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SUPERSEDING
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MILITARY SPECIFICATION

TANK, FUEL, AIRCRAFT, SELF-SEALING

This specifications has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 Scope. This specification covers self-sealing and partially self-sealing fuel tanks for use on aircraft. A tank shall consist of a cell or group of cells interconnected, and the components attached directly thereto, to form a complete tank or reservoir.

1.2 Classification. The tanks shall be of the following general types, classes, styles and protection levels to be furnished as specified by the procuring activity (see 6.2):

Type I – For use with engine fuel conforming to MIL-G-5572 (intended for use with reciprocating engines).
Type II-For use with engine fuel conforming to MIL-G-5572 or MIL-J-5624 (intended for use with jet engines).
Class A–Flexible cell construction.
Class B–Semirigid or self-supporting cell construction.
Style I–Nonpressurized fuel system.
Style 2-Pressurized fuel system.
Protection level (A) –Cell is completely self-sealing against .50 cal. and 20 mm.
Protection level (B) –Cell is completely self-sealing against .30 cal only.
Protection level (C)–Part of cell is bladder construction and part is self-sealing against .50 cal. and 20 mm.
Protection level (D) –Part of cell is bladder construction and part is self-sealing against .30 cal. only.

NOTE

For cells of protection levels (C) and (D), the portions of the cells to be self-sealing and non-self-sealing shall be as specified by the procuring activity.

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 this specification to the extent specified herein:

SPECIFICATIONS

FEDERAL

QQ-P-416-Plating, Cadmium (Electrodeposited)
UU-P-271-Paper, Wrapping, Waterproofed Kraft
PPP-B-585-Boxes, Wood, Wirebound
PPP-B-591-Boxes, Fiberboard Wood-Cleated
PPP-B-60l-130xq Wood Cleated-Plywood
PPP-B-621-Boxes, Wood Nailed and Lock-Corner
PPP-B-636-Box, Fiberboard
PPP-B-640-Boxes, Fiberboard, Corrugated, Triple Wall
PPP-T-60-Tape, Pressure Sensitive Adhesive, Waterproof-for Packaging and Sealing

MILITARY

JAN-P-100-Packaging and Packing for Ovenseas Shipment-General Specification
MIL-P-116-Preservation, Methods of
MIL-B-121-Barrier Material, Grease proofed, Waterproofed, Flexible
MIL-S-3136-Standard Test Fluids, Hydrocarbon
MIL-C-5541-Chemical Films for Aluminum and Aluminum Alloys

FSC 1560

MIL-G-5572-Gasoline, Aviation: Grades 80/87, 91/96, 100/130, 115/145
MIL-F-5577-Fittings, Tank, Powerplant Fluid, Removable
MIL-J-5624-Jet Fuel, Grades JP-4 and JP-5
MIL-T-6396-Tanks, Fuel, Oil, Water-Alcohol, Coolant Fluid, Aircraft, Non-Self-Sealing, Removable, Internal
MIL-C-6529-Corrosion-Preventive, Aircraft Engine
MIL-C-6800-Coating, Process for Application of Permanent Resin to Aircraft Engine Parts
MIL-S-7742-Screw Threads, Standard, Optimum Selected Series: General Specification for
MIL-P-8045-Plastic, Self-Sealing Tank Backing Material
MIL-A-8625-Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-T-9107—Test Reports, Preparation of
MIL-L-10547-Liners, Case, and Sheet, Overwrap, Water-Vaporproof or Waterproof, Flexible

STANDARDS

Federal

FED. TEST METH0D STANDARD NO. 601-Rubber: Sampling and Testing
FED. TEST METHOD STANDARD No. 791-Lubricants, Liquid Fuels, and Related Products; Methods of Testing

Military

MIL-STD-129-Marking for Shipment and Storage
MIL-STD-130-Identification Marking of U.S. Military Property
MIL-STD-143-Specifications and Standards, Order of Precedence for the Selection of
MIL-STD-276-Impregnation of Porous Nonferrous Metal Castings
MS29582-Flange, Attachment, Molded Tank, Recessed, Full Molded, Rectangular 12.00 x 18.00

Air Force-Navy Aeronautical

MS20470— Rivet-Solid-Universal Head, Aluminum and Aluminum Alloy

PUBLICATIONS

Air Force-Navy Aronautical Bulletins

No. 107—Inspection Standards for Stand and Dissection Tested Self-Sealing Fuel and Oil Cells
No. ll2-Acceptance Standards for Self-Sealing Fuel and Oil Cells

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

2.2 Other publications. The following document forms a put of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation forbids shall apply:

Consolidated Classification Committee

Uniform Freight Classification Rules

(Applicant for copies of the above publication should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 6, Ill.)

3. REQUIREMENTS

3.1 Preproduction. This specification makes provisions for preproduction testing (see 4.3).

3.2 Components. A tank shall consist of a cell or group of cells interconnected, and the components attached directly thereto, to form a complete tank or reservoir.

3.3 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.

3.4 Materials. The materials used in the manufacture of self-sealing fuel cells shall be suitable for the purpose and shall conform to applicable Government specifications. The use of magnesium is prohibited. Where applicable Government specifications do not exist, contractor's specifications may be used, provided that the contractor assumes full responsibility for the use thereof.

3.5 Design. The self-sealing fuel cells shall be suitable for use with fuels conforming to MIL-G-5572 or MIL-J-5624, or both, as specified by the procuring activity, and shall be designed in conjunction with the containing structure to avoid concentration of loads on splices, seams, fittings, or location of concentrated flexure. The assembly consisting of the cell (s) and aircraft structure in which it is mounted shall comprise the necessary strength to provide adequately for the stresses caused by the following:

(a) Flexing resulting from vibration
(b) Impact loads incident to takeoff, taxiing, and landing (including catapulting and arresting)
(c) Hydraulic surge of fuel incident to all dynamic conditions of flight
(d) Hydraulic surge of fuel incident to gunfire
(e) Pressure loads resulting from hydrostatic head of fuel during level flight or maneuvers, and resulting from neutral gases, if any, used to pressurize fuel cells.

3.5.1 *Dimensions.* The dimensions and dimensional tolerances shall be developed by the contractor or Government procuring activity. The dimensional tolerance specified shall be such that the capacity of the production tanks will be within 1.5 percent of the designed total capacity.

3.5.2 *Capacity.* The head-versus-volume curve on production tanks shall conform within 1.5 percent to the average head-versus-volume curve prepared in accordance with 4.4.2.1.

3.6 Construction. The following requirements apply to fuel cell construction intended for protection levels (A) and (B) and for the self-sealing portions of fuel cell construction intended for protection levels (C) and (D). The non-self-sealing portions of construction shall conform to MIL-T-6396, type II, class B.

3.6.1 *Inner-layer ply.* The construction shall be such that it will be impossible to transmit fuel to the sealant. If necessary to meet this requirement, a special barrier shall be utilized. The inner-layer ply shall be free of foreign matter, and the thickness shall agree with the approved construction within the approved manufacturing tolerances as described in the manufacturer's specifications.

3.6.2 *Fabric ply.* Fuel cells shall be so fabricated that the seam on any fabric ply shall not be superimposed with parallel seams of any adjacent fabric ply.

3.6.3 *Sealant.* The fuel cells shall use an approved sealant so vulcanized as to meet the retirement of this specification. The sealant shall be free of foreign matter, and the thickness shall agree with the approved construction within the established manufacturing tolerance as described in the manufacturer's specifications.

3.6.4 *Fittings.* All fittings used in self-sealing fuel cells shall conform to MIL-F-5577. Both the inside and outside flanges of the fitting shall be vulcanized to the cell carcass. Every effort shall be made to utilize fittings in a single plane. Where the aircraft design is such as to necessitate the use of double plane fittings, particular care should be taken to provide adequate exterior flange area to insure satisfactory adhesive strength under all conditions of operation. The use of through bolts shall be avoided.

3.6.4.1 *Screw threads.* Screw threads shall be in accordance with MIL-S-7742. The use of pipe threads is prohibited.

3.7 *Performance.* The cells and tanks, or specified parts thereof, shall satisfy the performance requirements specified herein when subjected to the following tests, as specified in section 4:

(a) Inspection ---------- (4.6.1)
(b) Stand ---------- (4.6.2)
(c) Dissection ---------- (4.6.8)
(d) Inner-layer ply---------- (4.6.4)
(e) Cells ---------- (4.6.5)
(f) Installation ---------- (4.6.6)
(g) Capacity ---------- (4.6.7)
(h) Pressure ---------- (4.6.8)
(i) Slosh or slosh and vibration resistance ---------- (4.6.9)
(j) Aging and low temperature 1eakage (4.6.10)
(k) Accelerated load resistance ---- (4.6.11)
(l) Gunfire resistance on tank installation ---------- (4.6.12)

3.7.1 *Operating temperature.* The self-sealing fuel cell shall be- suitable for operation throughout the temperature range of -40° to 160° F insofar as self-sealing performance is concerned. For all other operating conditions,

the cell shall be satisfactory throughout the temperature range of -65° to 160°F.

3.8 Weight. The weight of production cells shall be within 5 percent of the average weight of the first 10 production cells. If, during the production of cells, the weight consistently exceeds the tolerance on one side of the production weight, the procuring activity shall be so informed, and all pertinent data shall be supplied including a recommendation for anew production weight, the reason for exceeding the weight tolerances, and a log of the cell weights for review and establishment of a new production weight.

3.9 Finish.

3.9.1 *External surfaces.* The external surfaces of cells shall be protected against the action of ozone and fluid conforming to MIL-S-3136, type III, by a suitable lacquer or equivalent coating.

3.9.2 *Steel parts.* Exposed non-corrosion-resisting steel parts shall be protected against corrosion by cadmium plating, in accordance with QQ-P-416, type II.

3.9.3 *Aluminum-alloy parts.* Aluminum alloy parts, except those which are fully molded inserts, shall be analyzed in accordance with MIL-A-8625 or treated in. accordance with MIL-C-5541, and then coated with a permanent resin in accordance with MIL-C-6800. If necessary to prevent porosity, parts shall be treated in accordance with MIL-STD-276. If required, to provide a path across the part for electrical current, the film may be removed locally.

3.10 Markings

3.10.1 *Access door covers.* The exterior surface of all access door covers shall be durably and legibly marked "Outside".

3.10.2 *Assembly torque.* The torque values required to assemble the fittings and accessories to the cell shall be durably and legibly marked on or adjacent to each fitting or accessory involved. In cases where the torque required to assemble all fittings and accessories is the same, the proper torque value need be stenciled in only one place provided it is visible when any access door is removed.

3.11 Identification of product. Equipment assemblies, and parts shall be marked for identification in accordance with MIL-STD-130. The following special marking shall be added:

(a) Aircraft contractor
(b) Aircraft model(s) and cell location
(c) Specification MIL-T-5578C
(d) Month and year of manufacture

The nameplate shall be located on the cell in such a position that when the tank is installed in the aircraft, the nameplate shall be readily accessible and visible after removal of aircraft access panels, deck doors, etc.

3.12 Age. Cells shall be not more than 2 yearn old from date of initial cure to data of installation in the aircraft or delivery to the procuring activity.

3.13 Workmanship. Workmanship shall be in accordance with manufacturing practices covering this type of equipment.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserve 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 tests. The inspection and testing of fuel tanks shall be classified as follows:

(a) Preproduction tests--------— ------- (4.3)
(b) Quality conformance tests------—- (4.4)

4.3 Preproduction tests. The preproduction tests shall consist of phase I and phase II preproduction testing. (See 4.3.1.2 and 4.3.2,2.)

4.3.1 *Phase I preproduction testing.* For the purpose of this specification, phase I tests are those tests accomplished on samples of materials and construction to be used in the manufacture of self-sealing or dual construction fuel cells.

4.3.1.1 *Phase I test samples.* Phase I test samples shall consist of the following:

(B) Class A (flexible construction):

(1) Protection levels (A) and (B).

a. Three flexible cells to fit the metal container shown in figure 1 The flexible cells shall contain a fitting conforming to Part No. MS29582-1 centered on the top surface thereof.

b. Eight metal side panels in accordance with sheet 5 of figure 1

c. Eight sheets of backing material 27 by 30 inches and two sheets of backing material 30 by 30 inches, conforming to MIL-P-8045. The weight of the backing material for style 1 cells shall not exceed ½ pound per square foot.

d. Two 12- by 12-inch samples of composite cell construction.

e. One sample of inner-layer ply, without barrier, approximately 900 square inches in area with seam.

f. One sample of inner-layer ply, with barrier, approximately 900 square inches in area without seam.

g. One sample 6 by 6 by 0.075 to 0.125 inch inner-layer ply, without barrier.

(b) Class B (semi-rigid or self-supporting construction):

(1) Protection levels (A) and (B):

a. Three semi-rigid or self-supporting self-sealing cells with outside dimensions of 30 by 30 by 24 inches containing a fitting conforming to Part No. MS29582-1 centered on the top surface thereof.

b. Two 12- by 12-inch samples of composite cell construction.

c. One sample of inner-layer ply, without barrier, approximately 900 square inches in area with seam.

d. One sample of inner-layer ply, with barrier, approximately 900 square inches in area without seam.

e. One sample 6 by 6 by 0.075 to 0.125 inch inner-layer ply, without barrier.

(c) Class A or B:

(1) Protection levels (C) or (D):

a. Three cells with outside dimensions of 30 by 30 by 24 inches containing a fitting conforming to. Part No. MS29582-1, centered on the top surface thereof. The top of the cell and the top half of the sides shall be of approved non-self-sealing construction conforming to MIL-T-6396, type II. The lower half of the sides and bottom shall be of self-sealing construction conforming to requirements specified herein.

b. Eight metal side panels in accordance with sheet 5 of figure 1.

c. Eight sheets of backing material 27 by 30 inches and two sheets of backing material 30 by 30 inches conforming to MIL-P-8045. The weight of the backing material for style 1 cells shall not exceed ½ pound per square foot.

d. Two 12- by 12-inch samples of composite cell construction.

e. One sample of inner-layer ply, without barrier, approximately 900 square inches in area with seam (self-sealing portion only).

f. One sample of inner-layer ply, with barrier, approximately 900 square inches in area without seam (self-sealing portion only).

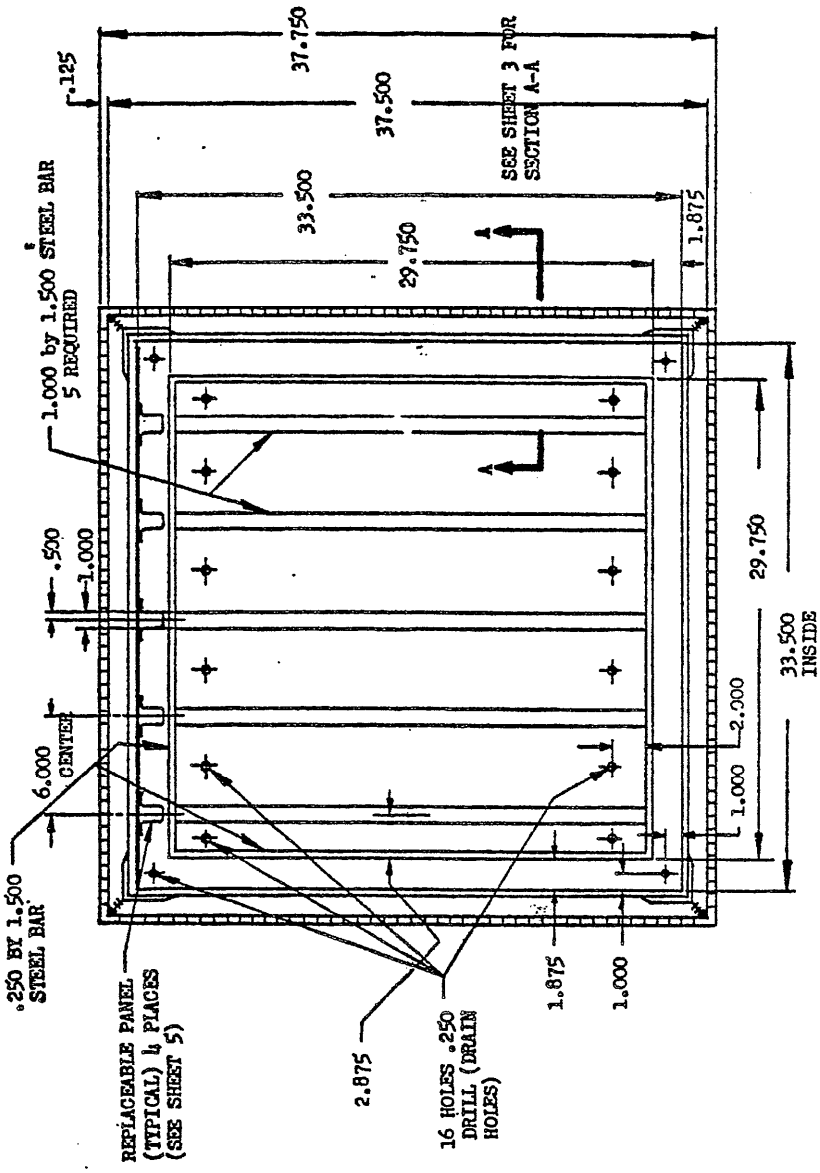
g. One sample 6 by 6 by 0.075 to 0.125 inch inner-layer ply, without barrier (self-sealing portion only).

None of these samples shall be preplasticised with fluid prior to submission. Any variations in the basic construction will be approved by the procuring activity and shall be indicated by a suitable dash numbering system.

4.3.1.2 *Phase I test.* Phase I preproduction tests shall consist of the following tests described under 4.6:

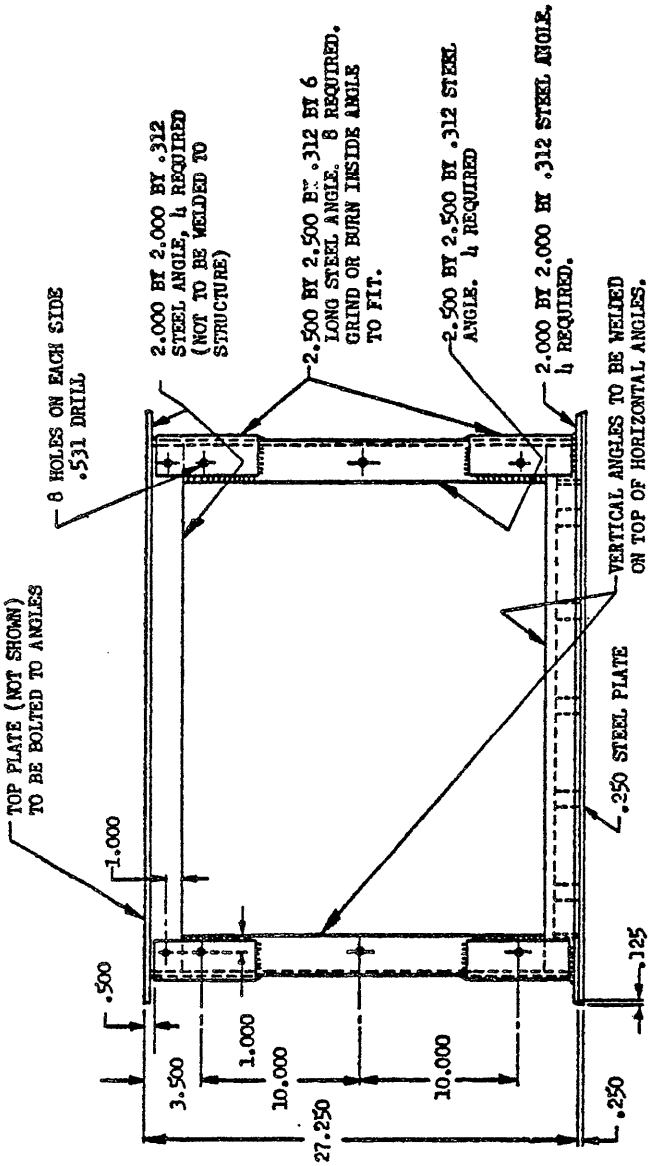
(a) Inspection ---------- (4.6.1)
(b) Inner-layer ply- - - - - - - — ---—--- (4.6.4)
(c) Cells ---------- ----------— (4.6.5)

4.3.2 *Phase II preproduction testing.* For purposes of this specification, phase II preproduction tests are those tests accomplished on



DIMENSIONS IN INCHES. TOLERANCES, DECIMALS ± .016

FIGURE 1 (*Sheet 1 of 6*). *Gunfire test structure.*



DIMENSIONS IN INCHES. TOLERANCES: DECIMALS ±.016.

FIGURE 1 (*Sheet 2 of 6*). *Gunfire test structure.*

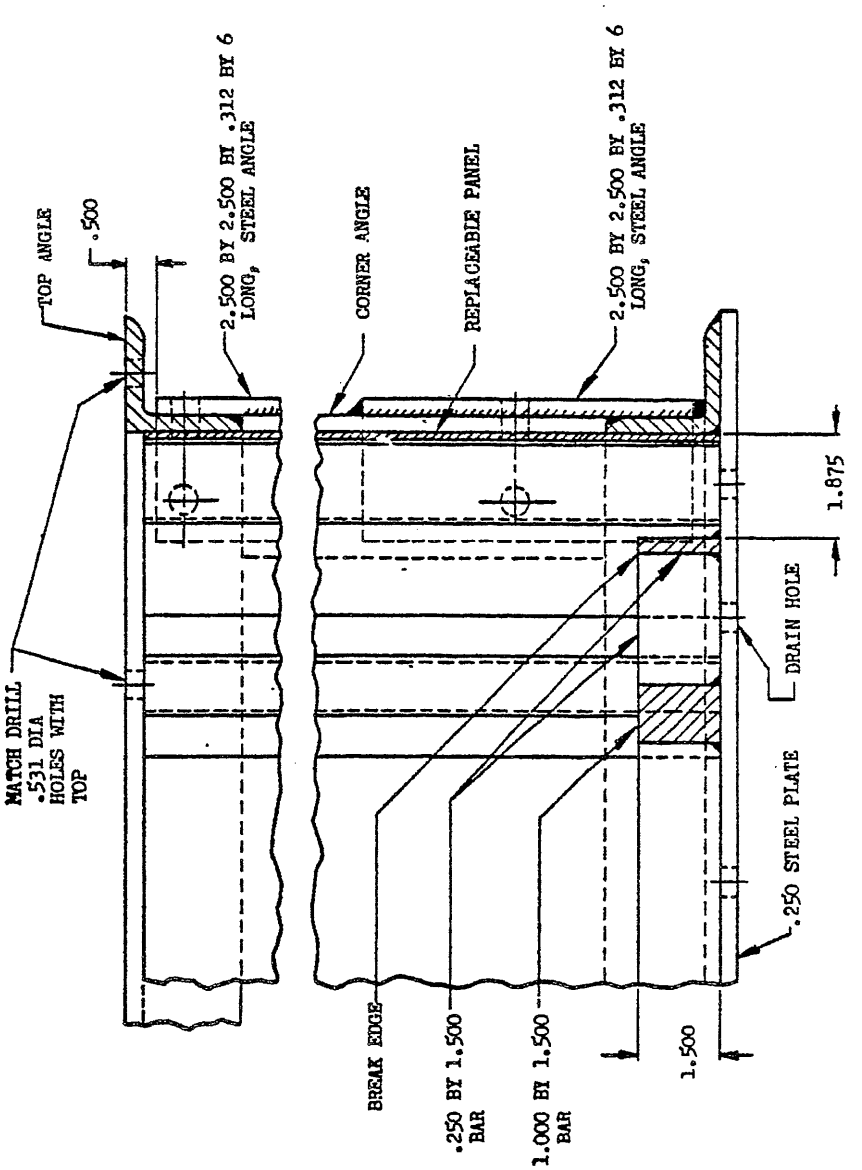


FIGURE 1 (*Sheet 3 of 5*). *Gunfire test structure.*

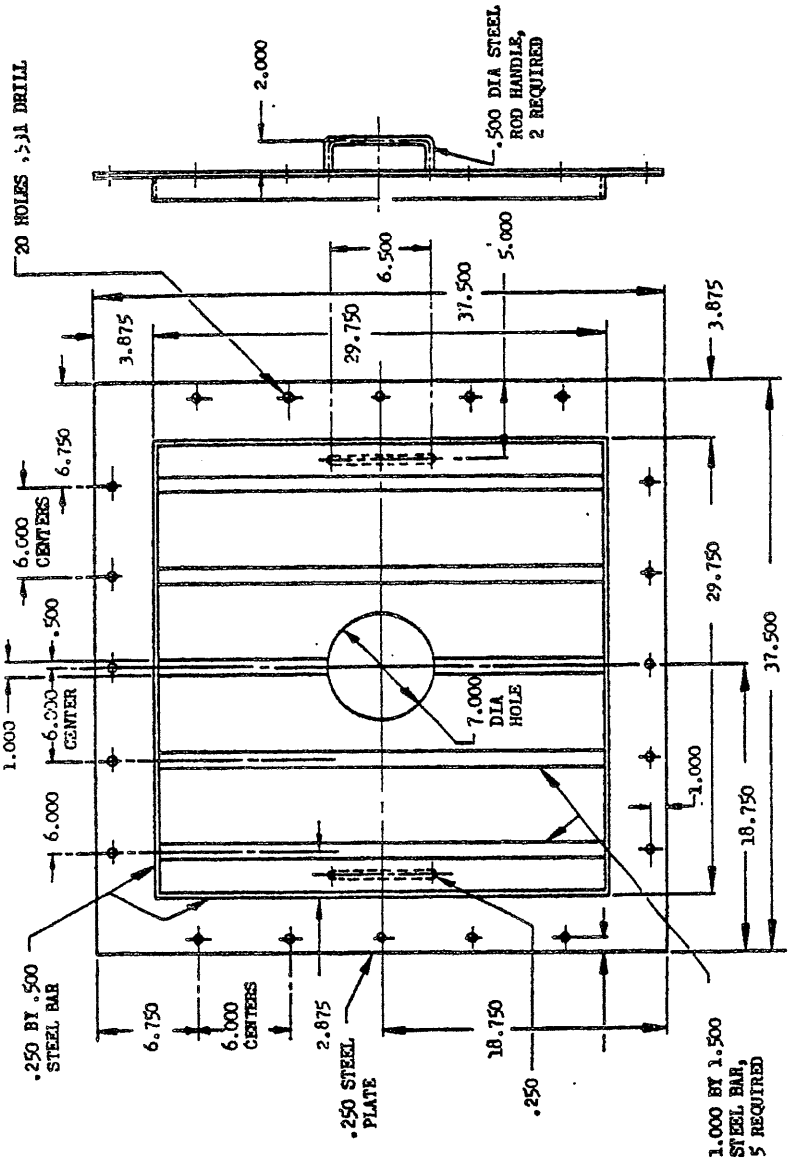
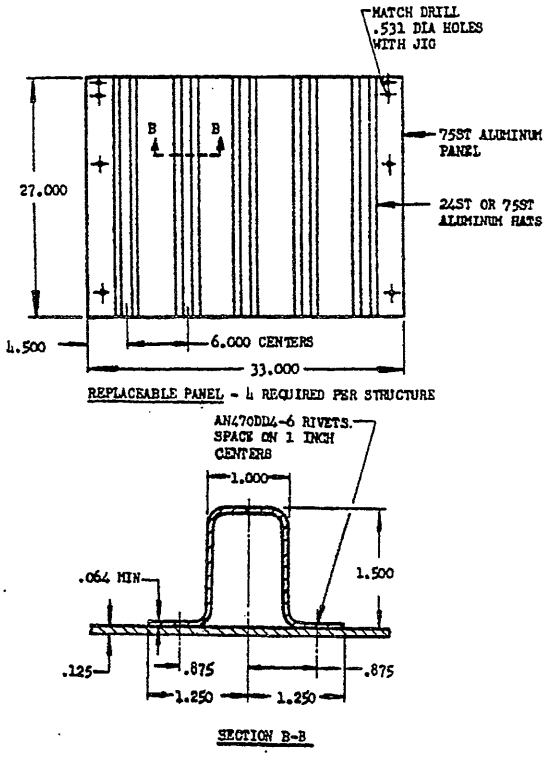


FIGURE 1 (*Sheet 4 of 6*). *Gunfire test structure.*



DIMENSIONS IN INCHES. TOLERANCES: DECIMALS ±.062.

FIGURE 1 (*Sheet 5 of 5*). *Gunfire test structure.*

complete full-scale fuel tanks, or portions thereof, submit ted for approval as satisfactory tanks for a particular aircraft installation.

4.3.2.1 *Phase II test samples.* Phase II test samples shall consist of one or more complete full-scale fuel tanks or portions thereof and the supporting structure or jig, or both, equipped with all applicable fuel-cell components. The tank or tanks shall be of the same materials and construction as used in the cell submitted for phase I tests, and shall be designed to fit in a particular location in a specific aircraft. Exceptions to the above shall comprise those cells which, because of the particular aircraft design, require the use of graduated wall thickness and weight, and any other exceptions specifically authorized by the procuring activity.

4.3.2.2 *Phase II tests.* Phase H preproduction tests shall consist of the following tests described under 4.6 and shall be conducted in the order listed:

(a)	Inspection	(4.6.1)
(b)	Installation	(4.6.6)
(c)	Capacity	(4.6.7)
(d)	Pressure	(4.6.8)
(e)	Slosh or slosh and vibration resistance	(4.6.9)
(f)	Aging and low temperature leak age	(4.6.10)
(g)	Accelerated load resistance	(4.6.11)
(h)	Gunfire resistance on tank installation	(4.6.12)

4.3.3 *Reports of tests.*

4.3.3.1 *Phase I.*

4.3.3.1.1 *Preproduction approval.* Phase I test reports shall be in accordance with MIL-T-9107. These reports shell be signed or approved by a responsible representative of the manufacturer or the laboratory in which the tests are conducted.

4.3.3.1.2 *Preemptive approval. (See 6.4.2.1.)*

4.3.3.2 *Phase II.* Phase II test reports shall be prepared in accordance with MIL-T-9107. At least 1 month prior to the initiation of phase II testing, a schedule shall be supplied to the procuring activity indicating the anticipated start and finish dates of all tests.

4.4 Quality conformance tests. Quality conformance tests shall consist of:

(a)	Individual tests	(4.4.1)
(b)	Sampling plans and tests	(4.4.2)

4.4.1 *Individual tests.* Each fuel cell shall be subjected to the following tests as described under 4.6.1:

(a)	Examination	(4.6.1.1)
(b)	Workmanship	(4.6.1.2]
(c)	Dimentions	(4.6.1.3)
(d)	Weight	(4.6.1.4)

4.4.2 *Sampling plans and tests.*

4.4.2.1 *Capacity check samples.* Each of the first 10 production cells shall be checked for capacity in accordance with 4.6.7. An average head-versus-volume curve shall be constructed from these tests.

4.4.2.2 *Stand test samples.* Cells selected at random from part numbers specified by the contractor and the procuring activity, in accordance with the following schedule, shall be subjected to the stand test described in 4.6.2. In the event that more than one part number is selected for sampling, the tests shall be conducted on an alternating basis.

Number of samples	*Number of units produced*
1	0-50.
1	1 every 90 days or 1 out of each additional 500 cells, whichever occurs first.

The samples specified above shall be selected from all cells produced at a particular plant for a specific a aircraft and approved under the same preproduction test and identified with the manufacturer's same construction number. The random samples selected shall be representative of cells submitted by the manufacturer for acceptance with respect to quality of workmanship and the number and type of repairs.

4.4.2.3 *Dissection teat samples.* Cells selected at random from part numbers specified by the contractor and the procuring activity, in accordance with the following schedule, shall be dissected its shown in figure 2, and subjected to the dissection test of 4.6.3.

Number of samples	*Number of units produced*
2	0-50.
1	One out of each additional 90 days' production, or one out of each additional 50 units produced, whichever occurs latest. However, the maximum time between tests shall not exceed 180 days.

The samples specified above shall be selected from rolls produced at a particular plant for a

specific aircraft and approved under the same preproduction test and identified with the manufacturer's same construction number. The random samples selected shall be representative of cells submitted by the manufacturer for acceptance with respect to quality of workmanship and the number and type of repairs.

4.4.2.4 *Inspection standards.* When one item selected from production fails to meet this specification, action shall be taken in accordance with Bulletin No. 112.

4.5 Test conditions. In addition to the test conditions set forth in specific tests, the conditions specified herein shall apply.

4.5.1 *Test fluid.* Test fluid shall be in accordance with MIL-S-3136.

4.5.1.1 Type I fluid shall be MIL-S-3136, type I

4.5.1.2 Type III fluid shall be MIL-S-3136, type III.

4.5.2 *Temperate tolerances.* Unless otherwise specified, the following temperature tolerances shall be maintained:

Specified temperature	*Tolerance*
Above 100° F	± 10° F
Below 100° F	± 5° F

4.5.3 Tank mounting structure. The tank mounting structure shall correspond as closely as practicable with respect to shape, dimensions, and material to the tank supporting structure in the vehicle. The necessary stops, cushions, pads, and hangers identical with those used in the finished vehicle, for mounting and supporting the tank shall be provided. The test tank shall be mounted in the test structure in a manner which duplicates the actual installation. In addition, all lines attached to the tank in the actual installation shall be included. The length and configuration of these lines shall be the same as in the actual installation, from the tank to the first support.

4.5.4 *Tank support jig.* The support jig shall be suitable for carrying the mounted sample tank and designed for bolting to the vibrator and rocker assembly. The jig framework shall be sufficiently rigid to prevent the possibility of unrealistic stresses being imposed on the mounted tank.

4.6 Test methods.

4.6.1 *Inspection.*

4.6.1.1 *Examination.* Each fuel cell shall be carefully examined to determine conformance with all the requirements of this specification for which no specific tests are described and to determine conformance with the manufacturer's material and fabrication specifications.

4.6.1.2 *Workmanship.* The fuel cells shall be inspected to determine conformance to the acceptable standards listed in Bulletin No. 112.

4.6.1.3 *Dimensions.* A check shall be made on each cell to insure that all dimensions critical to the installation are within the dimensional tolerances established by the contractor or procuring activity. The tolerances specified for this test shall not conflict with the capacity requirements specified in 3.5.1.

4.6.1.4 *Weight.* Each cell shall be weighed to determine compliance with the tolerance on weight. (See 3.8.)

4.6.2 *Stand.* Class A cells only shall be collapsed and held strapped for 30 minutes in a position comparable to that encountered prior to installation in its respective aircraft cavity, then released, and adequately supported. Both class A and class B cells shall be filled with type III fluid. During the filling process the capacity test (4.6.7) shall be conducted to determine conformance with 3.5.2. Cells shall then be tested in accordance with the following time cycle:

(a) First cell selected	90 days
(b) Second cell	30 days
(c) Third cell	- 30 days

This time cycle shall be repent.ed for additional walls chosen in accordance with 4.4.2.2 for the duration of the contract. Upon completion of the test, and at the intermediate inspections, the cells shall be carefully examined for any evidence of failure. After the examination, if faulty performance is indicated, the cell shall be dissected as shown in figure 2 and inspected for evidence of failure. In the event of failure of this test, the procuring activity and the contractor shall be notified. Bulletin No. 107 shall apply.

4.6.3 *Dissection.* The sectioned portion of each cell selected in 4.4.2.3 shall be examined for conditions outlined in Bulletin No. 107. In the event, of failure on this test, the procuring activity and contractor shall be notified immediately.

4.6.4 *Inner-layer ply.* Samples of the inner-layer ply of constructions intended for protection levels (A) and (B) and of the self-sealing portions of constructions intended for protection levels (C) and (D) shall be subjected to the following tests.

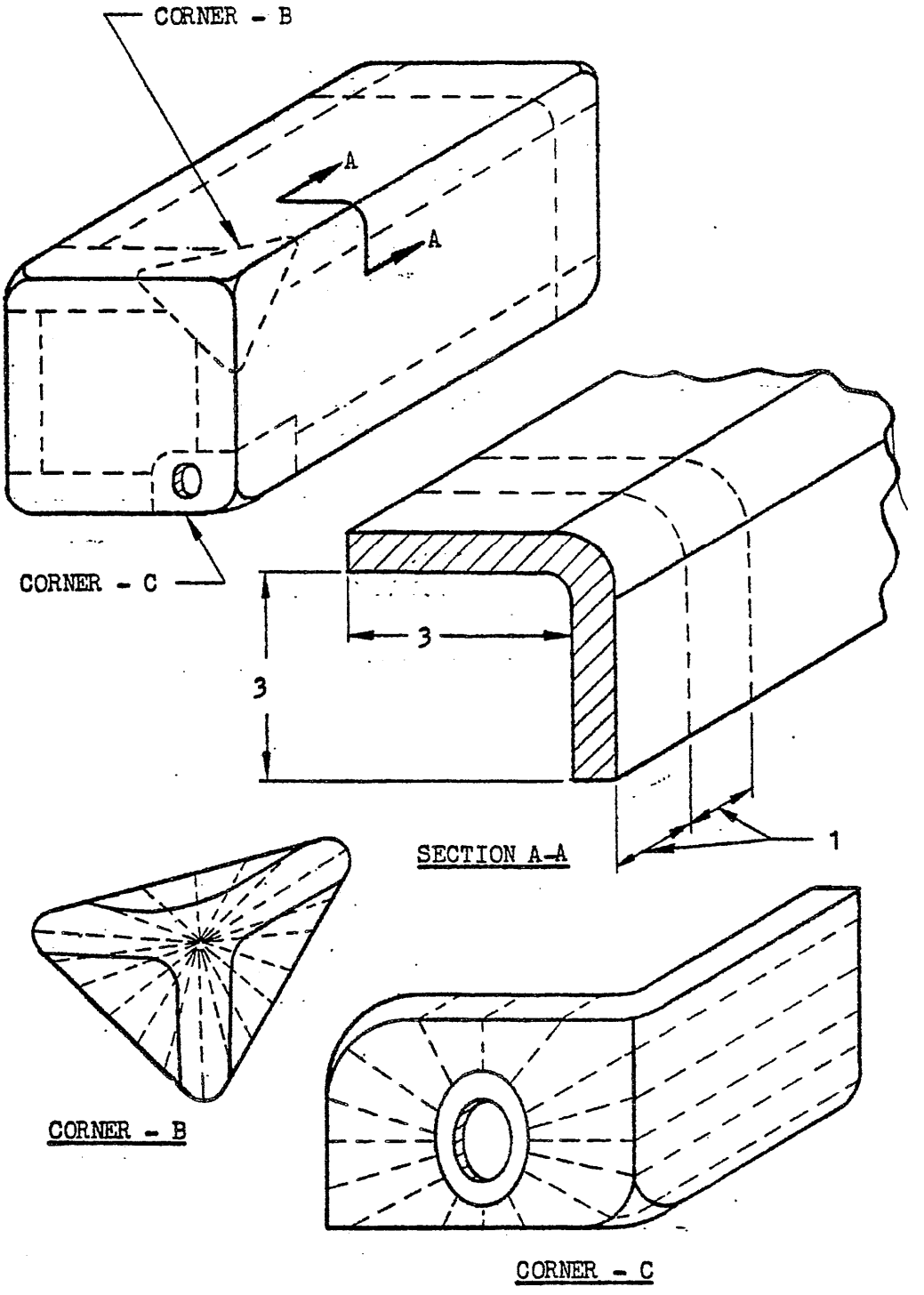
4.6.4.1 *Fuel contamination.* A 5-gram sample of the inner-layer ply, without barrier, shall be diced into approximately l/16-inch squares and placed in a flask containing 250 ml of type III fluid, and allowed to stand for 48 hours at 77° F. The contaminated test fluid shall be decanted off and the gum residue determined by Method 3302 of Federal Test Method Standard No. 791, except that the time of evaporation shall be 45 minutes. After cooling, the test beakers shall be weighed and the gum content determined. The beakers shall be then placed in an appropriate bath and maintained at 572° F for 30 minutes. After cooling to room temperature in a closed container, the beaker shall be weighed and the stoved gums determined. The necessary correction for preformed gums in the test fluid shall be made in each case. The fluid contamination shall be not greater than 60 milligrams per 100 millileters of contaminated fluid and, upon stoving, shall be not greater than 20 milligrams per 100 milliliters of contaminated fluid.

4.6.4.2 *Inner liner strength.* The tensile strength of the inner-layer ply, without barrier, shall be determined in accordance with Federal Test Method Standard No. 601, Method 4111, before and after immersion in water for 72 hours at a temperature of 135° ± 3° F. The tensile strength shall not be reduced more than 20 percent calculated on the basis of the original cross sectional area.

4.6.4.3 *Permeability.*

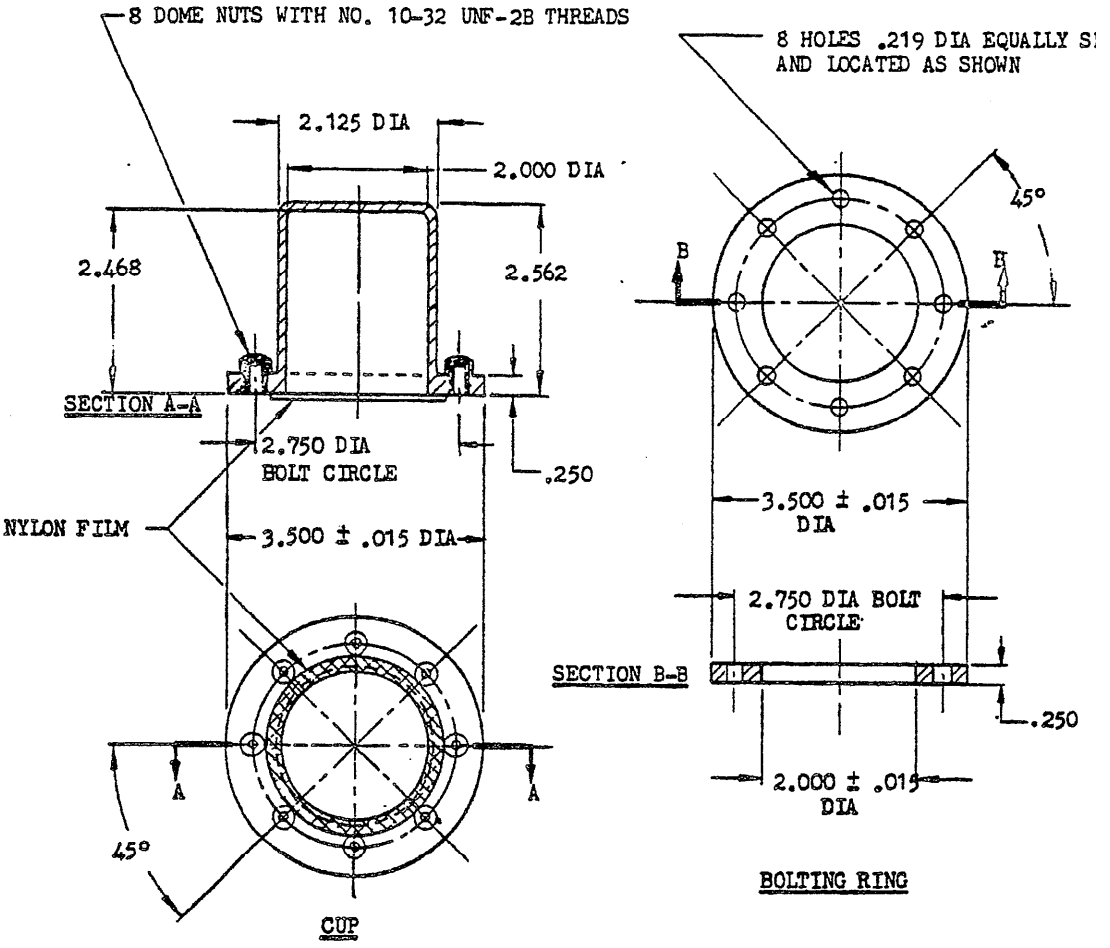
4.6.4.3.1 *Preparation of test specimens.* The uncured inner liner shall be applied to a 10- by 10-inch piece of corrugated fiberboard coated on one side with a suitable water-soluble breakaway agent, The exposed surface of the inner liner shall be coated with prime cement and barrier resin (if required) that conform to manufacturer's specifications. The assembly shall then be wrapped with cellophane and covered with a suitable waterproof bag. The assembly shall be vulcanized by the method used in regular production. After vulcanization, the waterproof bag and cellophane shall be removed. The inner liner shall then be removed from the fiberboard, using water if necessary. The free moisture shall then be wiped from the assembly, and the assembly shall be conditioned for 24 hours at a temperature of 77° F and a relative humidity of 40 percent ± 5 percent. After the conditioning, two disks 2.5 inches in diameter shall be cut from the vulcanized panel. One hundred milliliters of type III fluid shall be placed in a cup conforming to figure 3. A nylon solution of 10 percent of type FM6001 or FM6501 nylon in 2B alcohol, maintained at 120° F, shall be applied to the face of the cup flange as specified on figure 3. When the nylon solution is almost dry, the test disk shall be applied to the cup with the barrier, if any, facing outward. The assembly shall be completed by attaching the bolting ring shown on figure 3 and tightening the bolts in accordance with the following:

Innerliner tvpe	*Bolt torque in pounds-inches*
Gum stocks	5 to 10
Coated fabrics	15 to 20
Unsupported plastic films	20 to 25



DIMENSIONS IN INCHES.
CUT ON DOTTED LINES.

FIGURE 2. *Location of cuts for dissection sample*



BREAK ALL EDGES .031 RAD MAX
ALL FILLETS .031 RAD MAX

MATERIAL: 17ST ALUMINUM ALLOY BAR STOCK OR EQUAL
DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: ± .010

FIGURE 3. *Cup for permeability test*

4.6.4.3.2 *Conduct of test.* The cups, prepared as specified in the preceding paragraph, shall be placed in a suitable rack and maintained at a temperature of 77°F and a relative humidity of 40 percent ± 5 percent for a l-hour equilibration period. The cup shall be weighed to the nearest 0.005 gram and placed in the rack with the face of the-cup facing upward. The cup shall be maintained at a temperature of 77° ± 5°F and a relative humidity of 40 percent ± 5 percent for a 24-hour period. The cup shall then be weighed to check for the integrity of the seal. The bolts shall be retorqued if necessary. The cup shall be inverted (test disk down) in a rack that permits free access of air to the test disk. The cups shall be weighed at the end of the third, fifth, and eighth day after inverting. Defective films or leaks resulting from faulty assembly will usually be found when weighing on the third day. The diffusion rate calculation shall be made on the fifth to the eighth day period and expressed as fluid ounces per square foot per 24 hours. The permeability shall be less than 0.025 fluid ounce per square foot per 24 hours.

NOTE :

Diffusion expressed in fluid ounces per square foot per 24 hours equals the gram loss of the test specimen per 46 hours multiplied by a factor K which is defined as follows:

$$K = \frac{144}{(\text{Sp Gr})\ (29.573)\ (3.142)\ (R)^2}$$

Where: Sp Gr=specific gravity of test fluid at 77°F

R=inside radius of the test cup in inches

4.6.4.4 *Seam adhesion.* The seam adhesion of the inner layer ply to itself before and after immersion in type III fluid for 72 hours at a temperature of 135° F shall be tested within 4 hours along the length of the seam by the strip-back method, using a jaw separation rate of 2 inches per minute in accordance with Federal Test Method Standard No. 601, Method 8011. In cases where the adhesion of the seam is less than the strength of the material, the adhesion shall be a minimum of 6 pounds per inch.

4.6.4.5 *Slit resistance.* A section of the composite cell construction sample shall be selected. A slit of the inner layer ply, 1 inch long to the depth of the sealant, shall be cut parallel to the calender grain, if present, or to the direction of minimum tear resistance. The test section shall be 5 inches long with width sufficient to clamp in a vise, with the jaws of vise 1 inch from the slit when the test section is bent 180 degrees. The slit shall be parallel to vise jaws and on the outside of the bend. The sample shall be held in this folded condition for 1 hour and the increase in length of the slit noted. The slit shall not increase more than 0.25 inch.

4.6.4.6 *Innerliner adhesion.* The adhesion of the inner-layer ply to the sealant shall be tested by the strip back method, using a jaw separation rate of 2 inches per minute in accordance with Federal Test Method Standard No. 601, Method 8011. The adhesion shall be a minimum of 6 pounds per inch.

4.6.4.7 *Stress aging.* Ten samples of the inner-layer ply 4 inches square shall be double folded with the point of double fold located in the center of the sample. The material shall be held in the folded position by means of a spring clip, or equivalent, located 0.5 inch from the double folded edge. Folded samples shall be soaked in type III fluid, for 7 days at 160° F, and air dried for 7 days at 160° F. There shall be no evidence of blistering, cracking, separation, or other material failure.

4.6.5 *Cells.* The sample phase I cells shall be subjected to the tests described in the following paragraphs.

4.6.5.1 *Fuel resistance of exterior surfaces.* The cells shall be placed in a container sufficiently large to permit immersion of the bottom half of the cell in type III fluid. The cells shall be immersed for 24 hours at the ambient temperature. The cells shall then be removed and examined for swelling, separation, blisters, pinholes dissolution, or other evidence of deterioration. The exterior surface of the cell con-

struction shall show no unsatisfactory swelling, separation, blistering, dissolution, or other deterioration.

4.6.5.2 *Slosh resistance.* The phase I cell shall be tested for slosh resistance by mounting on a suitable rocker assembly and rocking the cell through an angle of 15 degrees on each side of the level position (total 30 degrees) at a rate of l8 ± 2 cycles per minute for a period of 25 hours with the cell two-thirds full of type III fluid. Cells that are non-self-supporting shall be installed in a test structure in accordance with figure 1. The fluid shall be maintained at a temperature of 110° F throughout the test. The time for the temperature rise to 110° F from the ambient temperature shall not exceed 2 hours. There shall be no evidence of leakage or failure of any kind during or as a result of this test.

4.6.5.3 *Gunfire resistance on phase I cells.*

4.6.5.3.1 *Test setup.* Class A calls shall be installed in the metal structure shown in figure 1. Class B cells shall be tested without auxiliary support. The temperature shall be measured by a thermometer or thermocouple immersed in the fluid. Test cells for protection levels (A) and (C) shall be mounted 75 feet from the gun. Cells for protection levels (B) and (D) shall be mounted 50 feet from the gun. All ammunition shall be fired into the cell space occupied by the fluid. A nonmetallic yaw plate shall be used to impart tumbling when required by table I.

4.6.5.3.2 *Firing schedule.* The firing schedule as shown on table I shall be conducted at low temperature on cell No. 1 It shall then be repeated at normal temperature on cell No. 2.

4.6.5.3.2.1 *Low tempemture gunfire.* The first cell shall be conditioned for gunfire testing by filling three-quarters full of type I fluid for a period of 24 hours. The fluid used in the conditioning shall remain in the cell during the gunfire test. The conditioning shall be at a temperature of 50° to 100° F. The cell shall then be cooled, and at the time of firing, the temperature of the fluid and cell shall have been maintained at -40° F for a minimum of 4 days.

4.6.5.3.2.2 *Normal temperature gunfire.* The second cell shall be filled three-quarters full of type I fluid. The temperature of the fluid at the time of the test shall be 50° to 100° F.

4.6.5.3.3 *Evaluation.* The following points shall be considered in determining the acceptable performance of the fuel cell:

(a) Quantity of fuel leakage.
(b) Time required to effect a damp seal. In general, wounds shall seal within 2 minutes at ambient temperature and within 4 minutes at -40° F.
(c) Integrity of inner layer ply, seams, and joints. (Cracking of the inner liner will be permitted under the low temperature test of 4.6.5.3.2.1)
(d) Integrity of fittings.
(e) Deformation.
(f) Support for sealant throughout the test.
(g) Healing, knitting, or breaching over the gunfire wound.
(h) Resistance of non-self-sealing materials to tearing, and integrity Of transition seam (protection levels (C) and (D)).

4.6.5.3.3.1 Shots striking as noted below, shall not be considered in evaluating the tank.

(a) Slicing shots wherein a projectile slices parallel to the cell wall instead of piercing.
(b) Striking of cell fittings by the projectile.
(c) Shots where the wounds overlap or run together.
(d) Shots which strike within 3 inches of corners.
(e) Shots where the projectile remains imbedded in the construction.
(f) Shots where metallic fingers project into wounds, and in a mechanical manner prevent the sealant from functioning.
(g) Shots where coring is present.

TABLE I. *Firing schedule*

Rounds	Protection levels			
	(A)	(B)	(C)	(D)
1	One .50 caliber projectile 90° to the cell surface and with exit.	One .30 caliber projectile 90° to the cell surface.	One .50 caliber projectile 90° to the cell surface into the self-sealing portion of the cell with entrance within 1 inch of transition seam and with exit wherever it occurs.	One .30 caliber projectile 90° to the cell surface into the self-sealing portion of the cell with entrance within 1 inch of transition seam.
2 and 3	One .50 caliber projectile 90° to the cell surface ¾ to full tumbled entrance.	One .30 caliber projectile 90° to the cell surface ¾ to full tumbled entrance.	One .50 caliber projectile 90° to the cell surface into the self-sealing portion of the cell with ¾ to full tumbled entrance.	One .30 caliber projectile 90° to the cell surface into self-sealing portion of the cell with ¾ to full tumbled entrance.
4	One .50 caliber projectile 45° to the cell surface and with exit.	One .30 caliber projectile 45° to the cell surface.	One .50 caliber projectile 45° to the cell surface into self-sealing portion of the cell with exit wherever it occurs.	One .30 caliber projectile 45° to the cell surface into self-sealing portion of the cell.
5	One 20mm PA projectile 90° to the cell surface.	----------	One 20mm PA projectile 90° to the cell surface into the self-sealing portion of the cell within 3 inches of the transition seam.	----------
6	----------	----------	One 20mm PA projectile 90° to the cell surface into the non-self-sealing portion of the cell within 3 inches of the transition seam.	One .30 caliber projectile 90° to the cell surface into the non-self-sealing portion of the cell within 3 inches of the transition seam.

4.6.5.4 *Fuel aging following gunfire resistance.* After the gunfire resistance test of 4.6.5.3, the cell shall be emptied and inspected, and any wounds which failed to seal (but did not disqualify the cell) shall be plugged and the cell refilled with type III fluid. After 24 hours the cell shall be emptied, and the wounds shall be carefully examined. There shall be no evidence if deterioration of the inner-layer ply or sealant.

4.6.5.5 *Stand.* For this test, the aircraft, a section thereof, or a tank mounting structure in accordance with 4.5.3 shall be used. The stand test (4.6.2) shall be conducted on the third test cell which shall be the same cell subjected to the slosh resistance test (4.6.5.2). The test cell shall be adequately supported, completely filled with type III fluid and allowed to stand. The cell shall be carefully examined every 30 days for any evidence of failure. After 90 days, if no evidence of failure is found, the cell will be considered as satisfactorily conforming to this test.

4.6.6 *Imtallation.* For this test, the aircraft or a section thereof shall be used. The installation test shall be conducted prior to the pressure

test described in 4.6.8. The installation test shall consist of removing and installing the tank in the test structure three times. Applicable service procedure shall be followed in tank installation and removal. All tank fittings shall be fastened to corresponding structure fittings and interconnect fittings of each installation. The tank shall be in a satisfactory condition on the completion of this test.

4.6.7 *Capacity.* The cell shall be slowly filled to capacity with type III fluid. The volume in gallons and the head in inches shall be recorded at a sufficient number of points during the filling to construct a head-versus-volume curve.

4.6.8 *Pressure.* For this test, the tank shall be mounted in the preproduction slosh test structure. All openings in the tank shall be sealed during the pressure test. All parts necessary to effect a satisfactory seal at the openings shall be furnished by the aircraft contractor. Tanks shall be subjected to a pressure equivalent to the normal head measured at the bottom of the tank multiplied by a factor of 1.5. Pressures shall be measured by means of a manometer using type III fluid and shall be applied in such a manner that the testing pressure is stabilized. No change in pressure shall occur in the following 15 minutes.

4.6.9 *Slosh or slosh and vibration resistance.* For this test, an actual section of the aircraft structure shall be used. All fitting and non-self-sealing areas in the interior of each fuel cell compartment shall be lined with brown paper, held in place with a suitable adhesive. The test specimen shall be slosh or slosh and vibration tested (see 4.6.9.1 and 4.6.9.2) with the tank two-thirds full of type III fluid containing a staining agent at a temperature of 110° F. All slosh or slosh and vibration resistance tests shall be conducted with the tank subjected to a pressure equivalent to the maximum stabilized vapor pressure encountered in any prescribed stabilized level flight conditions. The tank shall be mounted in such a manner as to simulate pitching in the actual aircraft. Special fixtures, such as baffles, shall also be tested if applicable by mounting the aircraft structure on the rocker in another position for a portion of the test time. The pressure test (4.6.8) shall be repeated. There shall be no evidence of leakage or failure of the fuel tank or the attachment of its components during this test.

4.6.9.1 *Fighter, attack, and interceptor aircraft.* Test of fighter, attack, and interceptor aircraft preproduction tanks shall be conducted on a vibrator and rocker assembly of a design acceptable to the procuring activity, and shall conform to the following requirements:

(a) Class A tanks or portions thereof, except those with cells containing suspension or supporting arrangements which maybe subject to failure due to vibration, shall be slosh tested.

Test conditions:
Time :25 hours
Rock: Total of 30°, approximately 15° on either side of the horizontal position.
Cycles per minute: 16 to 20.

(b) Class A tanks or portions thereof, with cells containing suspension or supporting arrangements which may be subject to failure due to vibration, and class B tanks shall be simultaneously slosh and vibration tested.

Test conditions:
Time: 25 hours.
Rock: Total of 30°, approximately 15° on either side of the horizontal position.
Cycles per minute: 16 to 20.
Displacement: The throw of the two eccentric weights on the vibration machine shall be in the same direction and shall be adjusted to produce a total displacement of 0.032 inch, +0.010 inch, -0.000 inch, measured at points of inherent rigidity on the tank.
speed:
Type I tanks-90 percent of normal rated crankshaft speed.
Type II tanks-2,000 $\pm$ 100 rpm.

(c) Remove cell from structure and examine for evidence of damage or failure.

4.6.9.2 *Types of aircraft other than fighter, attack, and interceptor.* Tests of all types of aircraft preproduction tanks other than fighter, attack, and interceptor type, shall be conducted on a vibration and rocker assembly design

acceptable to the procuring activity and shall conform to the following requirements:

(a) Class A tanks or portions thereof, except those with cells containing suspension or supporting arrangements which may be subject to failure due to vibration shall be slosh tested.

Test conditions:
Time :40 hours.
Rock: Total of 30°, approximately 15° on either side of the horizontal position.
Cycles per minute: 10 to 16.

(b) Class A tanks or portions thereof, with cells containing supporting or suspension arrangements which may be subject to failure due to vibration, and class B tanks shall be slosh and vibration tested.

Test conditions:
Time: 25 hours simultaneous slosh and vibration and 15 hours additional slosh.
Rock: Total of 30°, approximately 15° on either side of the horizontal position.
Cycles per minute: 10 to 16.
Displacement: The throw of the two eccentric weights on the vibration machine shall be in the same direction and shall be adjusted to produce a total displacement of 0.032 inch, +0.010 inch, -0.000 inch measured at point of inherent rigidity on the tank.
Speed:
Type I tanks-90 percent of normal rated crankshaft speed.
Type II tanks-2,000 ± 100 rpm.

(c) Remove cell from structure and examine for evidence of damage or failure.

4.6.9.2.1 *Alternate vibration frequency and displacement.* Where the above frequencies and displacements are not applicable, the tank shall be vibrated at a frequency and displacement agreed upon by the contractor and the procuring activity,

4.6.10 *Aging and low temperature leakage.* For this test, the tank shall be mounted in a structure for which it is designed, or a simulated test sample incorporating identical tank fitting installations. The interior of the test structure around fitting areas shall be lined with brown paper held in place with a suitable adhesive. The tank with fittings assembled shall be subjected to a 7-day soak with type III fluid, at a fluid temperature of 135° F. Following the hot fuel soak, the tank shall be emptied and air dried for a period of 7 days at a temperature of 160° F. On completion of the 7-day period of air drying, the tank shall be filled with type I fluid, containing a staining agent, and placed in a cold box for a period of 3 days. The cold box shall be maintained at a temperature of – 65° F for the 3-day period. At the end of this 3-day period, the tank shall be removed from the cold box, drained, and examined for any indications of leakage. The tank shall then be filled with type III fluid, containing a staining agent and allowed to stand at ambient temperature for a period of 80 days, at which time the fluid shall be drained, and the tank examined for any unsatisfactory condition or indication of fuel leakage as shown by any indication of stain on the brown paper or activation of the tank sealant. Sealant activation or any leakage of the tank, or at the attachment of its component(s), shall be considered as a tank failure. In the event of failure at the attachment of the component, retesting for this condition may be simulated in other than a full scale tank.

4.6.10.1 *Dissection.* After completion of the above test, the cell shall be dissected as shown in figure 2. The sectioned portion of each cell shall be examined for conditions outlined in Bulletin No. 107.

4.6.11 *Accelerated kind.* The tank assembly shall be mounted in a test jig that provides support equivalent to the aircraft structure for which it is designed and subjected to a load test as mutually agreed upon between the contractor and the procuring activity to determine the suitability of the tank installation under aircraft design accelerations, including the appropriate dynamic magnification factors. Tanks of pressurized systems shall be subjected to normal operating pressures during this test, except where unpressurized conditions are considered to be more critical. There shall be no structural failure of any components of the tank during these tests. Deflection of the tank shall be measured and shall be such that there

will be no interference with the functional operation of the aircraft components. All tanks shall be tested dynamically.

4.6.11.1 *Carrier-based aircraft.* Tanks shall be tested in the directions of dynamic loadings associated with catapult, flight, and arrested landing conditions to a total acceleration in gravitational units equal to the maximum applied acceleration for which the aircraft is designed. The suitability of the tank installation shall be tested for catapult and arrested landings with various fuel loads from full down to the minimum fuel load specified for a safe landing. For these tests, the tank shall be oriented in the normal position for catapult or arrested landings, as applicable.

4.6.12 *Gunfire resistance on tank installation.* For this test, the tank shall be mounted in an actual section of the aircraft structure containing the backing board that will be used in the specific application. The tank for this test need not include accessories. Purging capabilities shall be provided to help prevent fires during gunfire test. The tank shall be filled two-thirds full with type I fluid. All gunfire testing shall be conducted with the tank subjected to an internal pressure equivalent to the maximum stabilized vapor pressure encountered during any prescribed stabilized level fright conditions. The tank shall be subjected to the gunfire test in accordance with the capacity of each tank. The number of rounds of .50 caliber AP or .30 caliber AP ammunition to be fired shall be determined on the basis of one round for each 15 gallons of tank capacity up to a maximum of 10 rounds. For cells intended for protection levels (C) and (D), at least two rounds of .50 or .30 caliber, as applicable, shall be fired into the nonself-sealing portion of the cell. For protection levels (A) and (C), in addition to the .50 caliber gunfire, one round of 20-millimeter PA ammunition shall be fired. For protection level (C), this round of 20-millimeter PA ammunition shall be placed in the self-sealing portion of the cell. All shots shall be so placed as to be compatible with the aircraft installation and the combat utility of the aircraft. Tumbled .50 caliber AP rounds shall be utilized to simulate shrapnel. No bursts, shall be fired, and the test shall be conducted at ambient temperature. The same conditions that are cause for rejection of the phase I test cell shall apply to this test.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or level C, as specified (see 6.2).

5.1.1 *Level A.*

5.1.1.1 *Presentation.* Unless otherwise specified, tapped holes on fuel cell fittings or attachments shall be protected from corrosion by the application of a corrosion-preventive compound conforming to MIL-C-6529, type II. Care shall be taken to prevent an excessive amount of compound from being applied to the fuel cell proper. Paper conforming to MIL-B-121, grade A, shall be placed over all exposed tapped holes and sealed with a moisture-resistant tape conforming to PPP-T-60, type I, class 1. In those instances where cover plates are bolted into their positions, it will not be necessary to use type or grade A paper.

5.1.1.2 *Packaging.* Unless, otherwise specified, all openings, fittings, etc., shall be covered with waterproof paper conforming to UU-P-271, class C-l, and sealed with a moisture-resistant tape conforming to PPP-T-60, type I, class 1. The cells shall be closed in such a manner as to prevent dust or other foreign material from entering the cells. One vent hole may be left open, at the option of the manufacturer, but protected to prevent dust or other foreign material from collecting in the cells.

5.1.2 *Level C.* Cells shall be preserved and packaged in accordance with the manufacturer's commercial practice.

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

5.2.1 *Level A.* cells preserved and packaged to meet 5.1.1.1 and 5.1.1.2 shall be packed in overseas-type exterior shipping containers meeting PPP-B-591, PPP-B-636, PPP-B-585, PPP-B-621, or PPP-B-601. As far as practicable, exterior shipping containers shall be of uniform shape and size, be of minimum cube and tare consistent with the protection required, and contain identical quantities. the gross weight of each pack shall be limited to 200 pounds. Containers shall be closed and strapped in accordance with the applicable con-

tainer specification or appendix thereto. Containers shall be provided with a case liner conforming to MIL-L-10547 and shall be sealed in accordance with the appendix thereto. The case liner will not be required when the unit, intermediate, or exterior container" conforms to class 2 of PPP-B-636 and is sealed at all joints and seams, including the manufacturer's joint, with tape conforming to PPP-T-60.

5.2.2 *Level B.* Coils preserved and packaged to meet 5.1.1.1 and 5.1.1.2 shall be packed in domestic-type exterior shipping containers meeting PPP-B-591, PPP-B-601, PPP-B-585, PPP-B-621, PPP-B-636, or PPP-B-640. Exterior shipping containers shall be of minimum cube and tare consistent with the protection required. As far as practicable, exterior shipping containers shall be of uniform shape and size and contain identical quantities. The gross weight of each pack shall be limited to 500 pounds. Containers shall be closed and strapped in accordance with the applicable container specification or appendix thereto. When fiberboard containers are used, the fiberboard shall meet the special requirements table of PPP-B-636, as applicable.

5.2.3 *Level C.* Packages which require overpacking for acceptance by the carrier shall be packed in exterior-type shipping containers in a manner that will insure safe transportation at the lowest rate to the point of delivery. Containers shall meet Uniform Freight Classification Rules or regulations of other common carriers as applicable to the mode of transportation.

5.3 *Physical protection.* Cushioning, blocking, bracing, and bolting, as required, shall be in accordance with JAN-P-100, except that for domestic shipments, waterproofing requirements for cushioning materials and containers shall be waived. Drop tests of JAN-P-100 will be waived when preservation, packaging, and packing of the item is for immediate use or when drop tests of MIL-P-116 are applicable.

5.4 *Marking of shipments.* Each shipping container shall be marked to indicate presence of preservation and method of packing. The container shall be marked in accordance with MIL-STD-129. The following additional information shall be applied to the container:

TANK, FUEL, AIRCRAFT, SELF-SEALING
TYPE —, CLASS —, STYLE ——
PROTECTION LEVEL —
Model of aircraft for which cell is intended and location in the aircraft.
Construction number of the cell.

6. NOTES

6.1 Intended use. Self-sealing fuel tanks manufactured under this specification are intended for use in aircraft as a means for carrying aircraft fuel including aromatic constituents under all prescribed operating conditions and as a means of preventing, under the gunfire conditions specified herein, an excessive loss of fuel.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b] Model designation of the aircraft.
(c) Name of the cell manufacturer.
(d) Part number, type, class, style, and protection level of cell desired. (See 1.2.)
(e) Selection of applicable levels of preservation and packaging and packing. (See sec. 5.)
(f) Fuel suitability. (See 3.5.)

6.3 Definitions.

6.3.1 *Manufacturer.* For purposes of this specification, the term manufacturer refers to the manufacturer of the tank.

6.3.2 *Contractor.* The term contractor refers to the prime contractor or airframe manufacturer.

6.3.3 *Supplier.* The term supplier as used in 2.1 herein, refers to both the manufacturer and the contractor.

6.4 Preproduction testing.

6.4.1 *Notification of approval or disapproval.*

6.4.1.1 *Phase I preproduction tests.* In the case of phase I preproduction tests, written notification of approval or disapproval will be given by the applicable procuring activity to the fuel cell manufacturer.

6.4.1.2 *Phase II preproduction test.* In the case of phase II preproduction tests, notification

of approval or disapproval will be given by the applicable procuring activity to the aircraft manufacturer. A copy of such notification will be supplied to the fuel cell manufacturer.

6.4.2 Request for information pertaining to the phase I or phase II preproduction tests should be addressed to Commander, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio, Attention: ASNPFP; to the Bureau of Naval Weapons, Navy Department, Washington 25, D.C.; or to the Contracting Officer, U.S. Army Aviation and Surface Materiel Command, P.O. Box 209, Main Office, St Louis, MO, with copies to the other Services.

6.4.2.1 *Preemptive approval.* Preemptive approval is herein defined as approval for phase I tests, conducted without contractual coverage. Reports of tests, in accordance with MIL-T-9107 should be furnished in duplicate to the addressees as shown in 6.4.2. These reports should be signed or approved by a responsible representative of the manufacturer or the laboratory in which the tests are conducted. Preemptive approvals may be accepted at the option of the contractor in lieu of the phase I preproduction approval specified in 4.3.3.1.1.

6.5 Service life. Based on past experience, it is considered that the normal service life of fuel cells covered by this specification is equivalent to that of the aircraft in which they are installed.

6.6 Gunfire. The procuring activity may have one round of 40-millimeter high explosive statically detonated 24 inches from the outside of the tank. The results of this round will not be utilized in appraising and formulating tank approval decision, but will aid in the development of a possible cell construction that the Services are desirous of obtaining.

6.7 Special environment. When the test methods specified herein do not represent the tank environment, for example, temperatures resulting from aerodynamic heating in excess of 160° F, the test method should be modified as agreed upon by the contractor and the procuring activity to simulate operational comdi-tions.

Custodians:
Army-MO
Navy-Weps
Air Force-ASD

Preparing activity:
Air Force-ASD
Project No., 1560-0014

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5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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