

MIL-T-81838(AS)
30 November 1971

MILITARY SPECIFICATION

TANK, FUEL, AIRCRAFT , AUXILIARY EXTERNAL 300 GALLON, TYPE AERO-1D

This specification has been approved by the Naval Air Systems
Command, Department of the Navy

1. SCOPE

1.1 This specification establishes the requirements for the manufacture, assembly and test of the type AERO-1D 300 gallon external fuel tank.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

SPECIFICATIONS

Federal

| | |
|-----------|---------------------------------|
| PPP-B-636 | Boxes Fiberboard |
| P-D-680 | Dry Cleaning Solvent |
| TT-S-735 | Standard Test Fluid Hydrocarbon |

Military

| | |
|------------|--|
| MIL-P-116 | Preservation, Method of |
| MIL-D-1000 | Drawings, Engineering and Associated Lists |
| MIL-T-5021 | Tests, Aircraft and Missile Welding Operator, Qualification |
| MIL-C-5501 | Closure, Tubing Protective |
| MIL-C-5541 | Chemicals Films and Chemical Film Materials for Aluminum and Aluminum Alloys |

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SPECIFICATIONS

Military (Cont)

| | |
|-------------|---|
| MIL-T-5624 | Turbine Fuel, Aviation, Grades JP-4 and JP-5 |
| MIL-C-6529 | Corrosion-Preventative Compound, Aircraft Engine |
| MIL-W-6858 | Welding, Resistance, Aluminum, Magnesium Non-Hardening Steel or Alloy, Nickel Alloys, Heat Resisting Alloys and Titanium Alloy, Spot and Seam Inspection, Penetrant Method of |
| MIL-I-6866 | Inspection, Penetration, Method of |
| MIL-V-7173 | Vibration Test of Fuel, Oil and Misc., Tanks, Process for |
| MIL-F-7179 | Finishes and Coatings; General Specification for Protection of Aerospace Weapons Systems, Structures and Parts |
| MIL-P-7962 | Primer coating, Cellulose-Nitrate Modified Alkalyd Type, Corrosion-Inhibiting, Fast Drying (For Spray application over Pretreatment coating) |
| MIL-C-8514 | Coating Compound, Metal Pretreatment |
| MIL-W-8604 | Welding of Aluminum Alloys, Process for |
| MIL-Y-8615 | Fuel System Components; General Specification for |
| MIL-D-8634 | Decalcomanias, Aircraft, for Use on Exterior Surfaces |
| MIL-C-9437 | Crate, Wood Open, Fuel External Assembled |
| MIL-T-18847 | Tank, Fuel, Aircraft, Auxiliary, External, Design and Installation of |
| MIL-L-19537 | Lacquer, Acrylic-Nitrocellulose Gloss |

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3.2 Selection of specifications and standards - Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.3 Finish -

3.3.1 Aluminum alloy surface treatment - The internal surfaces of the tank shall be treated in accordance with Type I of MIL-F-7179.

3.3.1.1 External finish - All external surfaces shall repainted. Paint shall consist of MIL-P-23377 epoxy primer (0.0006 to 0.0009 inches dry film thickness) topcoated with MIL-C-81773 aliphatic polyurethane, Color #17875 (Top-coat dry film thickness of 0.0010 to 0.0015 inches) after MIL-C-5541 surface treatment, to obtain adequate paint adhesion.

3.4 Welding - Fusion welding shall be in accordance with MIL-W-8604. Resistance, spot and seam welding shall be in accordance with MIL-W-6858.

3.4.1 Welders' certification - Welding shall be performed by personnel certified in accordance with MIL-T-5021.

3.4.2 X-Ray inspection - X-Ray inspection shall be performed in accordance with MIL-STD-453.

3.4.3 Dye penetrant inspection - A dye penetrant inspection shall be performed in accordance with MIL-I-6866.

3.5 Identification of product - Each part or assembly shall be identified in accordance with MIL-STD-130.

3.501 Exterior decalcomania - A decalcomania shall be furnished that conforms to MIL-D-8634. The decalcomania shall be located on the tank exterior near the filler unit and shall be legibly filled with the following information:

TANK, FUEL, AIRCRAFT, AUXILIARY EXTERNAL

Type Designation - Aero 1D

Federal Stock Number

Tank Material

Capacity (in U.S. Gallons)

Weight Empty (Excluding Tail Cone Assembly)

Manufacturer's Part No.

Manufacturer's Serial No.

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Contractor Order No.
 Manufacturer's Name or Trademark
 Tech. Dir. Compliance (Contractor to leave
 blank space for future service use)
 U.S. Property

3.5.2 Internal nameplate - A metal nameplate shall be securely affixed to an internal structural component. The information to be included on the nameplate shall be identical to that specified in paragraph 3.5.1 above. The nameplate shall be visible and accessible through one of the access doors.

3.6 Tail assemblies - The tank shall have provision for either a bob-tail assembly or a long tail cone (see 6. 4).

3.6.1 Bob-tail assembly - The bob-tail assembly shall be smoothly contoured and without fins.

3.6.2 Long tail cone assembly - The long tail cone assembly shall have provisions for either 0, 2 or 4 fins. Provisions shall also permit mounting the fins either vertically and horizontally, or at 45 degrees from the vertical. (See 6.4.)

3.7 Weight - The empty weight of the tank with two fins installed on the long tail shall not exceed 200 pounds.

3.8 Float switch actuation - The tank float switch shall be actuated at the following levels:

| TANK ATTITUDE | CAPACITY GALLONS |
|--------------------|------------------|
| a. 6° 'nose up | 285.0 to 291.0 |
| b. 1°15' nose up | 288.0 to 294.0 |
| c. 1°20' nose down | 277.0 to 283.0 |

3.9 Aerodynamic smoothness - Variation from the nominal contour smoothness of the tank as shown on the applicable drawings shall not exceed the dimensions shown herein when measured with a spline over the distance of six (6) inches in any direction including weld bead height. The nominal dimension variation for the first third of the tank shall be $\pm .032$ inches and $\pm .050$ inches for the remaining two-thirds of the tank. All external screws, rivets, etc., shall be flush.

3.10 Cleaning - Each tank component shall be thoroughly cleaned, internally and externally, of dirt, sand, metal chips or other foreign matter while being assembled. The tank shall be thoroughly cleaned of the above after assembly.

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3.11 Pressure fueling - The tank shall be capable of receiving fuel at a rate not less than 50 GPM with a system pressure not to exceed 20 psig.

3.12 Tank description - Unless otherwise specified herein, or in the contractor order, the tank shall be manufactured, assembled, inspected and tested in accordance with the drawings listed on NAVAIR Drawing 244AS100.

3.13 Substitution of components - Listing of a component on the drawings referenced in paragraph 2.2 is not intended to restrict the use of other equivalent components. However, substitution of any component not listed on the drawings referenced in paragraph 2.2 must be approved by the contracting officer. Requests for approval of substitutions shall include a report of a successful qualification test to establish that the intended replacement is equivalent to the component for which replacement is desired and that it conforms to the requirements of MIL-F-8615.

3.14 Interchangeability - All parts having the same manufacturer's part number shall be directly interchangeable with each other with respect to installation and performance. Changes in manufacturer's part numbers shall be governed by the number requirements of MIL-D-1000.

3.15 Workmanship - Workmanship shall be of the quality necessary to produce tanks free from all defects which may affect proper functioning in service.

4. QUALITY ASSURANCE PROVISIONS

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

4.2 Classification of inspection - The inspection of fuel tanks shall be classified as follows:

- (a) First article inspection (see 4.3)
- (b) Quality conformance inspection (see 4.4)

4.3 First article inspection - First article inspection shall consist of all inspections of this specification conducted in the order listed under 4.3.1.

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4.3.1 Sampling for first article - From the first ten tanks, which are made underproduction methods and conditions and are fabricated on production tooling, a sample of two tanks shall be randomly selected by the Government inspector, one designated Tank A and the other designated Tank B, and subjected to the inspections listed under Tank A and B in the order indicated. The 10 tanks for this sampling shall be presented for selection no later than 180 days after date of contract.

Tank A

Examination of product (4.6.1)
 Welding inspection (4.6.9 through 4.6.9.3.5)
 Weight (4.6.10)
 Contour (4.6.12)
 Float Switch Actuation (4.6.11)
 Functional test of components (4.6.2)
 Pressure Fueling (4.6.13)
 Pressure (4.6.3.2)
 Vibration and slosh (4.6.4)
 Pressure (4.6.3.2)
 Temperature (4.6.5)
 115% load (4.6.6)
 *150% load (4.6.7)
 Force ejection (4.6.8)

*Do not load to failure

Tank B

Examination of product (4.6.1)
 Welding inspection (4.6.9 through 4.6.9.3.5)
 Weight (4.6.10)
 Contour (4.6.12)
 Float Switch Actuation (4.6.11)
 Functional test of components (4.6.2)
 Pressure Fueling (4.6.13)
 Pressure (4.6.3.2)
 Vibration and slosh (4. 6.4)
 Pressure (4.6.3.2)
 Functional test of components (4.6.2)
 Examination of product (4.6.1)
 *150% load (4.6.7)

*Load to failure in the most critical condition

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4.4 Quality conformance inspection - The acceptance inspection shall consist of the Individual and Sampling inspections and shall be conducted under the supervision of the Government Inspector.

4.4.1 Individual inspections - Each tank submitted for acceptance under the contract shall be subjected to the following tests:

- Examination of product (4.6.1)
- Functional test of components (4.6.2)
- Pressure test of individual tanks (4.6.3.1)
- Dye Penetrant Inspection (4.6.9.2)

4.4.2 Sampling inspection - The contractor shall furnish samples from each lot for the following tests. These tests are described under the "Test Methods" and are to be conducted in the order indicated:

- Examination of product (4.6.1)
- Functional test of components (4.6.2)
- Dye Penetrant Inspection (4.6.9.2)
- Pressure (4.6.3.2)
- Vibration and slosh (4.6.4)
- Pressure (4.6.3.2)
- Functional test of components (4.6.2)
- Examination of product (4.6.1)

The tanks will be selected by the Government Inspector without preliminary inspection or repair and tanks shall be subjected to the above inspections. For the purposes of this paragraph, the lot size shall be set by the contract, consistent with his production and test capabilities, which will meet the contract delivery schedule and be in accordance with MIL-STD-105 inspection level S-1, acceptance No. zero. sample tanks shall be in addition to the contract quantity. The contractor is required to build all tanks in each lot prior to the selection of the sample tanks to be tested and the tanks shall not be shipped until satisfactory completion of the tests. Failure of a tank under the sampling tests shall be cause for rejection of all tanks in that lot. The contractor shall take necessary corrective action to eliminate any deficiencies in the rejected tanks. A tank incorporating the corrective action shall be re-submitted for retest. Upon satisfactory retest, the rejected tanks may be submitted for acceptance under the contract upon concurrence of the Government Inspector, based on evidence submitted, that any necessary corrective action has been incorporated into the tanks.

4.5 Satisfactory performance - The failure of a tank to meet the specified requirements of any of the following inspections shall constitute failure of the tank. Rejected tanks shall not be resubmitted for inspection without furnishing to the Government Inspector full particulars concerning previous rejection and the measures taken to overcome the defects. Upon resubmission of the tank for inspection after a failure, the inspection shall start beginning of the test during which failure had occurred.

4.6 Inspection methods -

4.6.1 Examination of Product - The tank shall be examined for conformance with the requirements of this specification with respect to materials, workmanship, design, interchangeability, exterior surface, construction, external finish, markings, contour, and applicable drawings.

4.6.1.1 Finish - The finish of all tanks shall be examined for uniformity of the protective cover, proper degree of hardness, and for proper match with the specified color. On sample tanks (only), the adhesion shall be tested.

4.6.1.2 Uniformity of cover - The entire outer surface shall be visually examined for uniformity of the external finish. There shall be no bare spots, blow holes, thin flows, bubbles, or thick flows.

4.6.1.3 Finish hardness - The hardness of the outer finish on all tanks shall be tested in accordance with Fed. std. 141, Method 6212. The finish shall not be marred by the test.

4.6.1.4 Finish color - The color of the outer finish on all tanks shall be compared with the specified color. The Government representative shall judge whether the match is satisfactory.

4.6.1.5 Finish adhesion - The first article sampled and each lot sample shall be tested for proper adhesion of the outer finish. The test shall be in accordance with Fed. Std. 141, Method 6301. Any evidence of peeling shall be cause for rejection of the lot.

4.6.1.6 Finish (internal) - A test of the corrosion resistant properties of the internal finish (3. 3.1) and the cleanness (3.10) of all tanks shall be judged by a visual examination and wiping all accessible suspect areas with a clean white (lint-free) cloth. This examination shall be made after the functional tests. The First Article, Sample A, shall be examined as described above after the temperature Test of 4.6.5.

4.6.2 Functional test of components -

4.6.2.1 The following describes the tests required on external fuel tanks after complete assembly including installation of all valves, switches, lines and fuel quantity gage, and after leakage test. Table I defines the lettered parts on Figure 1.

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TABLE I

| LETTER | PART NAME |
|--------|----------------------------------|
| A | Pressure fueling shutoff valve |
| B | Pilot Line |
| C | Solenoid Valve - normally closed |
| D | Forward fuel connection |
| E | Air inlet connection |
| F | Aft fuel connection |
| G | Fuel quantity gage wires |
| H | Float switch wires |
| I | Float Switch |
| J | Conduit |
| K | Topside filler cap |
| L | Air line |
| M | Vent valve |
| N | Vent line |
| O | Vent exit |
| P | Fuel Quantity gage |
| Q | Drain valve |
| R | Manual shutoff valve |
| S | Air regulator - 3 way |
| T | Pressure Gage |
| U | Manual shutoff valve |

4.6.2.2 Test fluids - Any of the following test fluids may be used:

- (a) Stoddard Solvent, per P-D-680
- (b) TT-S-735, Type II fluid
- (c) JP-4 Fuel (MIL-T-5624)
- (d) JP-5 Fuel (MIL-T-5624)

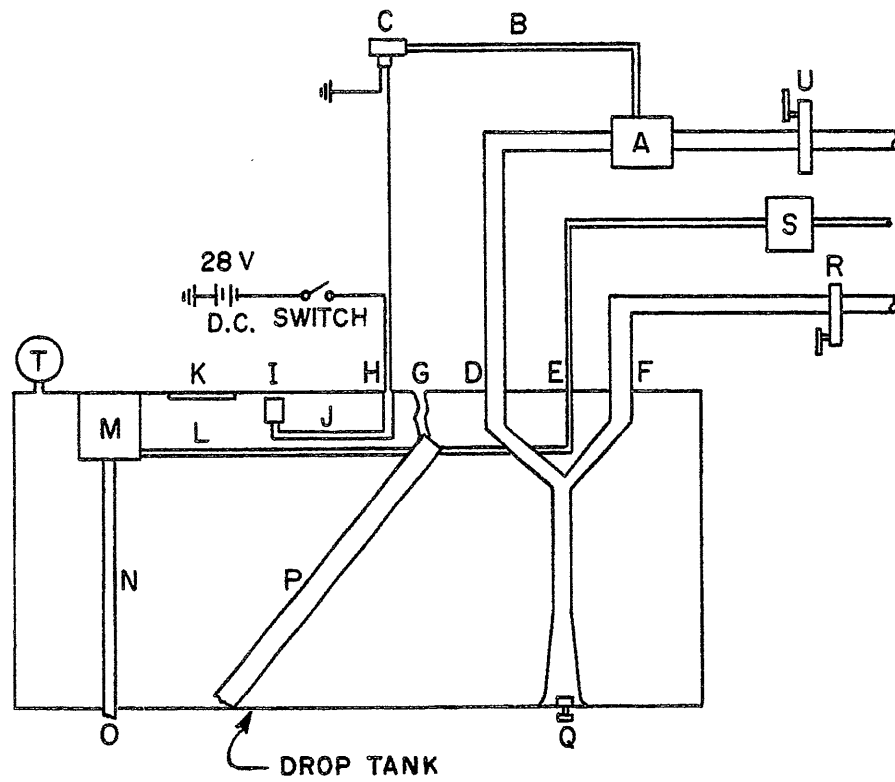
4.6.2.3 The following procedure is applicable to the 300 gallon fuel tank with the tank installed in a fixture to hold $5\ 1/2^\circ \pm 2^\circ$ nose-up.

4.6.2.3.1 Provide a flow to valve "A" of 50 to 60 gpm and a pressure of 10 to 30 psi.

4.6.2.3.2 Check the following points:

- (a) "R" closed
- (b) "S" closed
- (c) "K" closed
- (d) "O" open
- (e) "Q" closed
- (f) "U" open

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FUNCTIONAL TEST SETUP

FIGURE I

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4.6.2.3.3 Close switch, "C" will open allowing fuel to flow through "A" and "D" to tank.

4.6.2.3.4 Observe "T", Pressure will not exceed 1 psi.

4.6.2.3.5 When tank is full, "I" will open, closing "C" which in turn will close "A", shutting off fuel flow.

4.6.2.3.6 Check "O", 10 drops per minute allowable fluid leakage.

4.6.2.3.7 Open "Q", allow approximately 1 pint to drain, close, wipe dry and check for leakage, none being allowable.

4.6.2.3.8 Close "U".

4.6.2.3.9 Set "S" at 3,7,10,15 and 20 psi successively holding each pressure for at least one (1) minute. Check "K", "H", "G", "D", "E", "F" and "Q" for fluid leakage at each pressure - none allowed. "O" may leak in excess of 10 drops per minute at these pressures; however, leakage at any pressure shall not exceed 10 cc per minute.

4.6.2.3.10 During the previously listed checks, there will be a continuous bleed of air out of "O" which comes from the 0.033 inch diameter thermal relief orifice incorporated in "W".

4.6.2.3.11 Set "S" at 10 psi, open "U", and fuel will flow out "D" line.

4.6.2.3.12 After approximately 3 minutes, shut "U" and open "R", and then fuel will flow out of "F" line.

4.6.2.3.13 After one (1) minute, shut "R" and "S" and allow tank pressure to go to zero.

4.6.2.3.14 Remove and reinstall "K".

4.6.2.3.15 Open "S" and set at 10 psi. Allow tank pressure to build up to 10 psi. Check "K" for leakage - none allowed, Open "U" and allow fuel to flow out of tank until tank is empty.

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4.6.2.3.16 Tank shall be fueled to demonstrate compliance with paragraph 3.11.

4.6.2.4 The following procedure shall be used for checking the fuel quantity gages. This test may be run as part of the test described in paragraph 4.6.2.3.

4.6.2.4.1 Equipment required -

4.6.2.4.1.1 MD-2 Capacitance Bridge and Resistance Tester or TF-20-1 Liquid Quantity capacitance test set or equivalent.

4.6.2.4.1.1.1 The procedures herein apply to the MD-2 Tester. In the event a tester other than the MD-2 tester is used, the contractor shall submit the proposed test procedures to NADC, Johnsonville (Code MAEM) for acceptance 60 days prior to initiation of tests.

4.6.2.4.1.2 Wire harness as shown in Figure 2.

4.6.2.4.1.3 Electrical disconnect plug.

4.6.2.4.2 Empty tank - With the fuel probe installed in the empty tank, connect MD-2 tester per instructions accompanying the tester and Figure I. Connect the MD-2 tester leak marker "A" (coaxial) to the 564PH-1 connector of the B298-1 plug. Connect the MD-2 tester lead marked "B" (unshielded) to the 564IP6-1 connector of the B298-1 plug. Connect B298-1 plug to B299-1 socket on drop tank.

4.6.2.4.2.3 Capacitance check - MD-2 should read 95.13 ± 1.0 mmf.

4.6.2.4.2.2 Insulation resistance check - MD-2 should read 500 megohms or greater for "A" to "B", "A" to "GND" and "B" to "GND" under relative humidity condition of not more than 50%.

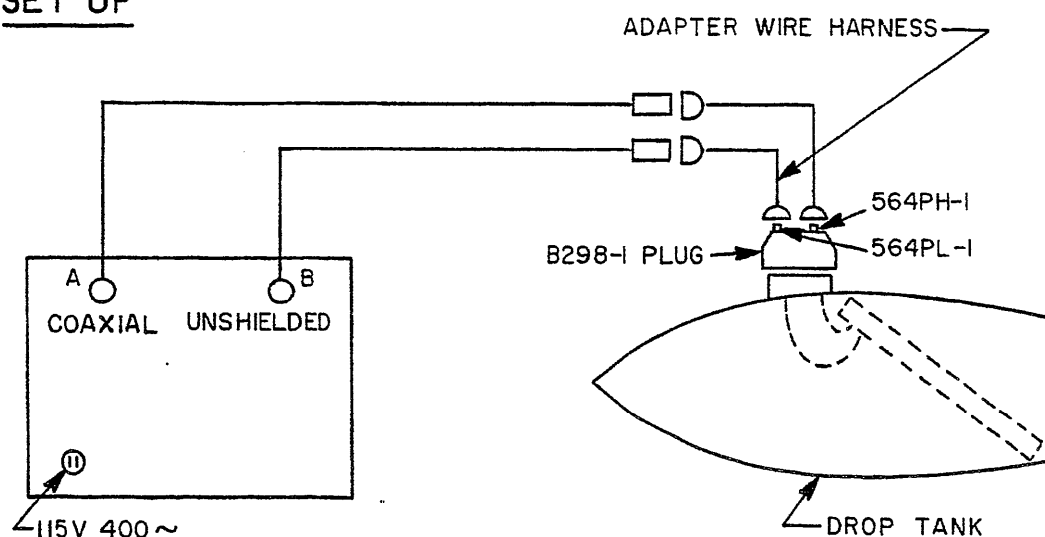
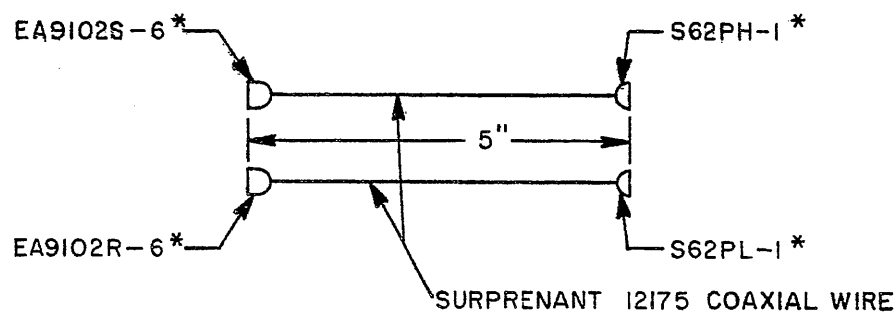
(Note: MD-2 tester tolerance $\pm 1/8$ inch (length of scale))

4.6.2.4.3 Full tank -

4.6.2.4.3.1 With the tank full of fuel and the MD-2 tester connected as in paragraph 4.6.2.7.2.2 read the full capacitance (C_F) of the probe. Compare the value of C_F as obtained with the MD-2 tester to the C_F value as calculated by the following formula:

$$C_F = K \times C_E \times C_A$$

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SET UPADAPTER HARNESSEQUIPMENT REQUIRED

MD-2 TESTER, TF-20-1 TESTER, OR EQUIVALENT
 ADAPTOR HARNESS
 B298-1 DISCONNECT PLUG

* LIQUIDOMETER PART NUMBER

SET UP AND ADAPTOR HARNESS

FIGURE 2

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When K = dielectric constant of the fuel being used.

$$C_E = 35.5 \text{ mmf}$$

$$C_A = 59.6 \text{ mmf}$$

C_F obtained with MD-2 tester should be within $\pm 1.5\%$ of the calculated C_F .
Calculated C_F using nominal dielectric constant ($K = 2.070$) of JP-4 is:

$$C_F = 2.070 \times 35.5 \times 59.6 = 133.1 \text{ mmf}$$

4. 6.2.4.3.2 Insulation resistance check - Resistance should be 200 megohms or greater for "A" to "B", "A" to "GND", and "B" to "GND".

4.6.3 Pressure test - The pressure relief valve and other openings, except one for applying pressure shall be sealed and the tank shall be subjected to the pressure tests of 4.6.3.1 or 4.6.3.2 as applicable. During these tests, leakage of the tank shall be detected by filling the tank with air and submersion of the tank in water or by coating with a soap solution or by filling the tank with a fluorescent dye and examining the exterior surface with an ultraviolet lamp.

4.6.3.1 Pressure test of individual tanks - Each production tank shall be pressure tested to an internal negative pressure of 7 psig for 3 minutes, an internal positive pressure of 75 psig for 3 minutes and an internal positive pressure of 15 psig for 35 minutes. These tests shall be made without leakage or failure except a leakage check is not required on the negative pressure test.

4.6.3.2 Pressure test for first article and sampling test - The tank shall be subjected to 86 psig for 3 minutes and 15 psig for 15 minutes without leakage or failure. These tests shall be conducted prior to slosh and vibration testing (Para. 4.6.4). Following the slosh and vibration test, the tank shall be subjected to an internal positive pressure of 112 psig for 3 minutes, a negative pressure of 10 psig for 3 minutes and a positive pressure of 15 psig for 15 minutes without leakage or failure.

4.6.4 Vibration and slosh - The tank shall be subjected to the vibration and slosh tests as specified in MIL-V-7173 except that the 25 hours shall consist of 12-1/2 hours in the pitch condition and 12-1/2 hours in the roll condition. The centerline of the tank shall be at least 20 inches above the slosh axis. The tank shall be suspended from the 30 inch lugs on an AERO-7A bomb rack. The tank shall be pressurized to 25 psig during the test. The minimum displacement

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measured adjacent to each lug shall be 0.020 inches double amplitude and a minimum average of 0.031 inch double amplitude between the points adjacent to the lugs and the bottom of the tank at the forward and aft bulkhead. There shall be no evidence of leakage, failure, or excessive wear. The tank shall then be pressure checked to the applicable values of paragraph 4.6.3.2.

4.6.4.1 Method of vibration displacement measurement - An electronic vibration measuring device whose pickups are permanently mounted on the tank shall be used to measure the vibration displacement. The average peak value, at the point being measured, during a 30 second interval shall be taken as the recorded value.

4.6.5 Temperature test - The tank shall be dried for one day at a temperature of $160^{\circ} \pm 5^{\circ}$ F. The tank then shall be filled with fluid conforming to TT-S-735, Type II containing a satisfactory staining agent and shall be cooled to $-65^{\circ} \pm 5^{\circ}$ F for a period of 3 days. The tank then shall be drained and examined for any unsatisfactory condition or indication of fluid leakage. If found satisfactory, the tank shall then be filled with the fluid and subjected to a temperature of $360^{\circ} \pm 5^{\circ}$ F for a period of 3 days. The tank shall then be drained and examined for any unsatisfactory condition or indication of fluid leakage. During the temperature drop, warm up and leak check phase of this test, the tank shall be pressurized at 25 psig. Any leakage shall be considered as a tank failure. All joints, seams, and fittings shall be covered with brown paper to aid in determining leakage.

4.6.5.1 Alternate leakage test - In lieu of the method employing a staining agent and brown paper, the leakage test may be conducted by using test fluid in accordance with TT-S-735, Type II containing a fluorescent dye and examining the exterior surface of the tank with an ultraviolet lamp.

4.6.6 115% load test - Static loads equal to 115% of the design limit loads shall be applied to the tank without permanent deformation or failure. Each of figures 3 through 6 show the applied loads at 115% design limit load. Figures 3 through 6 are attached hereto.

4.6.7 150% load test - Following the completion of the tests specified in paragraph 4.6.6, the tank shall be subjected to 150% of the design limit loads for the conditions specified in figures 3 through 6. The 150% design limit load values for the figure 6 condition are shown. The 150% values must be determined for the conditions shown in figures 3 through 5. The 150% design limit load static test shall be accomplished without a tank failure.

4.6.8 Force ejection - The tank shall withstand one release from the AERO-7A bomb rack without being ruptured. The tank shall be full during this

test with an equivalent amount of water to simulate a tank filled with JP-5 fuel, The ejection mechanism will be provided by the Naval Air Systems Command, (JP-5 fuel is 6.8#/GAL)

4.6.9 Welding inspection - The following inspection and acceptance criteria are applicable.

4.6.9.1 X-Ray inspection - X-Ray inspection shall be performed on a 5 percent sample basis. The sample shall be based upon the number of tanks to be furnished on each lot and shall be representative of the entire production lot. Failure of the sample to comply with the weld acceptance criteria of this contract shall result in rejection of all welds until the contractor has demonstrated to the local government authority that the failure condition has been corrected. In the event the contractor cannot propose a procedure satisfactory to the local government authority to correct the failure condition, the local government authority shall invoke 100% X-Ray inspection. Negatives of the welds shall be forwarded with the first article test report.

4.6.9.2 Dye penetrant inspection - A dye penetrant inspection shall be performed on all welds of each tank.

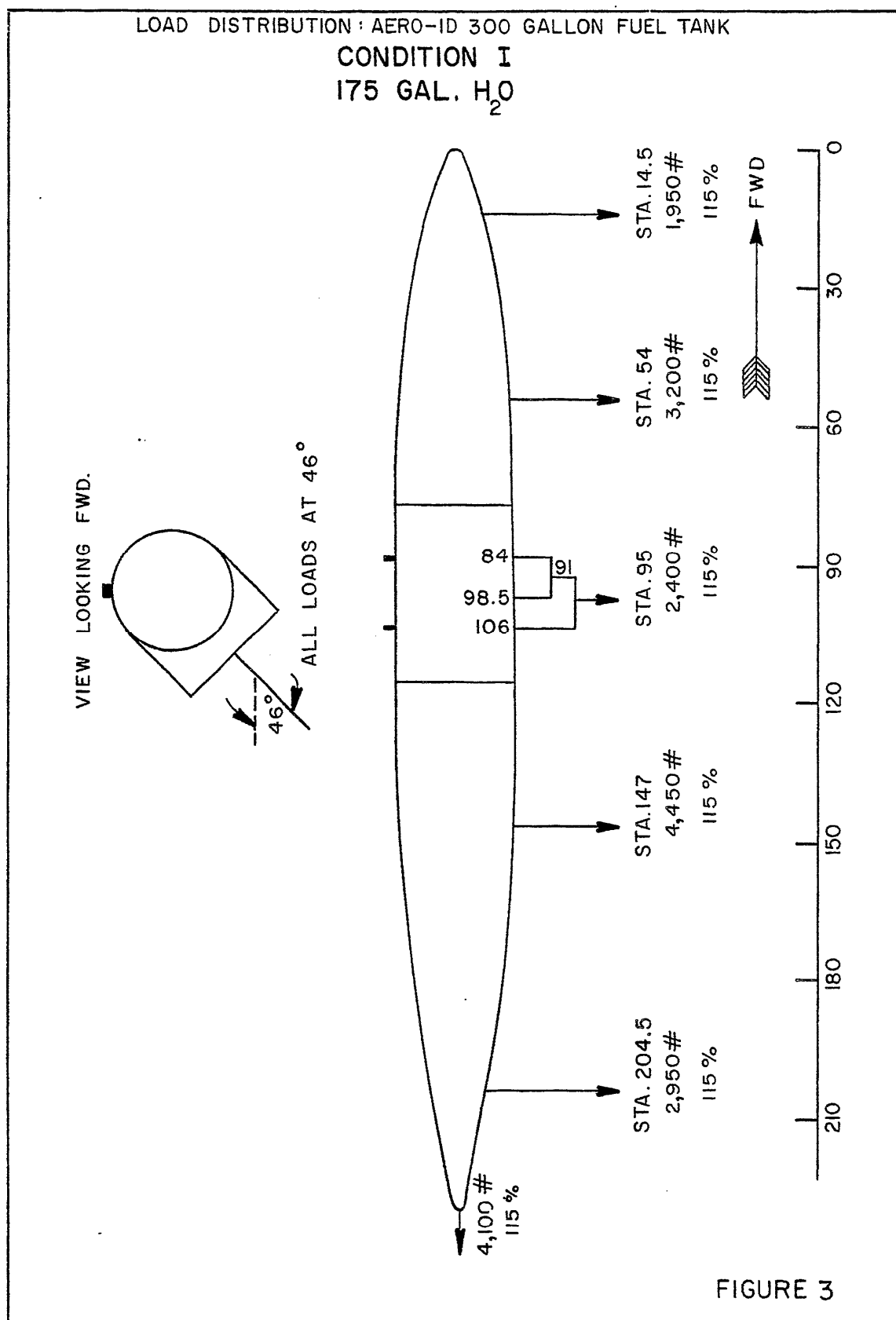
4.6.9.3 Defects - Cracks, lack of fusion, and incomplete weld penetration in any form are unacceptable. Unless otherwise specified, the dimension "T" is defined as the nominal parent metal thickness of the thinnest joint member.

4.6.9.3.1 Porosity and inclusions - For the purposes of this specification, the diameter of any porosity cavity shall be defined as its largest dimension. Interconnected porosity shall be considered a single cavity. Inclusions, either tungsten or nonmetallic, shall be subject to the same dimensional limitations as porosity. When both inclusions and porosity are present, the sum of their areas shall fall within the limitations defined for porosity (either total or aligned, as applicable).

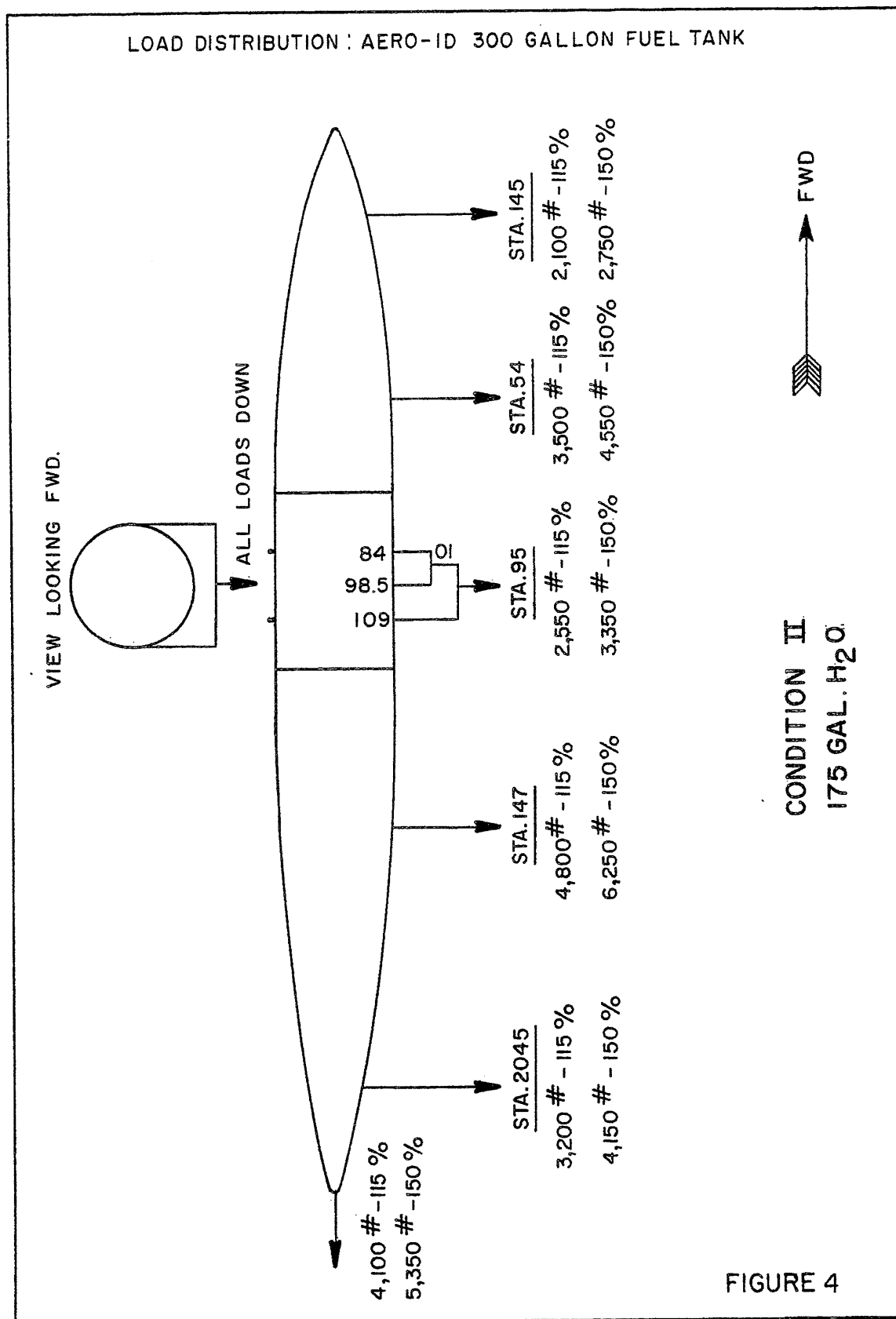
4.6.9.3.2 External defects - The following external defects are rejectable:

(a) Cracks shall not be acceptable in the weld metal or adjacent base metal. Cracks occurring in the weld bead reinforcement area (root and face) may be removed.

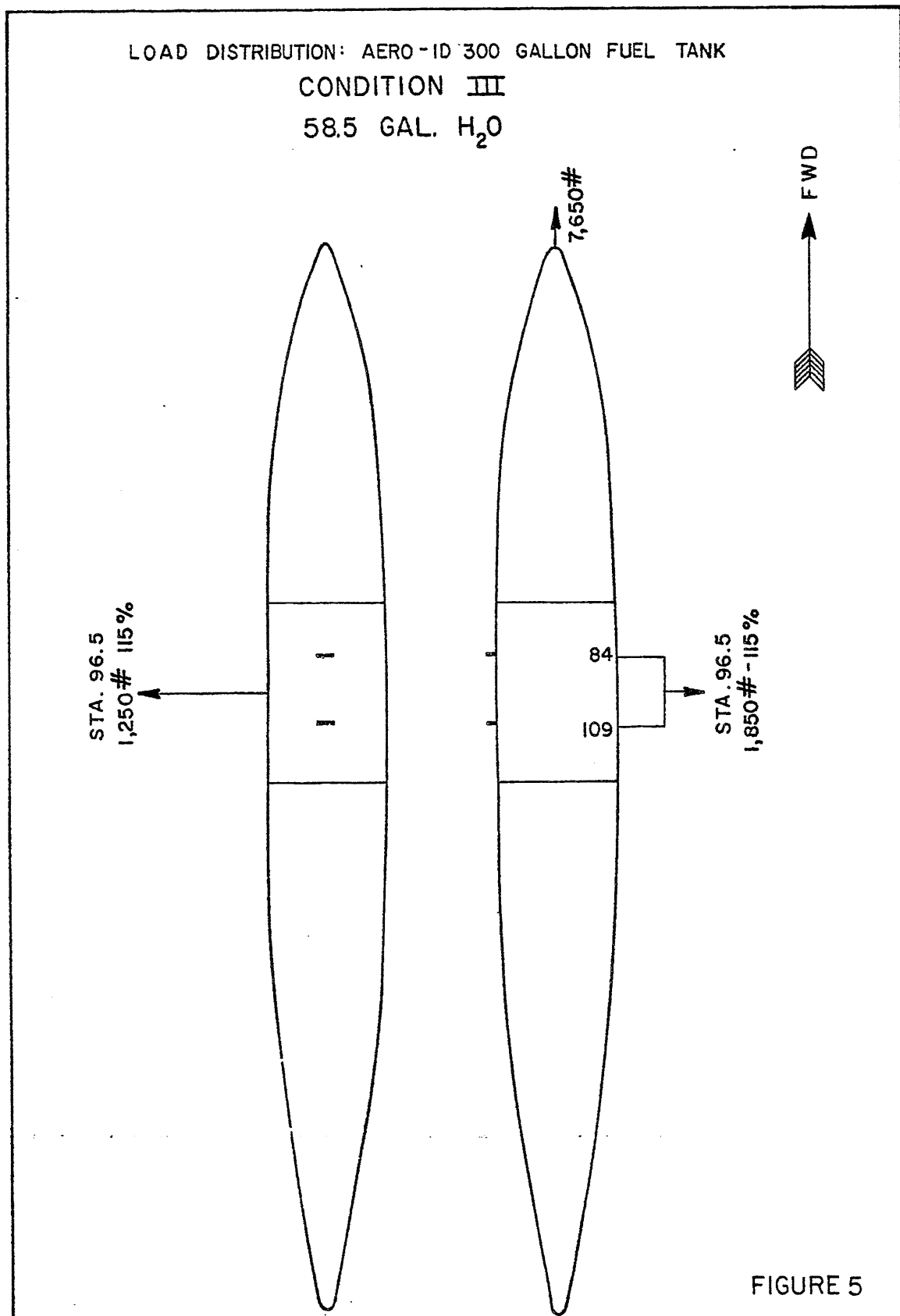
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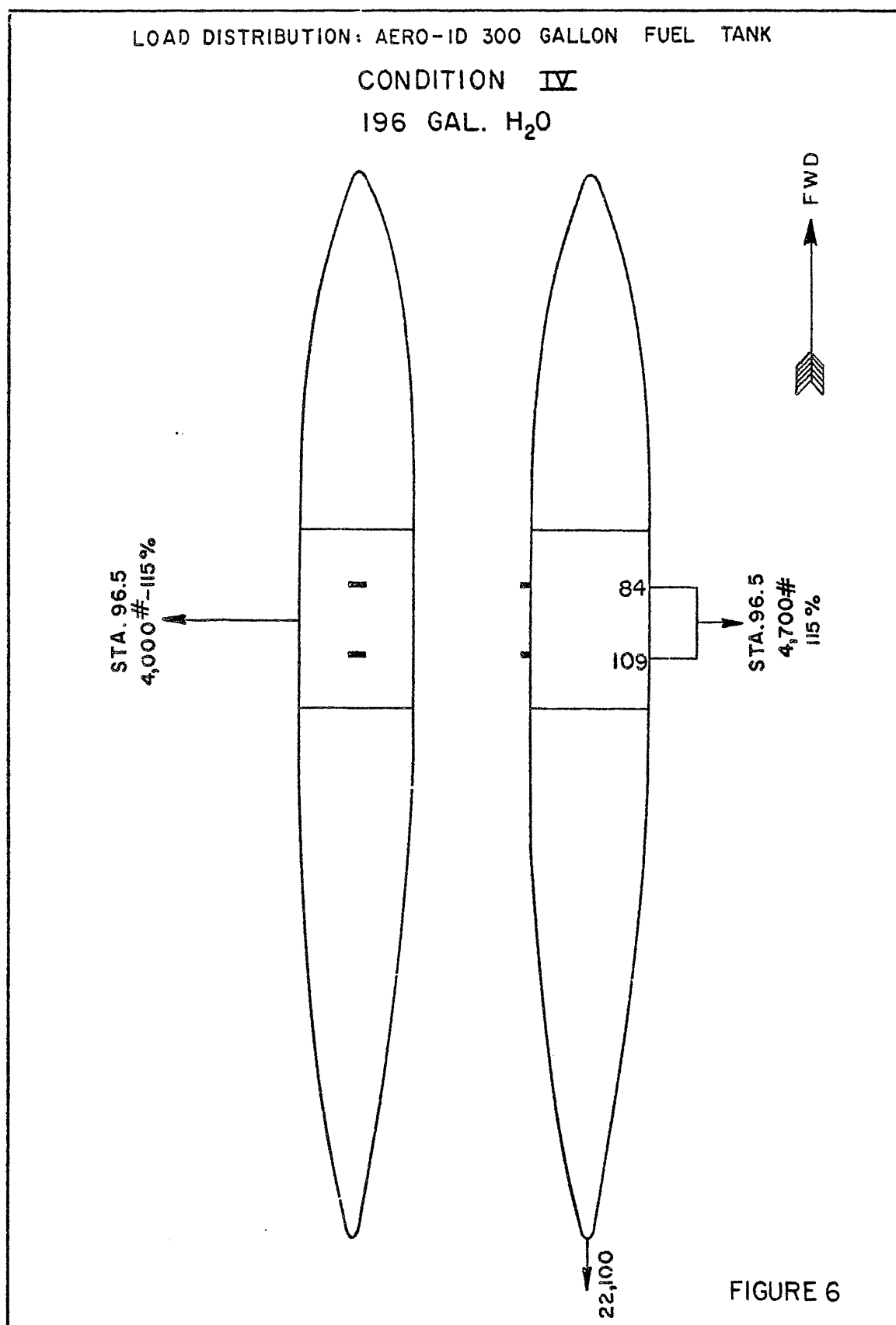
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(b) Unless otherwise noted, oxide folds and suckbacks are acceptable if the thickness in the area is not less than the minimum sheet or plate thickness allowed in the material specification and/or the drawing tolerance for machined or formed sheets or parts, whichever is applicable.

(c) Discontinuities exposed to the surface are acceptable providing the linear dimension and total area values do not exceed the corresponding radiographic limits specified for all internal discontinuities.

4.6.9.3.3 Internal defects - (Radiographic Requirements) The following internal defects are rejectable:

(a) Cracks are not acceptable in the weld or adjacent base metal.

(b) Porosity, voids and oxide inclusion defects shall be limited as follows:

(1) Maximum Pore Size: Unconnected voids shall not exceed a linear dimension greater than 50% of the weld bead thickness or shall not exceed a diameter of .050 (1/20) inches, whichever is smaller.

(2) The summation of all unconnected void areas in any linear inch of weld shall not exceed 7% of an area equal to (1 in x T) sq. in. Aligned porosity shall not exceed 3.5% of an area equal to (1 in. X T) sq. in.

(3) Porosity pores smaller than 0.00008 sq. in. in area are considered non-detrimental and need not be evaluated.

(4) Weld metal radiograph images which appear to have pores that overlap, but each pore can be differentiated from the other by Radiographic Triangulation, shall be evaluated as separate pores.

4.6.9.3.4 Stringer discontinuity- A stringer discontinuity is defined, for the purpose of X-Ray interpretation, as an oxide stringer, or a series of stringers in a linear distribution when the ratio of the major dimension to the minor dimension of an individual discontinuity is 5:1 or greater. The stringer discontinuity shall be considered a single stringer where the adjacent discontinuities are not separated by a length equal to or greater than 15% of "T".

A stringer discontinuity is permissible if: The summation of all connected or aligned stringers do not exceed a total area of 0.060 (60/1000) sq. in. in any 6.0 inch length of weld and occurs in the weld bead reinforcement area (root and face).

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4.6.9.3.5 Undercutting - Undercutting shall be cause for rejection if it is in excess of 1/10 T in depth. Undercutting of any depth less than 1/10 T shall not exceed one inch on weld length. "T" is the thickness of the parent metal adjacent to the undercut.

4.6.10 Weight - The tank shall be checked for conformance with the requirements of paragraph 3.7 herein.

4.6.11 Float switch actuation - The tank shall be checked with the requirements of paragraph 3.8 herein.

4.6.12 Contour - The tank shall be checked for conformance with the requirements of paragraph 3.9 herein.

4.6.13 Pressure fueling - The tank shall be checked for conformance with the requirements of paragraph 3.11 herein.

5. PREPARATION FOR DELIVERY

5.1 Preservation - The tanks shall be protected internally during shipment and storage by the application of Type III mixture conforming to MIL-C-6529. Particular care shall be exercised to insure complete coverage of all internal surfaces and to insure adequate drainage of the excess compound.

5.1.1 Fittings - All fittings shall be preserved in accordance with Method 1(a) MIL-P-116 and securely packaged in an interior paperboard corrugated fiberboard container conforming to PPP-B-636, Type I, Class 2. The packaged fittings shall be secured to the interior face of the tank shipping container.

5.1.2 Closures - The tank interior shall be protected against the entrance of dirt or other foreign material by sealing the exterior openings in accordance with MIL-C-5501. During shipment and storage, the tank shall be vented through the fuel line to compensate for thermal changes.

5.2 Packing - Each assembled tank and the accessories to accompany the tank, as defined in the contract or order, shall be packed in an open crate conforming to MIL-C-9437. The boxes containing the accessories shall be so distributed as to insure that the center of balance of the crate is approximately at the midpoint of the long dimension. Crates containing tanks shall be capable of meeting the rough handling test of MIL-STD-794.

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5.2.1 Cushioning - Tanks and accessories shall be securely mounted in the crate. The tank shall be secured to the crate insofar as practicable by its aircraft suspension points. Saddles or other blocking shall be used only to prevent excessive motion of the tank in the crate. Blocking, bracing and cushioning shall be designed as to withstand the tests specified herein when the crate is loaded and fully assembled for surface shipment.

5.2.2 Package contents - Each shipping container shall contain all the necessary plumbing fittings and equipment required for the complete assembly and installation of each tank packaged within the container.

5.3 Marking - Shipping container shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use - The external auxiliary fuel tank covered by this specification is intended for use on military aircraft which require the carrying of external fuel.

6.2 First article test report - The manufacturer shall furnish four (4) copies of the first article test report to the local Government Inspector. The report shall include a detailed summary of all phases of the testing. The test method, test and recording equipment, and the test results shall be reported. All test failures shall be reported even if the failure condition is subsequently corrected and the corrected article is tested satisfactorily. One copy is for retention by the Government Inspector. The other three are to be transmitted to the following: Two copies to the Naval Air Systems Command Headquarters, Washington, D. C. 20360 (Code AIR-530313B), for information and one copy to the Naval Air Development Center, Johnsville, Aero Materials Department, Warminster, Pa. 18974 (Code MAEM) for approval.

6.3 Sampling test reports - The requirements of paragraph 6.2 shall apply except this report shall be approved by the local Government Inspector.

6.4 Ordering data - Contracts, purchase orders and requisitions should specify the following:

(a) Title, number and date of this specification.

(b) Type and number of tail assemblies to be delivered

(see 3. 6).

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity (as indicated on reverse hereof).

SPECIFICATION

MIL-T-81838(AS) TANK, FUEL, AIRCRAFT, AUXILIARY EXTERNAL 300 GALLON, TYPE AERO 1D

ORGANIZATION (Of submitter)

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT

\$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES☐ NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)

DATE

FOLD

DEPARTMENT OF THE NAVY

Naval Air Systems Command
Washington, D.C. 20360

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