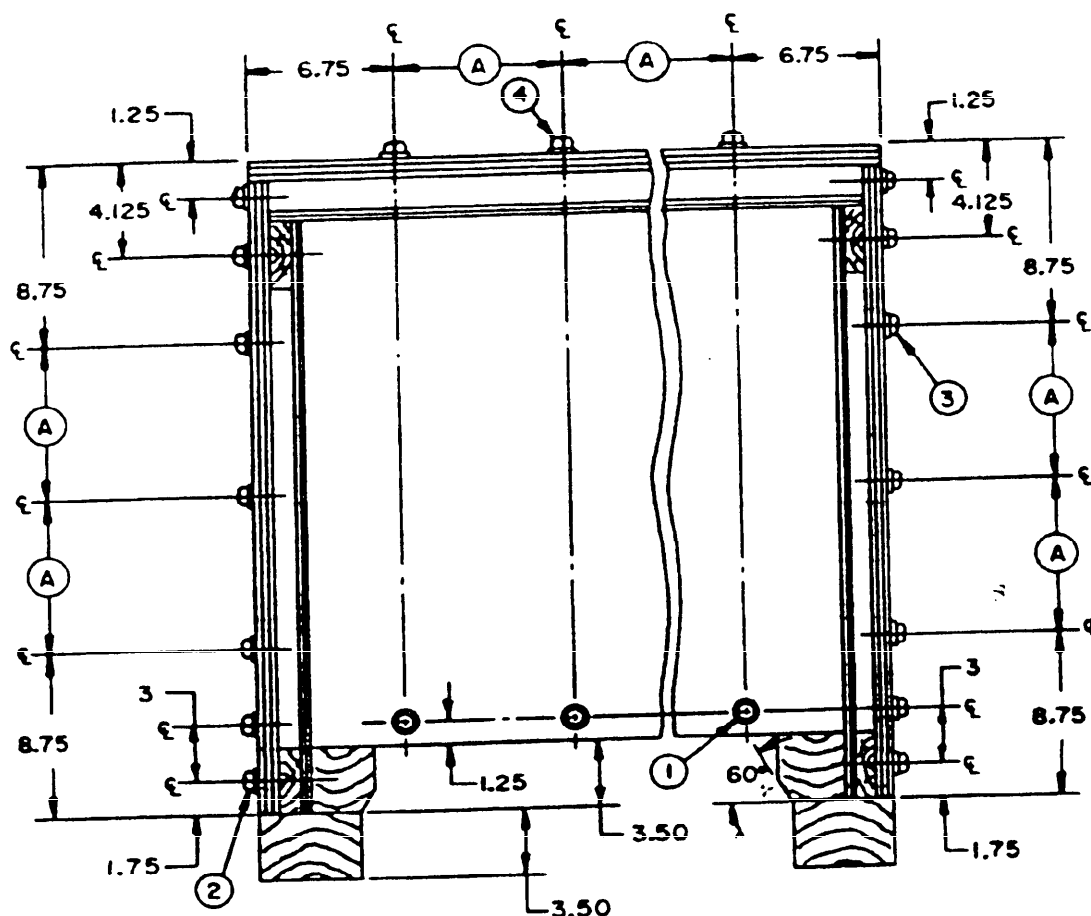
1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS (A) BETWEEN INTERMEDIATE LAG SCREWS OR CARRIAGE BOLTS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:
  - ① SKID TO BOTTOM PANEL.
  - ② BOTTOM PANEL TO END PANEL.
  - ③ SIDE PANEL TO BOTTOM PANEL.

FIGURE 17. Bottom View of Box

X-4710B



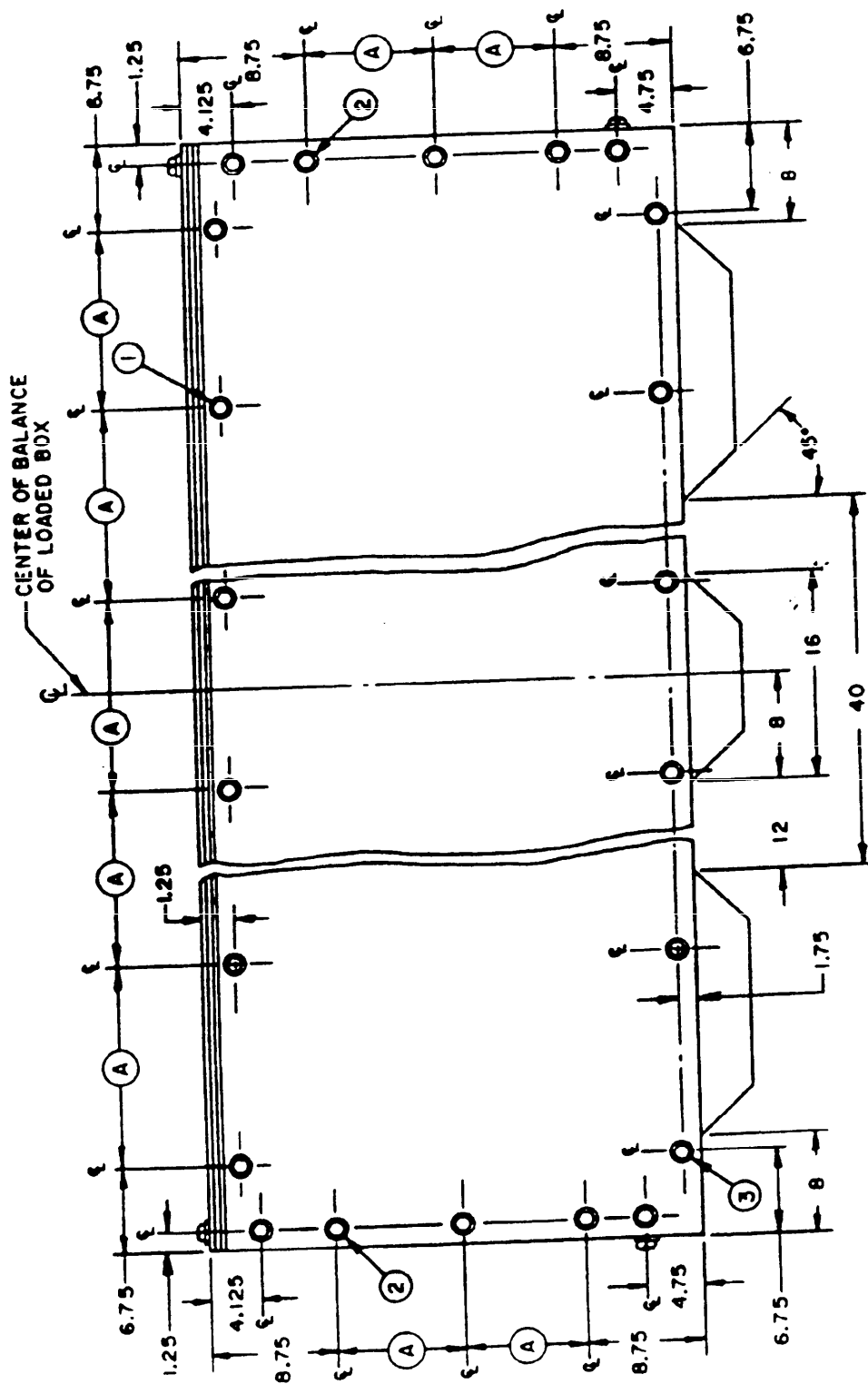
MIL-T-52983G



## NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS (A) BETWEEN INTERMEDIATE LAG SCREWS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:
  - ① END PANEL TO BASE.
  - ② SIDE PANEL TO BASE.
  - ③ SIDE PANEL TO END PANEL.
  - ④ TOP PANEL TO END PANEL.

FIGURE 18. End View of Box With Outside Length Greater Than 96 Inches.



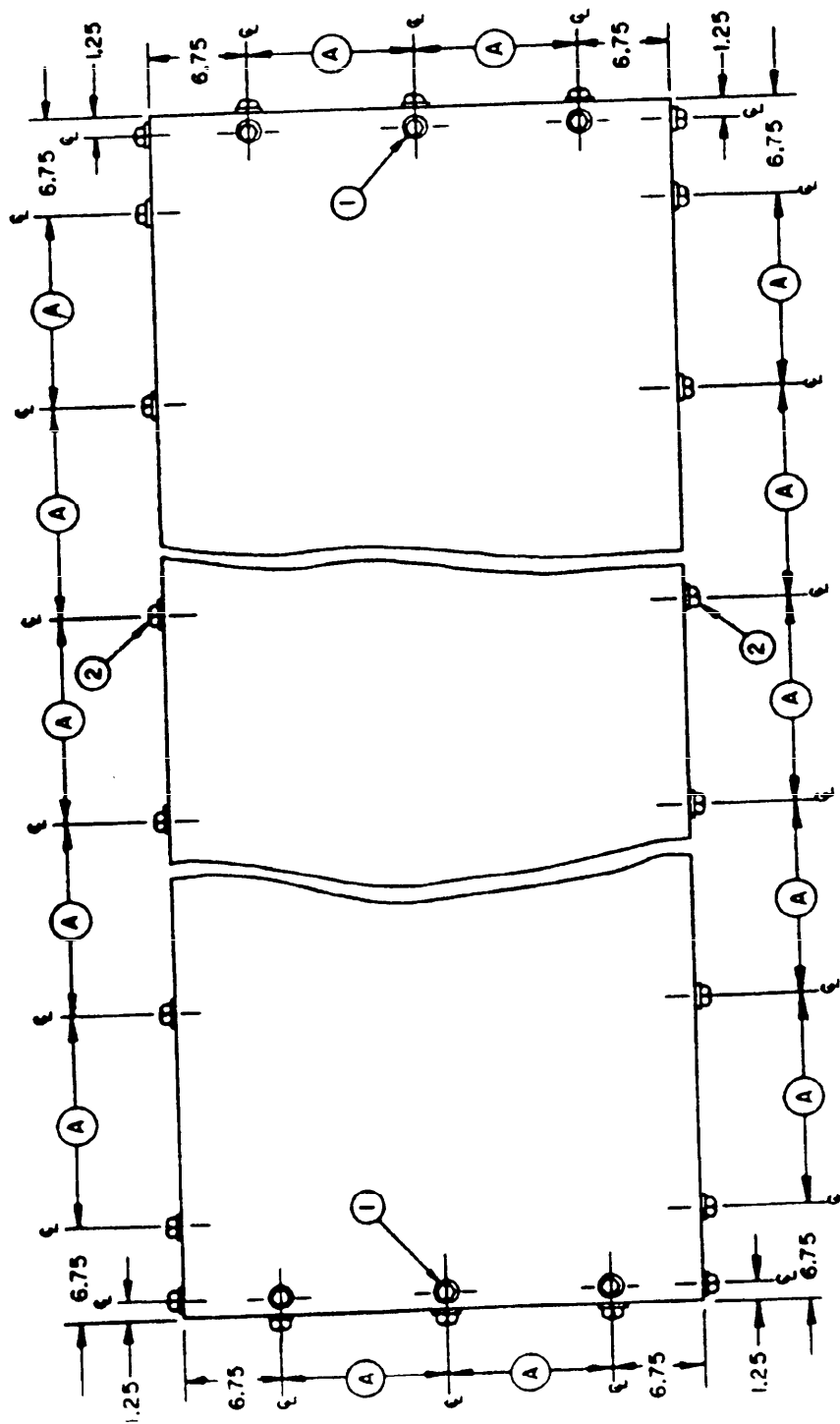
**NOTES:**

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS (A) BETWEEN INTERMEDIATE LAG SCREWS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:

**FIGURE 19. Side View of Box With Outside Length Dimension Greater Than 96 Inches.**

X-4712A

**MIL-T-52983G**



**NOTES:**

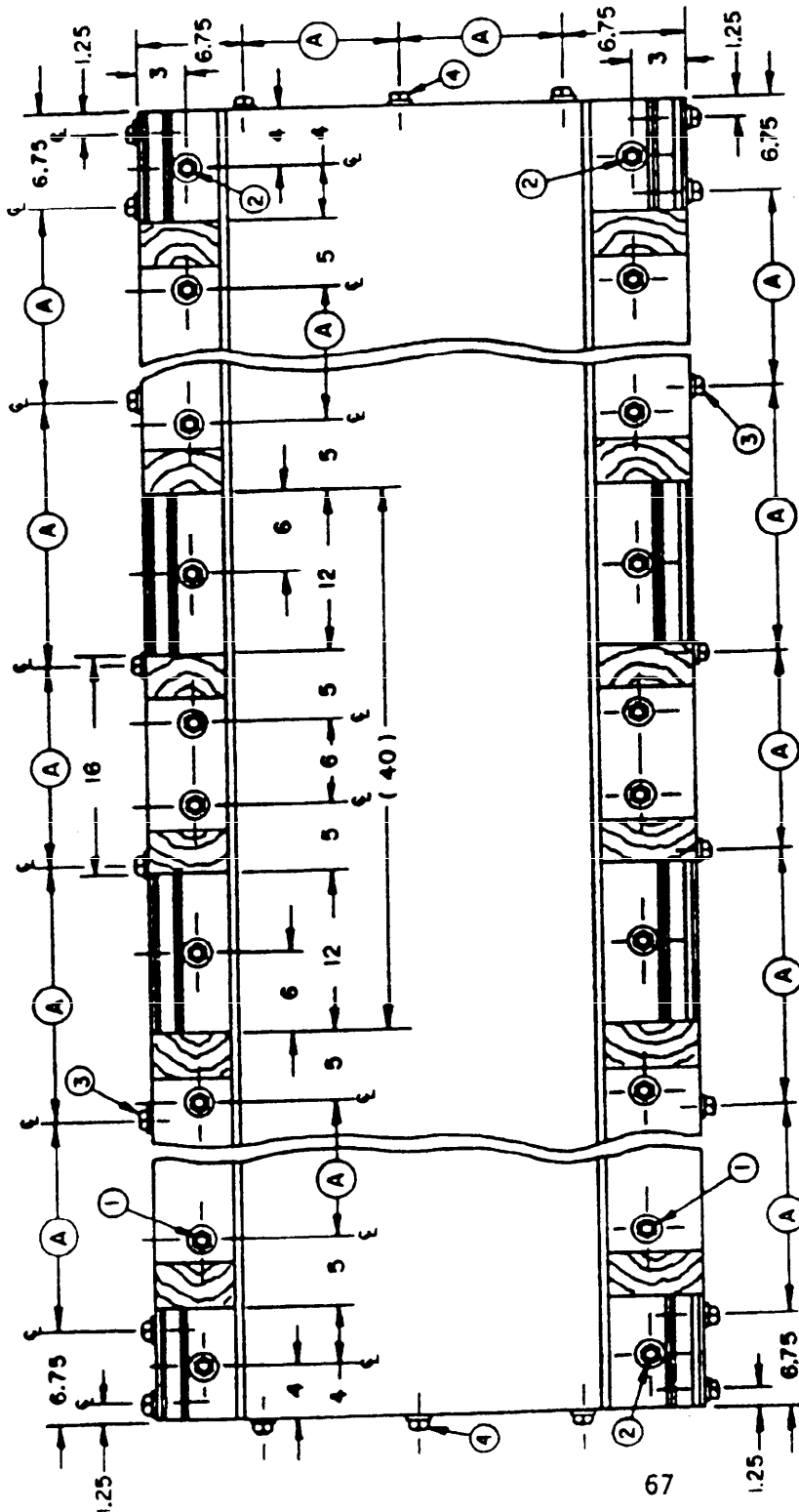
1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS <sup>(A)</sup>BETWEEN INTERMEDIATE LAG SCREWS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.
3. FIGURE SHOWS FASTENING OF:
  - ① TOP PANEL TO END PANEL.
  - ② SIDE PANEL TO TOP PANEL.

**FIGURE 20. Top View of Box With Outside Length Dimension Greater Than 96 Inches.**

X-4713A

MIL-T-52983G

X-4714A



## NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSIONS (A) BETWEEN INTERMEDIATE LAG SCREWS AND CARRIAGE BOLTS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.

3. FIGURE SHOWS FASTENING OF:

- ① RUBBING STRIPS AND SKIDS TO BASE.
- ② HEADER TO BASE.
- ③ SIDE PANEL TO BASE.
- ④ END PANEL TO BASE.

FIGURE 21. Bottom View of Box With Outside Length Dimension Greater Than 96 Inches.

MIL-T-52983C

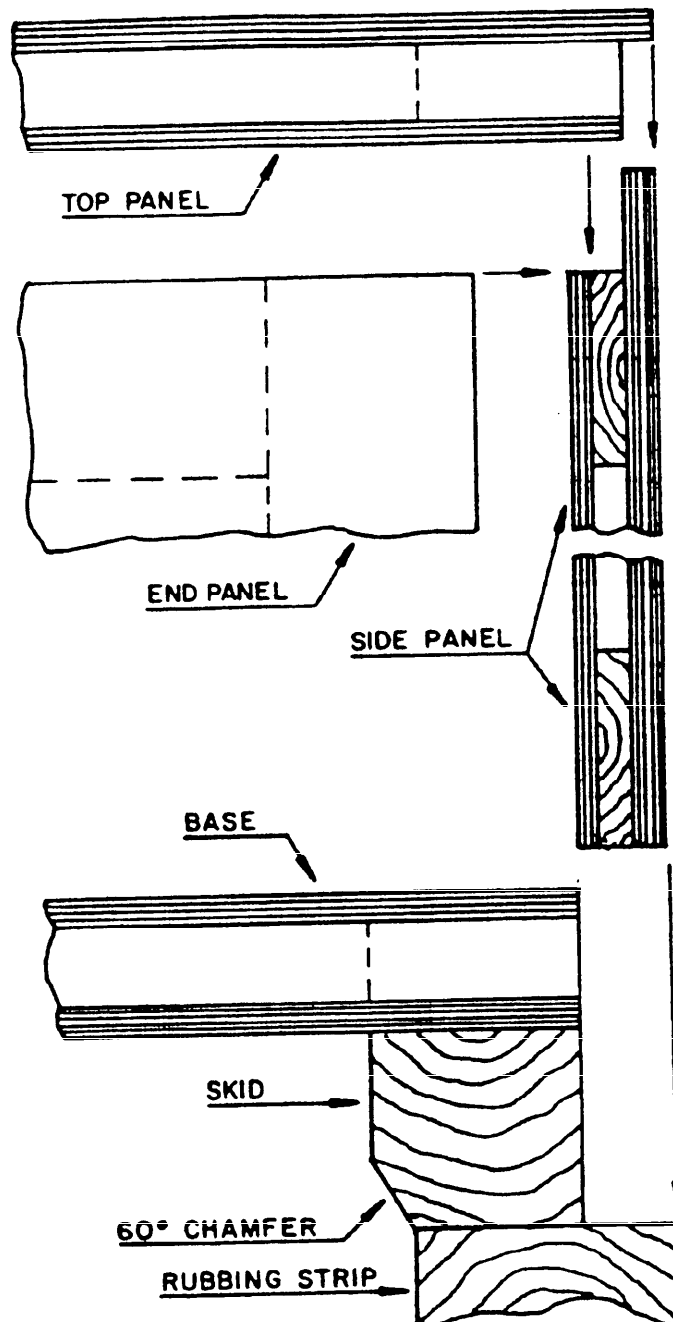
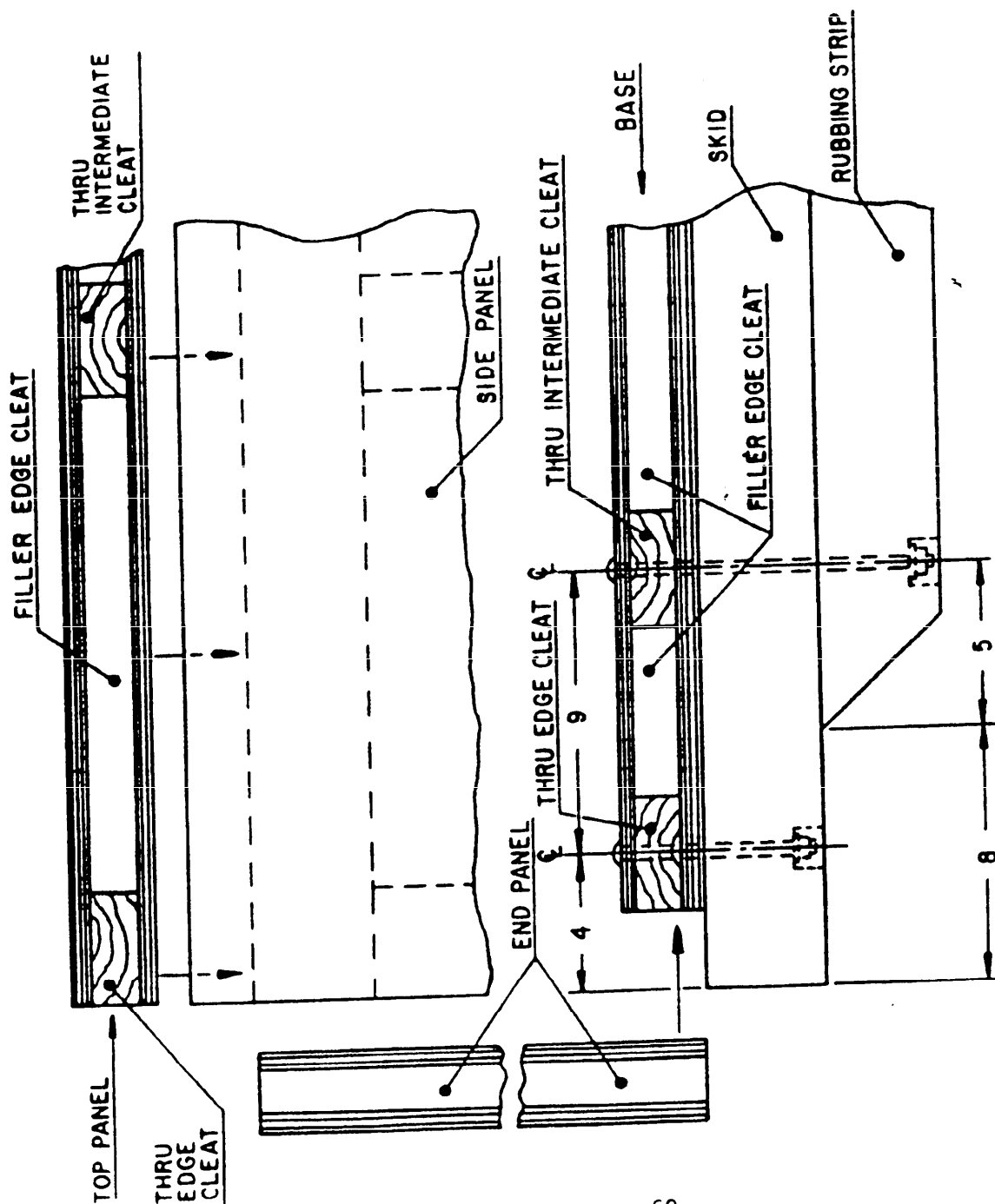


FIGURE 22. Assembly Method (End View)  
for Box Over 96 Inches in Length.

MIL-T-52983G



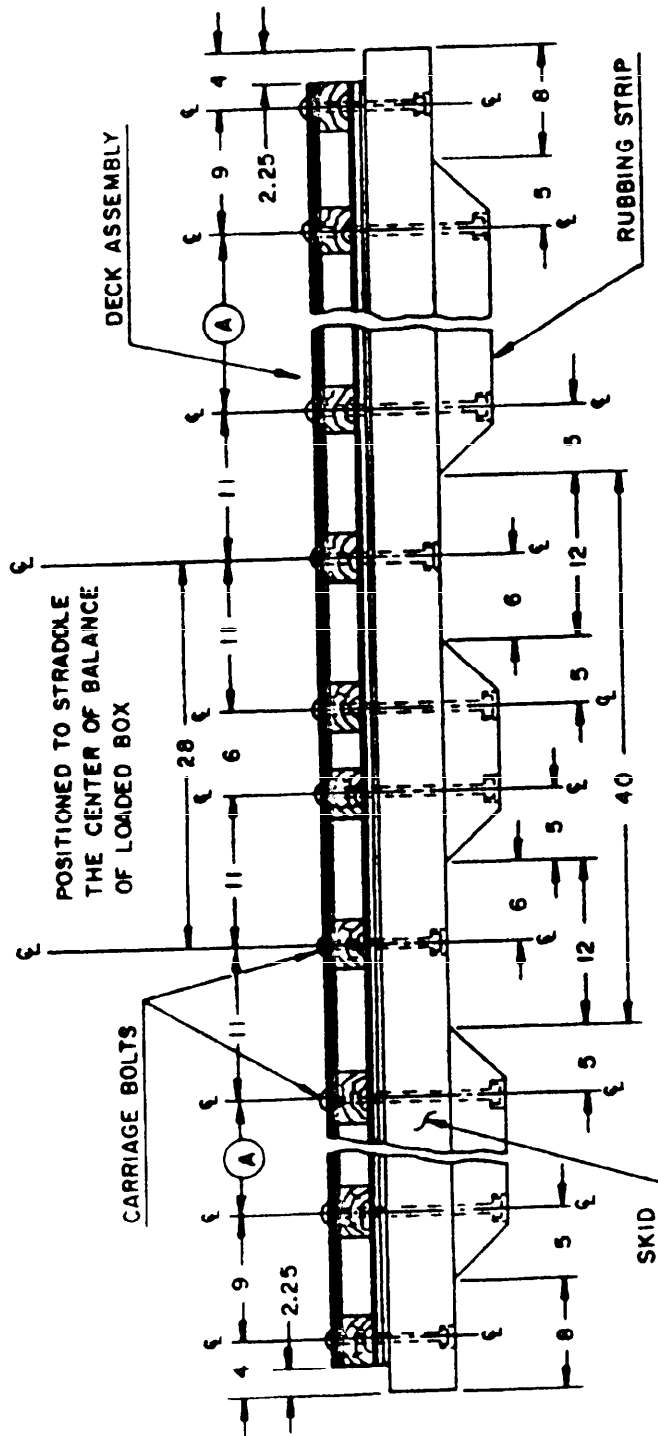
NOTE:

1. ALL DIMENSIONS ARE IN INCHES.

FIGURE 23. Assembly Method (Side View)  
for Box Over 96 Inches in Length.

X-4716A

MIL-T-52983G



## NOTES:

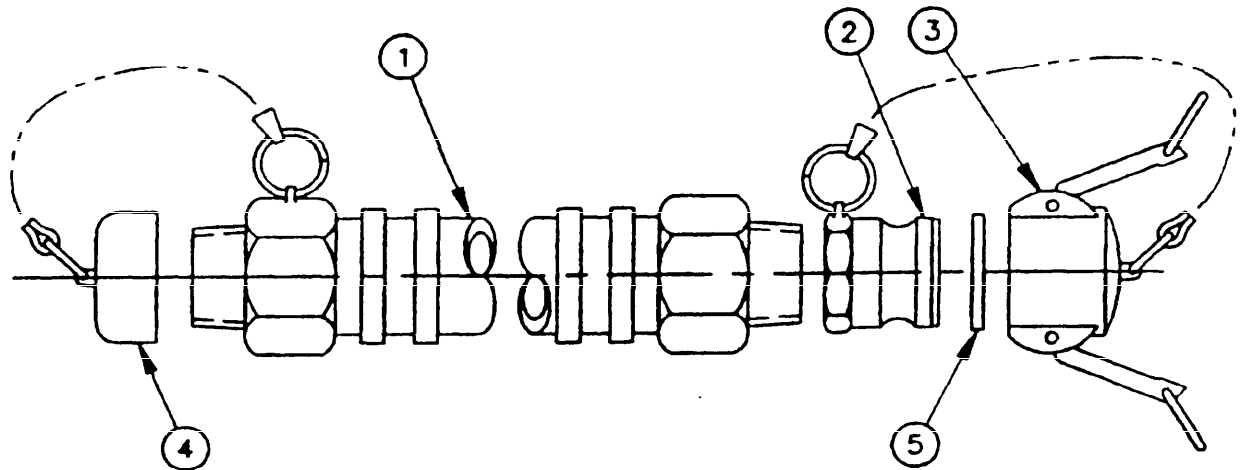
1. ALL DIMENSIONS ARE IN INCHES.
2. DIMENSION (A) BETWEEN THRU INTERMEDIATE CLEATS AND INTERMEDIATE CARRIAGE BOLTS SHALL BE NOT LESS THAN 8 INCHES OR MORE THAN 16 INCHES.

FIGURE 24. Fabrication Method for Base (Side View)  
for Box Over 96 Inches in Length.

X-4717A



MIL-T-52983G



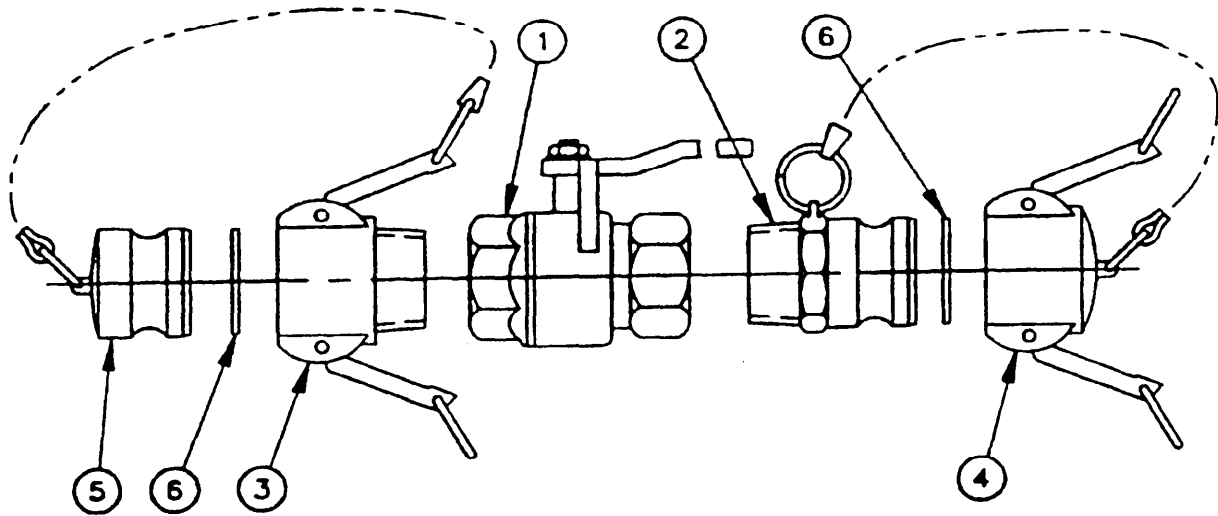
FIND NO.	PART NO. OR IDENT NO.	QTY REQD		DESCRIPTION	SPECIFICATION
		FUEL TANK	WATER TANK		
1	M370B06C2A0960	1	-	HOSE ASSEMBLY, TYPE B, SIZE 06 (2-INCH), CLASS C, 8-FOOT LENGTH, WITH 2-INCH ALUMINUM MALE (NPT) BANDED SHANK FITTINGS ON BOTH ENDS	MIL-H-370
1	ZZH561BA2020096	-	1	HOSE ASSEMBLY, GRADE B, CLASS 2, SIZE 2-INCH, 8-FOOT LENGTH, WITH 2-INCH MALE (NPT) BANDED SHANK FITTINGS ON BOTH ENDS	ZZ-H-561
2	MS27020-11	1	-	COUPLING HALF	
2	MS27020-12	-	1	COUPLING HALF	
3	MS27028-11	1	-	DUST CAP	
3	MS27028-12	-	1	DUST CAP	
4		1	1	THREADED PIPE CAP, 2-INCH	ANSI B16.15
5	MS27030-6	1	1	COUPLING GASKET	

## NOTES:

1. LUBRICATE GASKET, FIND NO. 5, WITH LUBRICANT PRIOR TO ASSEMBLY.

FIGURE 25. Hose assembly (Drain).

## MIL-T-52983G



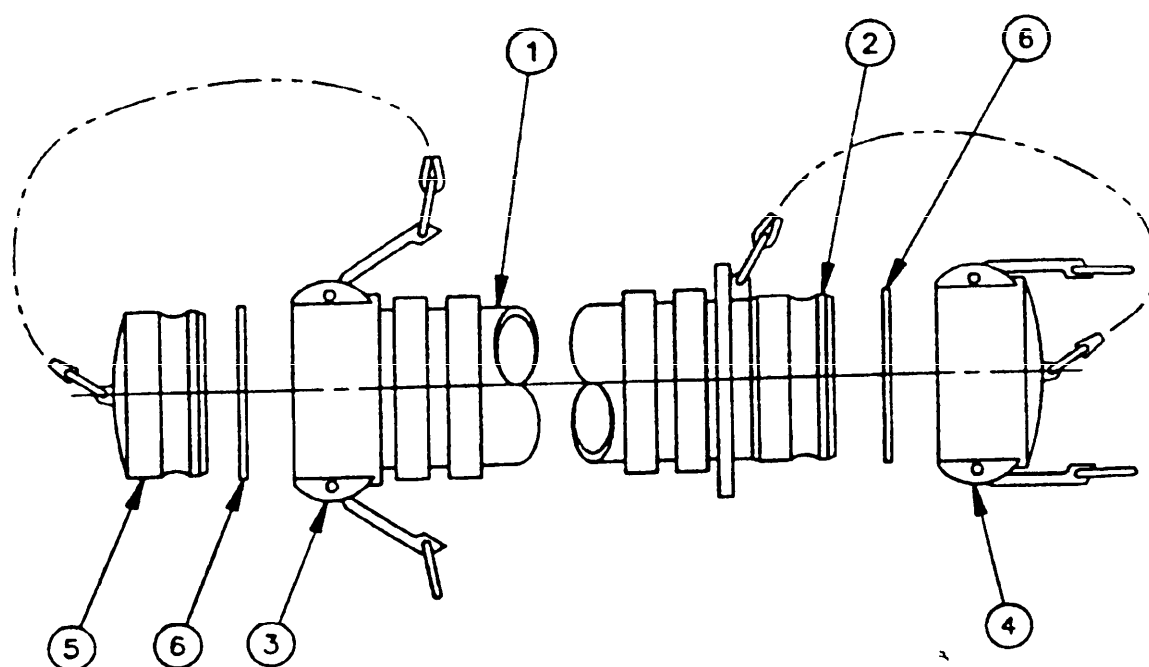
FIND NO.	PART NO. OR IDENT NO.	QTY REQD		DESCRIPTION	SPECIFICATION
		FUEL TANK	WATER TANK		
1		1	-	BALL VALVE, TYPE II, COMPOSITION CS, STYLE 1, END CONNECTION THREADED, CLASS 125, SIZE 2	WW-V-35
1		-	1	BALL VALVE, TYPE II, COMPOSITION BZ, STYLE 1, END CONNECTION THREADED, CLASS 125, SIZE 2	WW-V-35
2	MS27022-11	1	-	COUPLING HALF	
2	MS27022-12	-	1	COUPLING HALF	
3	MS27026-11	1	-	COUPLING HALF	
3	MS27026-12	-	1	COUPLING HALF	
4	MS27028-11	1	-	DUST CAP	
4	MS27028-12	-	1	DUST CAP	
5	MS27029-11	1	-	DUST PLUG	
5	MS27029-12	-	1	DUST PLUG	
6	MS27030-6	2	2	COUPLING GASKET	

## NOTES:

1. LUBRICATE GASKET, FIND NO. 6, WITH LUBRICANT PRIOR TO ASSEMBLY.

FIGURE 26. Ball valve assembly (Drain).

MIL-T-52983G



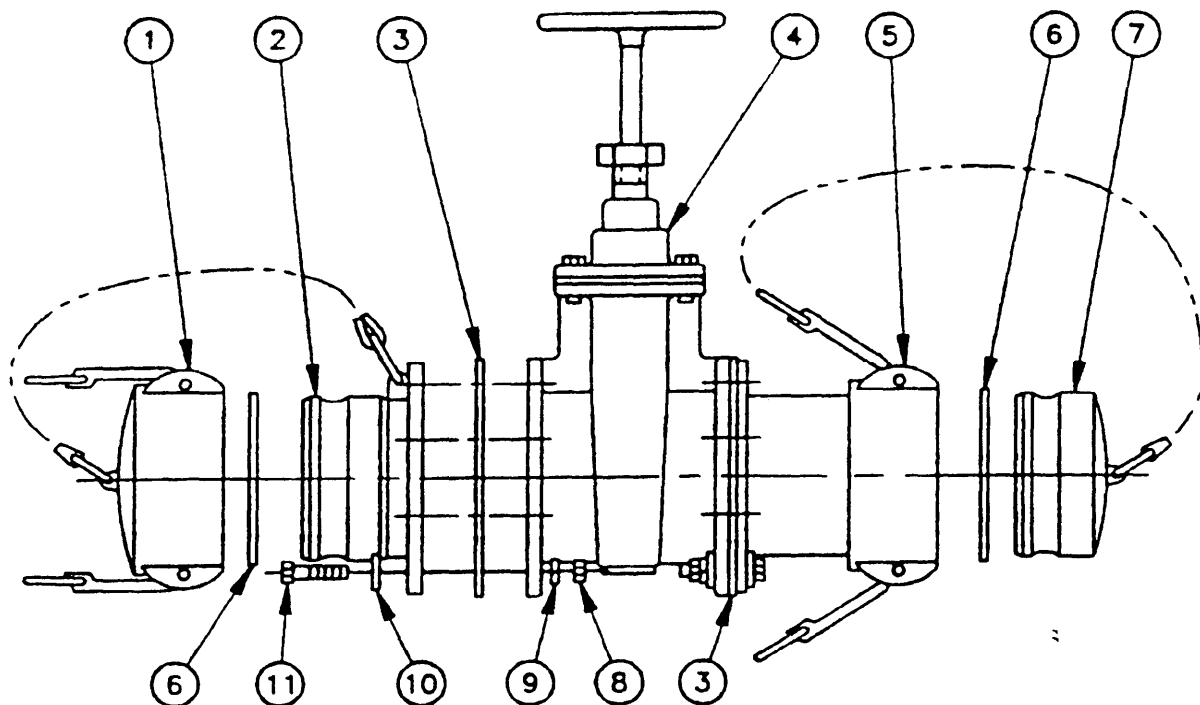
FIND NO.	PART NO. OR IDENT NO.	QTY REQD		DESCRIPTION	SPECIFICATION
		FUEL TANK	WATER TANK		
1	M370B09B2A0960	1	-	HOSE ASSEMBLY, TYPE B, CLASS B, SIZE 09 (4-INCH), STYLE A, 8-FOOT LENGTH	MIL-H-370
1	ZZH561BA2040096	-	1	HOSE, GRADE B, CLASS 2, 4-INCH DIAMETER, 8-FOOT LENGTH	ZZ-H-561
2	MS27021-17	-	1	COUPLING HALF	
3	MS27025-17	-	1	COUPLING HALF	
4	MS27028-17	1	1	DUST CAP	
5	MS27029-17	1	1	DUST PLUG	
6	MS27030-9	2	2	COUPLING GASKET	

## NOTES:

1. LUBRICATE GASKET, FIND NO. 6, WITH LUBRICANT PRIOR TO ASSEMBLY.
2. CLAMPS SHALL BE IN ACCORDANCE WITH MIL-H-370.

FIGURE 27. Hose assembly  
(Filler/Discharge).

MIL-T-52983G



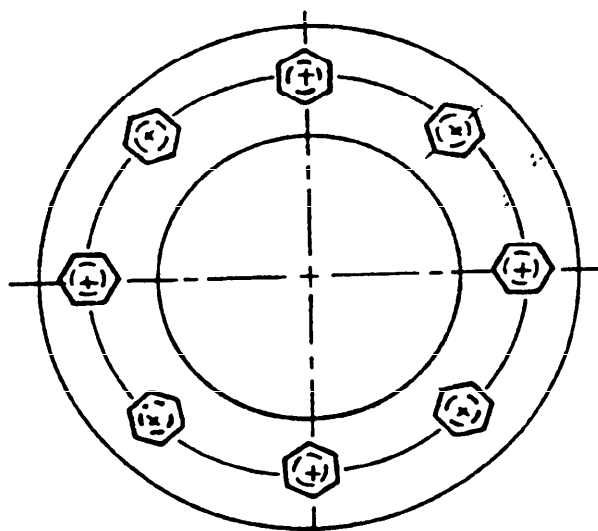
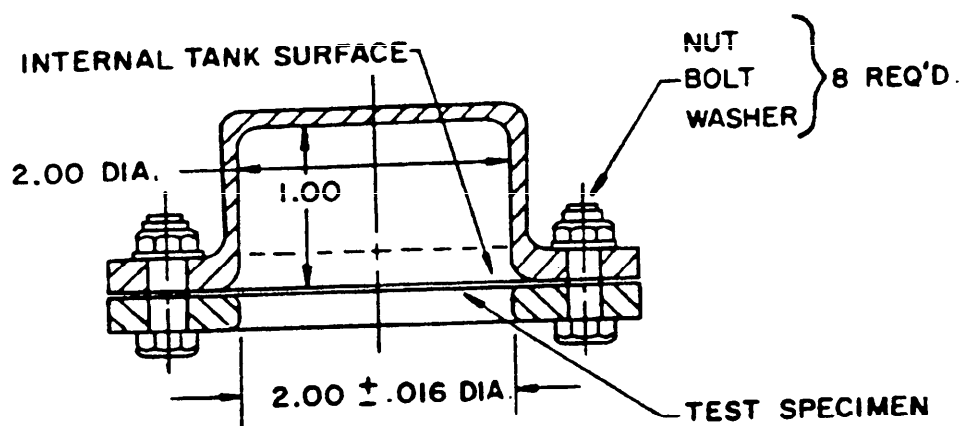
FIND NO.	PART NO. OR IDENT NO.	QTY	DESCRIPTION	SPECIFICATION
1	MS27028-17	1	DUST CAP	
2	MS27023-17	1	COUPLING HALF	
3	FIGURE 11	2	GASKET	
4		1	GATE VALVE, SIZE 4-INCH, TYPE I	MIL-V-58039
5	MS27027-17	1	COUPLING HALF	
6	MS27030-9	2	COUPLING GASKET	
7	MS27029-17	1	DUST PLUG	
8		16	MACHINE SCREW HEX NUT, .375-INCH	ANSI B18.2.2
9		16	HELICAL LOCK WASHER, .375-INCH	ANSI B18.21.1
10		16	PLAIN WASHER, .375-INCH	ANSI B18.22.1
11		16	HEX BOLT, .375-INCH	ANSI B18.2.1

## NOTES:

1. LUBRICATE GASKETS, FIND NO. 3 AND 6, WITH LUBRICANT BEFORE ASSEMBLING HARDWARE.

FIGURE 28. Gate valve assembly  
(Filler/Discharge).

MIL-T-52983G



NOTES:

1. UNLESS OTHERWISE SPECIFIED DIMENSIONS  
ARE IN INCHES.

TOLERANCES:  $.XX \pm .06$

FIGURE 29. Diffusion cup assembly.

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

5. REASON FOR RECOMMENDATION

6. SUBMITTER

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c. ADDRESS (Include Zip Code)

d. TELEPHONE (Include Area Code)  
(1) Commercial  
(if applicable)  
(2) DSN

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8. PREPARING ACTIVITY

a. NAME

Carolyn B. Johnson

b. TELEPHONE (Include Area Code)

(1) Commercial  
(703) 704-3468

(2) DSN  
654-3468

c. ADDRESS (Include Zip Code)

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