



# SERVICE BULLETIN

No. 591

Piper Aircraft Corporation

Lock Haven, Pennsylvania, U.S.A.

"Modification DOA EA-1 Approved";

"FAA Southern Region Approved"

March 22, 1978

S/M

Subject: Inspection of Goodyear BTC-39 Fuel Cells

Models Affected: Serial Numbers Affected:

## GROUP I.

PA-25-235 and PA-25-260 Pawnee.....25-3885 to 25-7405572 inclusive (See Note 1, below)  
PA-31 and PA-31-300 Navajo.....31-1 to 31-810 inclusive (See Note 1, below)  
PA-31P Pressurized Navajo.....31P-1 to 31P-7300142 inclusive (See note 1, below)

## GROUP II.

PA-25 and PA-25-235 Pawnee.....25-1 to 25-3884 inclusive (See note 2, below)  
PA-31 Navajo.....31-811 and up (See note 3, below)  
PA-31-350 Navajo Chieftain.....31-5001 and up (See note 3, below):Aux. Tanks Only.  
PA-31P Pressurized Navajo.....31P-7300143 and up (See note 3, below)  
PA-31T Cheyenne.....31T-7400002 and up (See note 3, below):Outbd. Tanks Only.

## NOTES:

1. These serial numbers reflect aircraft in which the Goodyear BTC-39 construction type fuel cells could have been factory installed.
2. These aircraft are affected only if Fuel Tank Replacement Kit (Rubber Cell), Piper part number 757 020 has been field-installed.
3. These aircraft are affected only if original (factory-installed) fuel cells have been replaced in the field; if aircraft records do not reflect the replacement cell(s) construction number (e.g., Goodyear BTC-39, BTC-54 or BTC-67), cell(s) must be visually checked - to ascertain construction number. ONLY BTC-39 CONSTRUCTION TYPE CELLS ARE AFFECTED.

## Compliance Time:

1. Initial (Fuel Leakage) Visual Inspection: "Within the next twenty-five (25) hours of operation or thirty (30) days", in accordance with FAA Airworthiness Directive No. 78-05-06.
2. Fuel Cell Pressure Test: Within the next 100 hours of operation or 180 days, whichever occurs first (unless cell leakage is observed per above inspection - see AD 78-05-06 pp.b.), perform pressure test in accordance with AD and instructions provided herein.

Purpose: Goodyear BTC-39 "Vithane" bladder type fuel cells (specifically, deterioration of the molded connector nipples and drain fitting attachments) was the subject of a recent FAA/industry conference, resulting from reports of deteriorated subject type fuel cells and fuel cell rupture-caused fire hazards (non-Piper models). As a result of this meeting, Airworthiness Directive No. 78-05-06 - based on information contained in Goodyears Service Bulletin No. FT-77-1 Revision B dated August 31, 1977 - has been issued containing fuel cell inspection, pressure testing and replacement requirements. In addition, each affected aircraft manufacturer is publishing service instructions for identification of affected aircraft. Fuel/fuel cell type, detailed fuel cell pressure testing information and cell replacement guidelines (if necessary) in accordance with the AD requirements.

This service release provides information to comply with the fuel cell inspection, testing

.....continued

Purpose: (continued)

and replacement guidelines contained in FAA Airworthiness Directive No. 78-05-06 affecting Piper airplanes with Goodyear BTC-39 construction type fuel cells installed.

Instructions:

1. Ascertain type of fuel cells installed: "Construction No., BTC-\_\_\_\_" is indelibly stencilled on cell top surface.
  - a. If aircraft records, shop work order/invoice copies (where cell replacement is involved), etc. confirm that no BTC-39 (construction no.) type cells are installed, no further action (except log book entry) is required.
2. Aircraft specified in Models/Serial Numbers Affected, GROUP I (above) are likely to have BTC-39 fuel cells installed (original factory installation); proceed with step 4, below.
3. If aircraft specified in Models/Serial Numbers Affected, either GROUP I or II (above) have had fuel cell(s) replaced in the field - and cell construction no. is not known, inspect fuel cell(s) for construction no. and, if affected, proceed with step 4, below.
4. In accordance with Compliance Time No. 1, conduct visual check of aircraft lower wing surface, nacelles and/or fuselage lower areas for signs of fuel seepage/leakage (i.e., visible stains at fittings and/or lap joints).
  - a. If no signs of leakage or seepage are observed, proceed with step 5, below to reveal whether vent nipples above the normal fuel level are serviceable.
  - b. If evidence of leakage is found, determine source. If other than cell leakage (i.e., plumbing, installation, etc.) correct and proceed with step 5. See step 6 if cell leakage is confirmed.
5. In accordance with Compliance Time No. 2, conduct fuel cell pressure test per attached information.
6. If inspection/test results reveal leaking fuel cells, damaged and/or deteriorated nipples, fuel cell must be replaced (refer to appropriate parts catalog and service manual-where applicable-for fuel cell ordering information and installation details, respectively. NOTE: Goodyear Service Bulletin No. FT-77-1 Rev. C dated January 12, 1978 is attached and is to be referred to for nipple fitting inspection.
7. If above inspection/test procedures confirm fuel cell serviceability, prepare aircraft for return to service.
8. Make appropriate log book entry.
9. Fuel cell pressure test (refer to step 5, above) must be repeated every twelve (12) months on BTC-39 cells until/unless cell(s) is (are) replaced.

Material Required: For fuel cell replacement(s) - due to inspection/test results - refer to appropriate Piper parts catalog for fuel cell identification and ordering data. NOTE: Fuel cells in factory stock are not BTC-39 construction type.

Availability of Parts: Your Piper Field Service Facility.

Effectivity Date: This Service Bulletin is effective upon receipt.

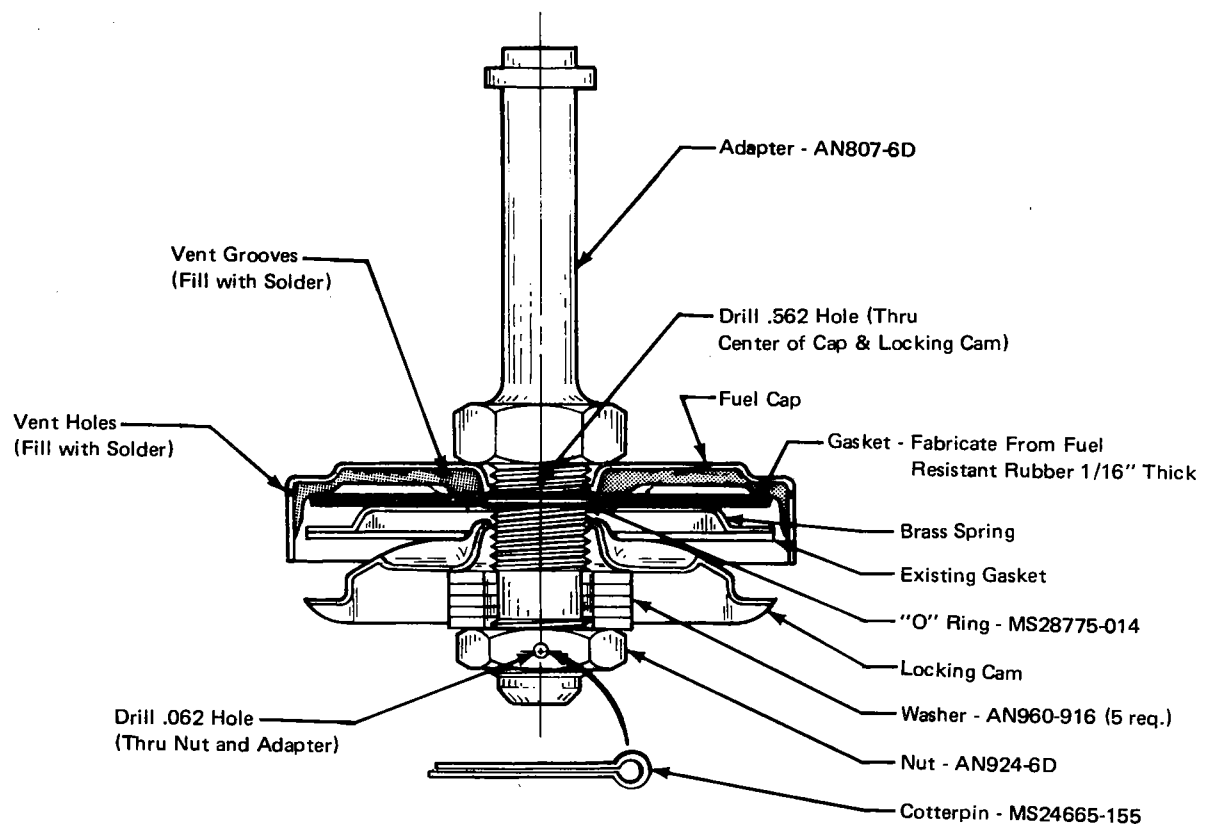
Summary: Please contact your Piper Field Service Facility to make arrangements for compliance with the provisions of this service release in accordance with Compliance Time, above. This service release is submitted to guard affected owners/operators against fuel cell leakage of BTC-39 construction type fuel cells, composed of a rubber compound subject to deterioration by age and environmental conditions, and to remove suspect fuel cells from service.

## FUEL CELL PRESSURE TEST INSTRUCTIONS

- A. FUEL CELL PRESSURE TEST PROCEDURES FOR PA-25-150, PA-25-235 and PA-25-260 FUEL CELL. REFER TO SKETCH "A".
1. Remove existing fuel cap from fuel cell and fill cell with fuel. Retain fuel cap for reinstallation.
  2. Obtain a fuel cap, PAC Part No. 60707-04, and rework for this test as follows. (Refer to Figure 2 on Sketch "A").
    - a. Drill out rivet in center of fuel cap. Remove locking cam, gaskets and brass spring from cap.
    - b. Enlarge hole in center of cap and locking cam to .562 dia.
    - c. Fill vent holes and vent grooves in fuel cap with solder until level and sand smooth.
    - d. Reassemble fuel cap, as shown, using new and existing parts. Tighten the AN924-6D nut securely to compress gaskets and "O" ring. CAUTION: This assembly must be tight, so locking cam and AN807-6D adapter do not rotate in cap.
    - e. Drill a .062 dia. hole thru the AN924-6D nut and AN807-6D adapter as shown. Install cotterpin MS24665-155.
    - f. Clean inside of adapter and fuel cap of any drill chips.
  3. Install reworked fuel cap on fuel cell.
  4. Refer to Figure 1. Install a section of flexible tubing to the fuel cap adapter and the overflow vent as shown. Tubing must extend at least 12" above highest point of fuel cell. (Insure that .062 dia. hole in overflow vent is covered with tube.)
  5. Fill the fuel cell and flexible tubing with fuel. Fuel level in tubing must be at least 12" above highest point of fuel cell as shown. Allow one or two minutes for fuel level to stabilize.
  6. Inspect aircraft for evidence of fuel leakage or seepage. Maintain fuel level in flexible tubing for not less than fifteen minutes unless fuel leakage is observed sooner. Fuel leakage may also be revealed by a reduction in height of fuel in tubing.
    - a. If there is no evidence of fuel leakage or seepage from the fuel cell, discontinue the test. Restore the fuel system to flight configuration.
    - b. If there is evidence of fuel leakage or seepage from the fuel cell, refer to the attached Goodyear Service Bulletin FT-77-1 and inspect the fuel cell per Section II. Any fuel cell found with cracking, peeling or deteriorated cell interior and/or deteriorated nipples must be replaced. (Refer to PA-25 Pawnee parts catalog for fuel cell ordering information.)
  7. Make proper logbook entry of Service Bulletin 591 compliance.
- B. FUEL CELL PRESSURE TEST PROCEDURES FOR PA-31 and PA-31-300 MAIN and AUXILIARY FUEL CELLS. REFER TO SKETCH "B". (Accomplish on one fuel cell at a time.)
1. Obtain a fuel cap, PAC Part No. 454 258, or stopper, MS36369-15, and rework for this test per Figure 1.
  2. Fabricate a fuel drain plug per Figure 2.
  3. Obtain a stopper MS36369-1 and rework as follows: See Figure 3.
    - a. Drill a .156 dia. hole thru center of stopper.
    - b. Install a 3/16 O.D. x 2" long tube in .156 hole.
    - c. Shave or sand stopper to fit the .40 dia. fuel vent hole on bottom of wing.
  4. Attach fuel drain plug to drain on bottom of wing as shown in Figure 4.
  5. Install reworked stopper MS36369-1 in .40 fuel vent hole as shown in Figure 4. Stopper must fit tightly in vent hole.
  6. Remove existing fuel cap from fuel cell and fill cell with fuel. Retain fuel cap for reinstallation.
  7. Install fuel cap or stopper, that was reworked per Figure 1, on fuel cell.
  8. Attach a section of fuel resistant tubing to the fuel cap or stopper and the fuel vent stopper as shown in Figure 4.
  9. Fill the fuel cell and flexible tubing with fuel. Fuel level in tubing must be at least 12" above highest point of fuel cell as shown. Allow one or two minutes for fuel level to stabilize.
  10. Inspect aircraft for evidence of fuel leakage or seepage. Maintain fuel level in flexible tubing for not less than fifteen minutes unless fuel leakage is observed sooner. Fuel leakage may also be revealed by a reduction in height of fuel in tubing.
    - a. If there is no evidence of fuel leakage or seepage from the fuel cell, discontinue the test. Restore the fuel cell to flight configuration.
    - b. If there is evidence of fuel leakage or seepage from the fuel cell, refer to the attached Goodyear Service Bulletin FT-77-1 and inspect the fuel cell per Section II. Any fuel cell found with cracking, peeling or deteriorated cell interior and/or deteriorated nipples must be replaced. (Refer to PA-31 Navajo parts catalog and service manual for fuel cell ordering information and installation details.)
  11. Make proper logbook entry of Service Bulletin 591 compliance.

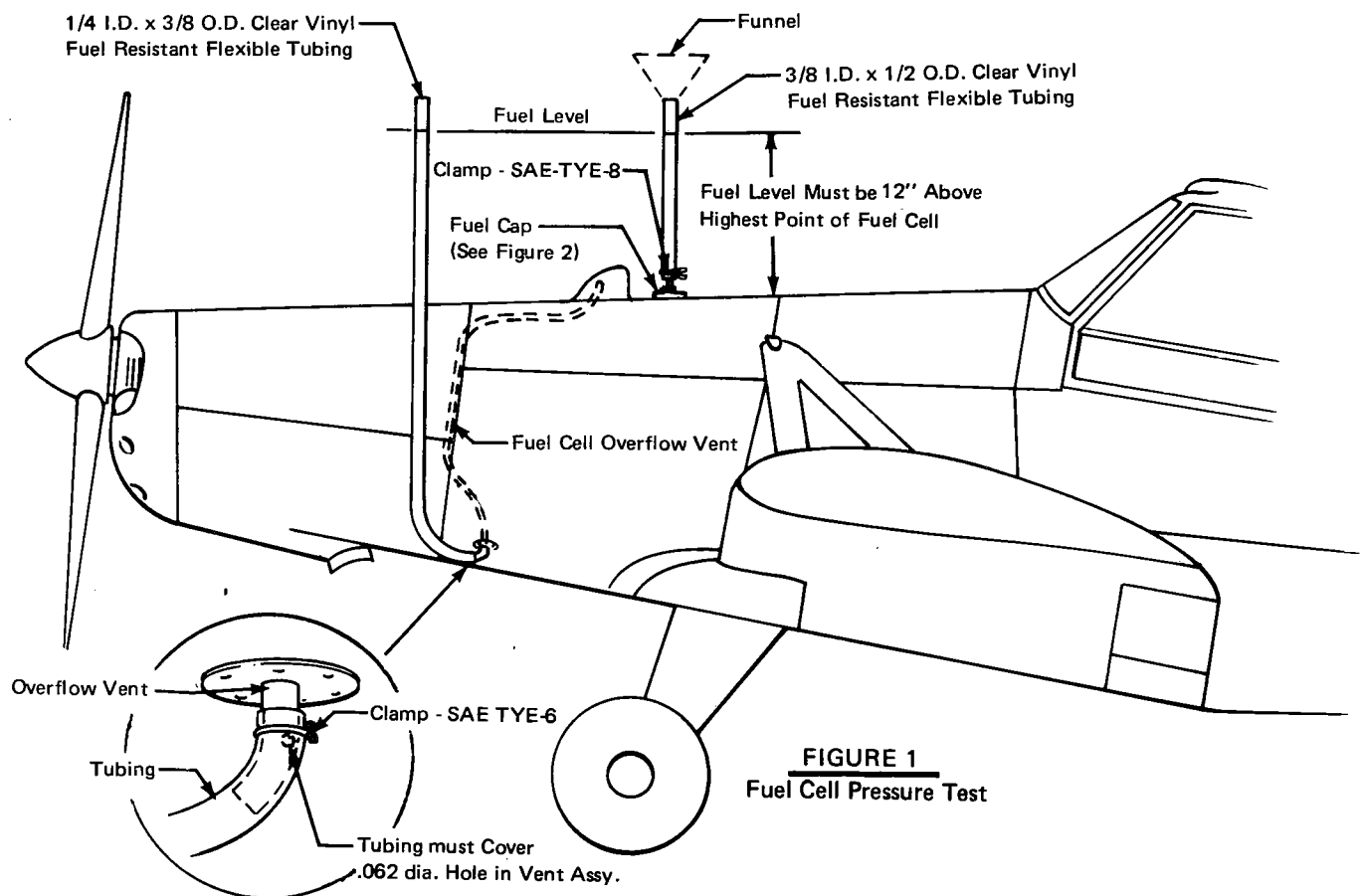
C. FUEL CELL PRESSURE TEST PROCEDURES FOR PA-31P MAIN, AUXILIARY AND NACELLE FUEL CELLS. REFER TO SKETCH "C".

1. Obtain two fuel caps, PAC Part No. 454 258, or stoppers, MS36369-15, and rework for this test per Figure 1.
2. Fabricate a fuel drain plug per Figure 2.
3. Obtain a stopper MS36369-1 and rework as follows: See Figure 3.
  - a. Drill a .156 dia. hole thru center of stopper.
  - b. Install a 3/16 O.D. x 2" long tube in .156 hole.
  - c. Shave or sand stopper to fit the .40 dia. fuel vent hole on bottom of wing.
4. Obtain a line assembly PAC Part No. 17881-06 or make one per Figure 4.
5. Refer to Figure 5 and pressure test main fuel cells as follows:
  - a. Attach fuel drain plug to drain on bottom of wing as shown.
  - b. Install reworked stopper MS36369-1 in .40 fuel vent hole as shown. Stopper must fit tightly in vent hole.
  - c. Remove existing fuel cap from fuel cell and fill cell with fuel. Retain fuel cap for reinstallation.
  - d. Install a fuel cap or stopper, that was reworked per Figure 1, on fuel cell. Only one reworked fuel cap or stopper is needed for the main fuel cell test.
  - e. Attach a section of fuel resistant tubing to the fuel cap or stopper and the fuel vent stopper as shown.
  - f. Fill fuel cell and flexible tubing with fuel. Fuel level in tubing must be at least 12" above highest point of fuel cell as shown. Allow one or two minutes for fuel level to stabilize.
  - g. Inspect aircraft for evidence of fuel leakage or seepage. Maintain fuel level in flexible tubing for not less than fifteen minutes unless fuel leakage is observed sooner. Fuel leakage may also be revealed by a reduction in height of fuel in tubing.
    - (1.) If there is no evidence of fuel leakage or seepage from the main fuel cell, discontinue the test. Restore the fuel cell to flight configuration.
    - (2.) If there is evidence of fuel leakage or seepage from the main fuel cell, refer to the attached Goodyear Service Bulletin FT-77-1 and inspect the fuel cell per Section II. Any fuel cell found with cracking, peeling or deteriorated cell interior and/or deteriorated nipples must be replaced. (Refer to PA-31P Navajo parts catalog and service manual for fuel cell ordering information and installation details.)
6. Refer to Figure 6 and pressure test the auxiliary and nacelle fuel cells simultaneously as follows:
  - a. Attach fuel drain plug to drain on bottom of wing as shown.
  - b. Install reworked stopper MS36369-1 in .40 fuel vent hole as shown. Stopper must fit tightly in vent hole. Remove heated fuel vent tube on serial nos. 31P-3 to 31P-7400224 incl. before installing stopper.
  - c. Remove the nacelle fuel vent cover from aircraft with serial nos. 31P-7400225 and up. Attach vent line assembly to nacelle fuel vent elbow as shown.
  - d. Remove nacelle and auxiliary fuel caps from fuel cells and fill with fuel. Retain fuel caps for reinstallation.
  - e. Install fuel caps or stoppers, that were reworked per Figure 1, on auxiliary and nacelle fuel cells.
  - f. Attach a section of fuel resistant tubing to the fuel caps or stoppers, the fuel vent stopper, and the nacelle vent line assembly as shown.
  - g. Fill fuel cells and flexible tubing with fuel. Fuel level in tubing must be at least 12" above highest point of the nacelle fuel cell as shown. Bleed air from the fwd and aft nacelle vent line drain cocks, located on bottom of nacelle. Allow one or two minutes for fuel level to stabilize.
  - h. Inspect aircraft for evidence of fuel leakage or seepage. Maintain fuel level in flexible tubing for not less than fifteen minutes unless fuel leakage is observed sooner. Fuel leakage may also be revealed by a reduction in height of fuel in tubing.
    - (1.) If there is no evidence of fuel leakage or seepage from either fuel cell, discontinue the test. Restore the fuel cell to flight configuration.
    - (2.) If there is evidence of fuel leakage or seepage from the fuel cells, refer to the attached Goodyear Service Bulletin FT-77-1 and inspect both fuel cells per Section II. Any fuel cell found with cracking, peeling or deteriorated cell interior and/or deteriorated nipples must be replaced. (Refer to PA-31P Navajo parts catalog and service manual for fuel cell ordering information and installation details.)
7. Make proper logbook entry of Service Bulletin 591 compliance.



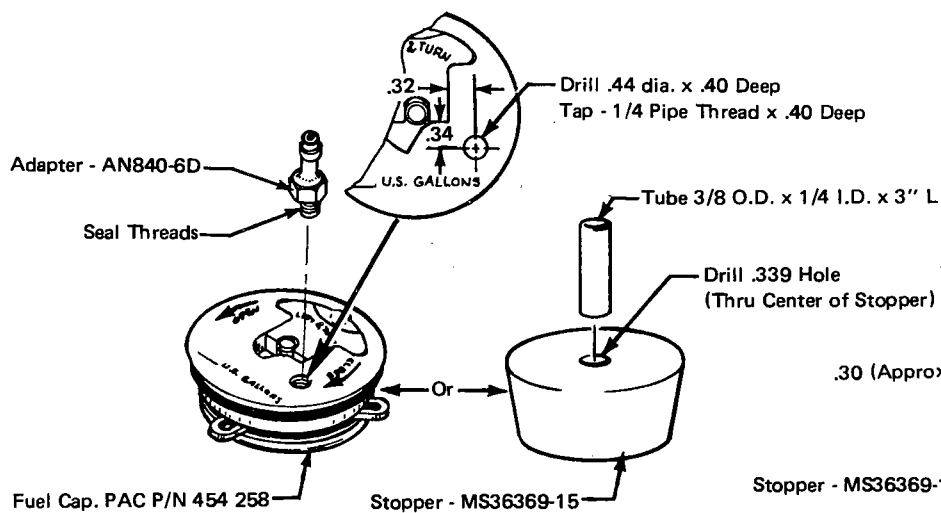
**FIGURE 2**

Reworked Fuel Cap (PAC P/N 60707-04)

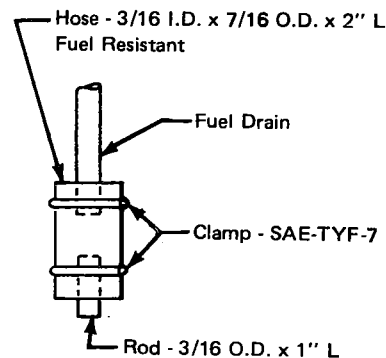


**FIGURE 1**

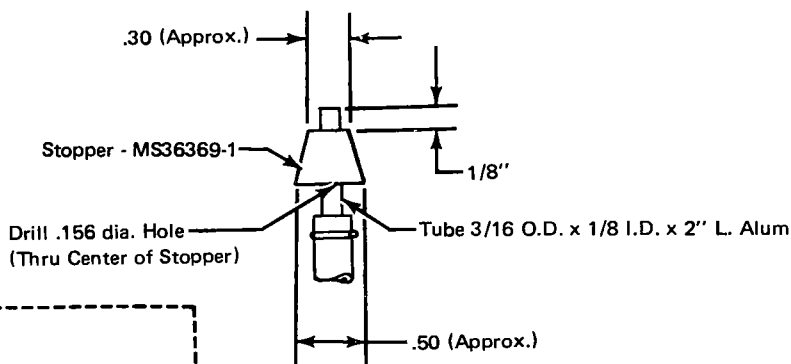
Fuel Cell Pressure Test



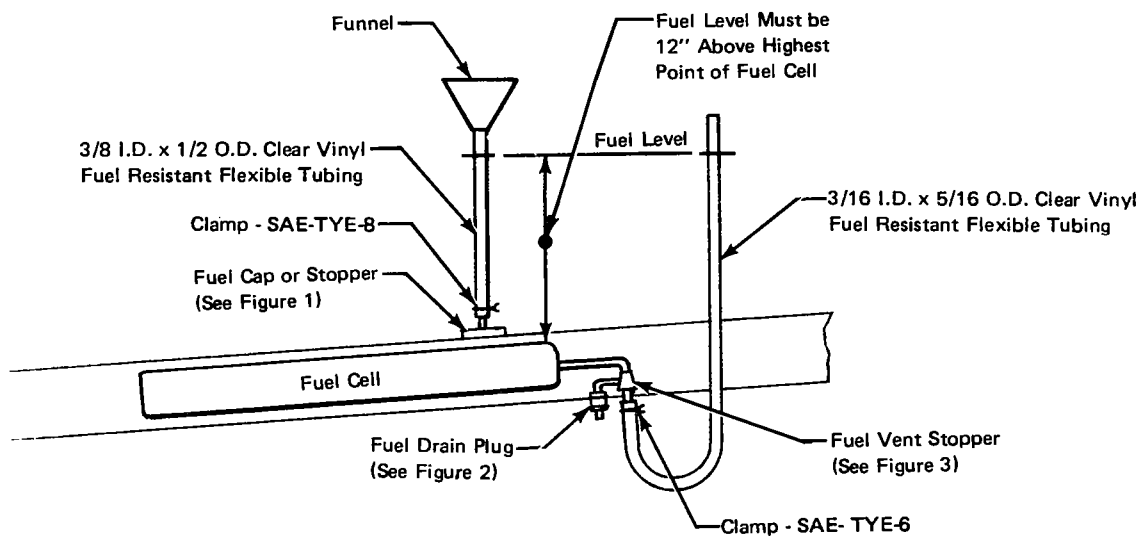
**FIGURE 1**  
Fuel Cap/Fuel Stopper



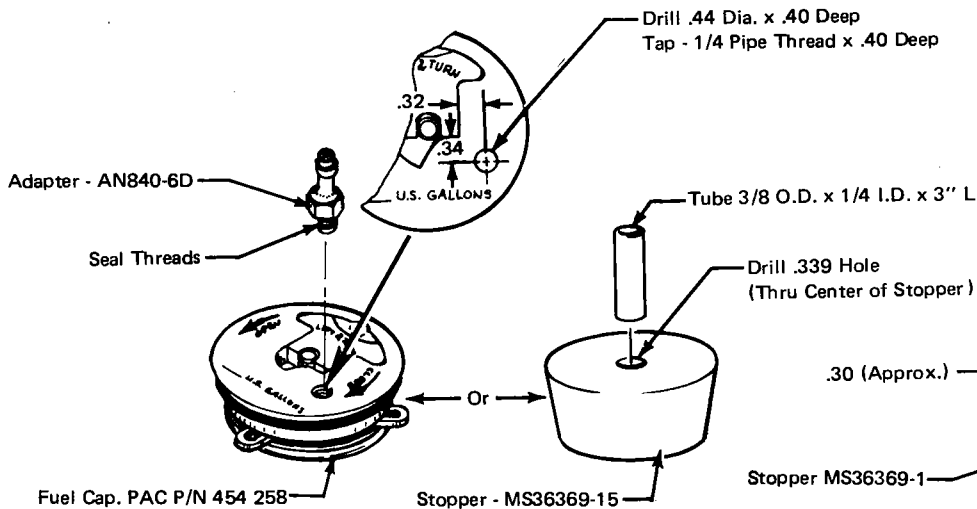
**FIGURE 2**  
Fuel Drain Plug



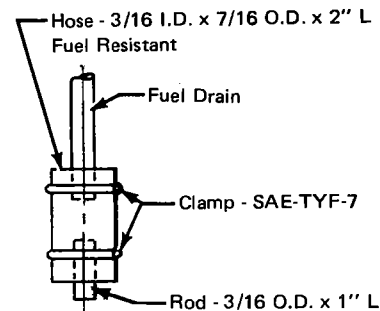
**FIGURE 3**  
Fuel Vent Stopper



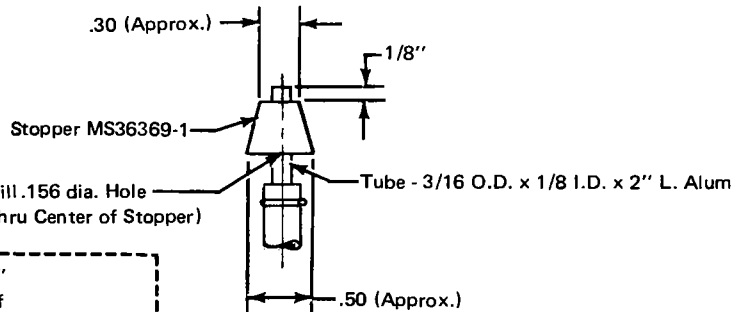
**FIGURE 4**  
Typical Fuel Cell Pressure Test



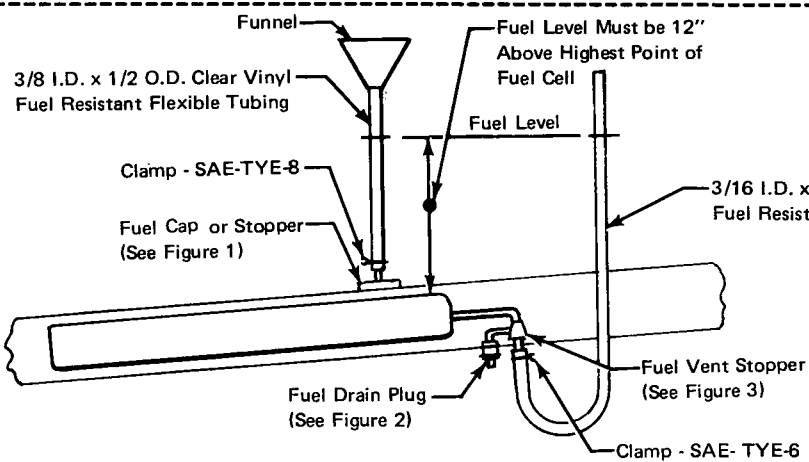
**FIGURE 1**  
Fuel Cap/Fuel Stopper



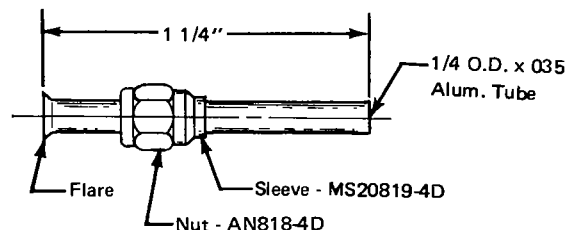
**FIGURE 2**  
Fuel Drain Plug



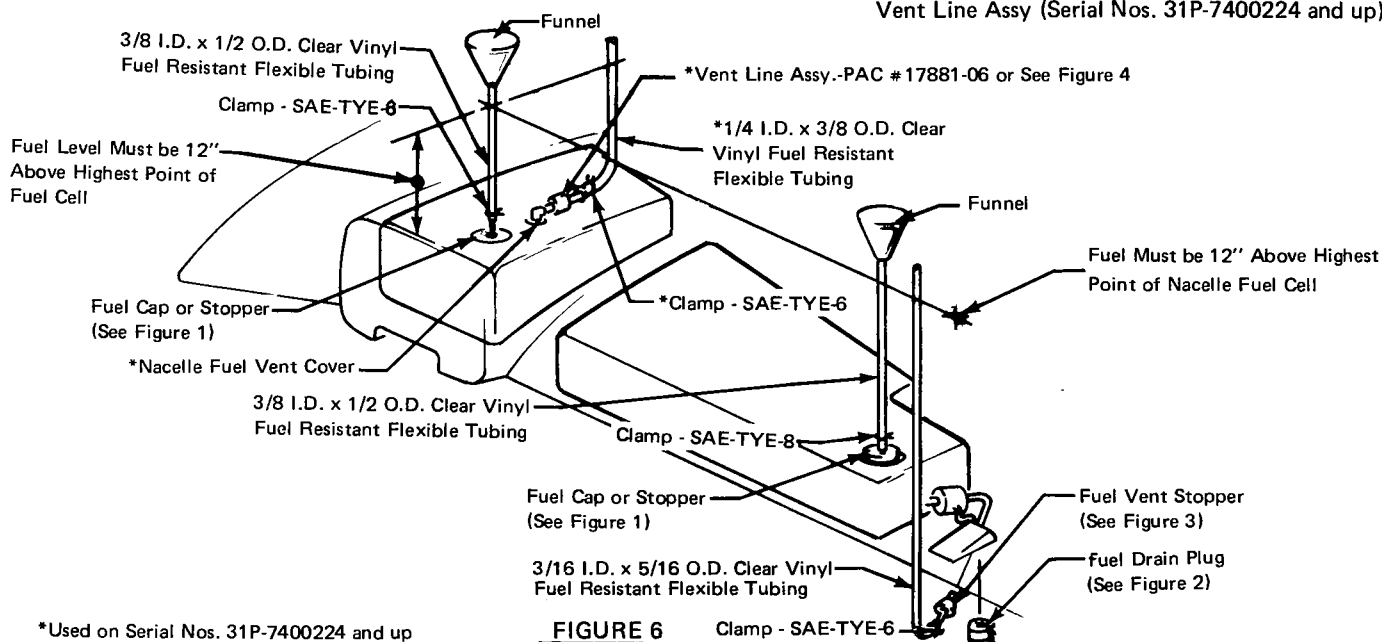
**FIGURE 3**  
Fuel Vent Stopper



**FIGURE 5**  
Main Fuel Cell Pressure Test



**FIGURE 4**  
Vent Line Assy (Serial Nos. 31P-7400224 and up)



**FIGURE 6**  
Nacelle and Auxiliary Fuel  
Cell Pressure Test

SKETCH "C" (PA-31P)

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\*Used on Serial Nos. 31P-7400224 and up



ENGINEERED FABRICS DIVISION  
GOODYEAR AEROSPACE CORPORATION  
AKRON, OHIO 44315/ROCKMART, GEORGIA 30153

## SERVICE BULLETIN

SUBJECT: FUEL TANKS - RECOMMENDED INSPECTION FOR POSSIBLE FUEL SEEPAGE AND LEAKAGE FROM BTC-39 SERIES FUEL TANKS INCLUDING INSPECTION FOR POSSIBLE DETERIORATED OR SOFT RUBBER NIPPLE FITTINGS.

### SECTION I - PLANNING INFORMATION

A. EFFECTIVITY:

This Service Bulletin affects the following list of Aircraft series, but not necessarily limited to, which may be equipped with Goodyear BTC-39 series fuel tanks. Fuel tanks of Goodyear Construction BTC-54 and BTC-67 series are not affected.

BEECH

35-33  
35  
36  
45  
T34  
50  
95-55  
56TC  
58  
60  
65-88  
65  
70  
65-80  
65-90  
95  
99  
100  
200

CESSNA - SINGLE

180  
182  
185  
205  
206  
207  
210  
188

CESSNA - TWIN

310  
320  
340  
401  
402  
411  
414  
421

ROCKWELL INTERNATIONAL  
GENERAL AVIATION DIVN

500  
520  
560  
680  
681  
720  
685  
690

PIPER

PA25  
PA31

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A. EFFECTIVITY: (cont'd)

ROCKWELL INTERNATIONAL  
SABRELINER DIVN.

ISRAEL AIRCRAFT

40  
60

1121  
1123

B. REASON:

To inspect for possible deterioration and fuel seepage from BTC-39 series fuel tanks manufactured by Goodyear Aerospace or The Goodyear Tire & Rubber Co., between 1961 and 1971.

C. DESCRIPTION:

Aircraft bladder fuel tanks are an assembly of items made up of age sensitive rubbers. These rubbers are subject to deterioration by time, humidity, high temperature and other environmental conditions that may be experienced in the course of storage or use. Therefore, an immediate inspection of this type of fuel tank is recommended.

D. COMPLIANCE:

- 1) For aircraft affected, which incorporate Goodyear BTC-39 series fuel cells, Goodyear recommends an immediate inspection for signs of fuel seepage or leakage. See airframe manufacturers recommended inspection and detection methods of leakage. If tank leakage is found, perform the inspection in Section II.
- 2) New tanks (never used) of BTC-39 construction are not recommended for installation. Goodyear recommends replacement of BTC-39 tanks with the newer, improved Construction BTC-67. Dispose of BTC-39 series tanks per the instructions of the appropriate airframe manufacturer.
- 3) Used BTC-39 series fuel tanks found to be leaking or deteriorated should not be repaired or reinstalled.
- 4) Used BTC-39 series fuel tanks removed for reasons other than leakage or deterioration are not recommended for reinstallation.

E. REFERENCE:

Goodyear Aerospace Corporation  
Fuel Tank Repair Manual AP 368  
Beech Service Instructions 0895  
Cessna Single SE-78-10 Service Letter  
Cessna Twin ME-78-7 Service Letter  
Rockwell International Service Bulletin 165  
Piper Service Bulletin 591  
Israel Aircraft Service Bulletin Model 1121 CJ-17  
and Model 1123 WW-20

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## SECTION II - ACCOMPLISHMENT INSTRUCTIONS

### A. INSPECTION AND/OR CHECK:

#### Inspection

1. After tank leakage is confirmed, access to the nipple fitting and tank interior should be accomplished in accordance with aircraft manufacturers instructions.
2. Inspect the interior of each tank for cracking, peeling, or other signs of deterioration.
3. Inspect vent, drain, fuel outlet and inter-connect nipples. These may be inspected by the fingernail test to give an indication of the condition of the nipple.

The fingernail test consists of using the fingernail to attempt to scrape the rubber off the nipple fitting (see Figure 1). If the rubber has not degraded, the fingernail will glide across the rubber without damage to the rubber. If an unsatisfactory condition exists, the fingernail will dig into the rubber. The rubber will have a consistency of either art gum or chewing gum.

4. Any fuel tank found seeping or with soft nipples should be replaced.
5. Replacement fuel tanks should be installed in accordance with aircraft manufacturers instructions.

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A. INSPECTION AND/OR  
CHECK: (cont'd)

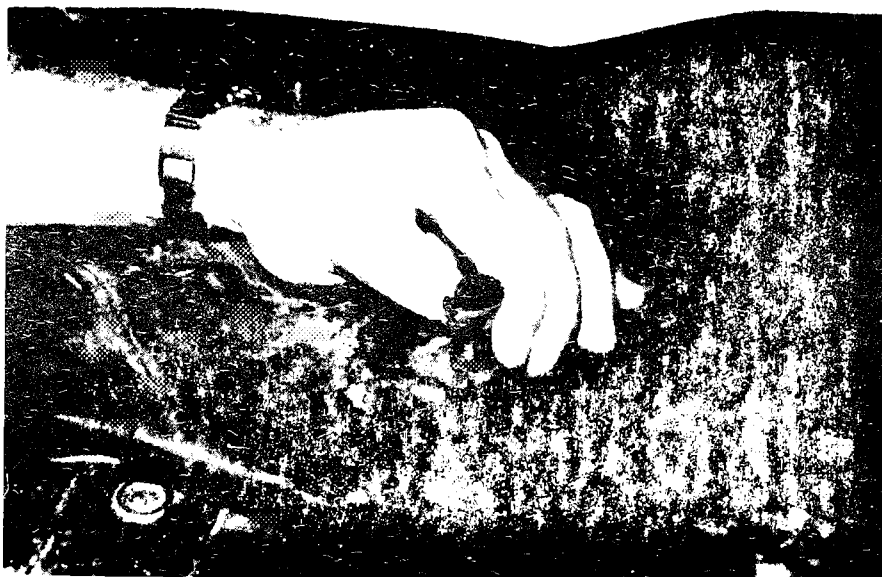


FIGURE 1

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