

N53RD

1981 Cessna Citation I

Branson Fuel Tank STC

MSN: 500-0415



Prepared by the worldwide aviation specialists at RidgeAire, Inc.

3.

United States of America
Department of Transportation — Federal Aviation Administration
Supplemental Type Certificate

Number SA80RM

This certificate, issued to

Branson Aircraft Corporation
7993 West 48th Avenue
Wheat Ridge, Colorado 80033

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 25 of the Federal Aviation Regulations:

Original Product — Type Certificate Number: A22CE
Make: Cessna
Model: 500

Description of Type Design Change:

Installation of extended range fuel tank and relocation of aft pressure bulkhead in accordance with Branson Aircraft Corporation List of Drawings and Documents No. 91800, Sheets 1 and 2, Revision A, dated 9/10/76, approved September 16, 1976, or later FAA approved revision.

Limitations and Conditions: Cessna 500 Serial Numbers 0303 and up only, provided it is determined that this Supplemental Type Certificate is compatible with later design changes to this model aircraft. This approval should not be extended to other aircraft of this model on which previously approved modifications are incorporated unless it is determined by the installer that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that aircraft.

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: March 3, 1976

Date issued:

Date of issuance: September 16, 1976

Date amended:



By direction of the Administrator

Mark E. Baldwin
(Signature)
MARK E. BALDWIN, Chief
Engineering and Manufacturing Br., ARM-210
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

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Branson Aircraft Corporation
Wheat Ridge, Colorado

F.A.A. APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
CITATION FUSELAGE FUEL TANK
CESSNA CITATION MODEL 500
FAA STC SA80RM

The information in this document is FAA Approved material, which, together with the basic Cessna Citation Model 500 Airplane Flight Manual, is applicable and must be carried in the basic manual when the airplane is modified by the installation of the Branson Aircraft Corporation Citation Fuselage Fuel Tank modification in accordance with STC SA80RM.

The information in this document supersedes the basic manual only where covered in the items contained herein. For Limitations, Procedures, and Performance not contained in this supplement, consult the basic manual.

DESCRIPTION:

The Citation Fuselage Fuel Tank provides approximately 120 gallons of additional fuel for long range missions. The Tank is located between Fuselage Station 289 and Fuselage Station 304. The center of gravity of the Fuselage Tank is located at Fuselage Station 297.0. The Fuselage Fuel Tank is filled from the left main wing tank using the existing boost pump. The Fuselage Tank controls are located on the Right Hand Meter Panel and consist of a rotary switch with FILL, OFF, and XFER positions. Indicator lights denote FULL, INTRANSIT, and EMPTY conditions of the Fuselage Tank and valves. The FILL valve is located between the existing fuel system and the Fuselage Fuel Tank. When the Fuselage Tank is full, a float switch automatically shuts off the boost pump and closes the FILL valve. To transfer fuel from the Fuselage Fuel Tank into the wing tanks, the switch is turned to XFER. The Fuselage Tank empties into both main wing tanks at the inboard rib. When the EMPTY light shows, the switch is returned to OFF after allowing a few minutes for the tank to completely drain. Fuel quantity is measured by the existing wing gauges after XFER.

LIMITATIONS:

1. Fuel must not be transferred from the fuselage tank during takeoff and landing.
2. Fuel must not be transferred from the left wing tank to the fuselage tank while in flight.

FAA APPROVED:

for Mark E. Baldwin
MARK E. BALDWIN, Chief

Engineering & Manufacturing Br., ARM-210
Flight Standards Division

SEP 16 1976

(Date)

Branson Aircraft Corporation
Wheat Ridge, Colorado

F.A.A. APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
CITATION FUSELAGE FUEL TANK
CESSNA CITATION MODEL 500
FAA STC SA80RM

LIMITATIONS (Continued):

3. Fuel must be transferred before wing fuel is reduced to 1000 pounds total. If fuselage fuel has not completely transferred as indicated by the EMPTY light do not utilize remaining fuselage fuel for flight planning.
4. At least 30 minutes is required to transfer the fuselage fuel, depending on wing fuel capacity; therefore, as soon as convenient after takeoff the transfer should be initiated.
5. The usable fuel quantity in the fuselage tank is 791 pounds.

PROCEDURES:

NORMAL

1. Preflight when the Fuselage Fuel Tank is to be used include the following:
 - a. Drain a small quantity of fuel from the sump drain located on the bottom of the fuselage at F.5. 320 and the approximate center line. Check to insure the drain valve is closed when completed.
 - b. Check the Fuselage Fuel Tank switch is in the OFF position before starting engines.
 - c. Check the FULL light for quantity indication when performing the normal cockpit check before takeoff.
2. Fill the Fuselage Fuel Tank by turning the Fuselage Fuel Tank Switch to FILL. Do not manually switch on boost pump. The usable fuel quantity is 791 pounds.
3. When the Fuselage Tank is full, the Left Hand Boost Pump will turn off and the Fill Valve will close. The FULL light will turn on. When the Boost Pump turns off, return the Fuselage Fuel Tank Switch to OFF. The left wing fuel tank may then be refilled.

FAA APPROVED: _____

SEP 11 1976

(Date)

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Branson Aircraft Corporation
Wheat Ridge, Colorado

F.A.A. APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
CITATION FUSELAGE FUEL TANK
CESSNA CITATION MODEL 500
FAA STC SA80RM

PROCEDURES:

NORMAL (Continued)

4. Transfer the fuselage fuel to the Wing Tanks by turning the Fuselage Fuel Tank Switch to XFER.
5. When the Fuselage Tank is empty, the EMPTY light will turn on. Allow a short period after the EMPTY light turns on for the Fuselage Fuel Tank to completely drain into the wing tank before turning the Fuselage Fuel Tank Switch to OFF.
6. For Weight and Balance data refer to Weight and Balance section of Flight Manual.
7. Fuselage fuel tank will not normally fully empty into the wing tanks until the wing fuel quantity is below 1200 pounds.

EMERGENCY:

1. If the Fuselage Fuel Tank float switch fails to turn off the boost pump and close the valve within a short period after the FULL light turns on manually turn the Fuselage Fuel Tank Switch to OFF to prevent fuel from draining from the vent.
2. If the Fuselage Fuel Tank fails to transfer before 1000 pounds of fuel is needed, check the Fuselage Fuel Circuit Breaker. If Circuit Breaker has opened, reset and attempt transfer again. If tank fails to transfer, fuselage fuel becomes unusable and a revised flight plan is required. Check center of gravity position full Fuselage Fuel Tank and expected minimum wing fuel.

PERFORMANCE:

The Flight Manual performance for the Cessna Citation Model 500 aircraft with the Fuselage Fuel Tank installed equals that for the unmodified aircraft.

FAA APPROVED: SEP 10 1976
(Date)

BRANSON AIRCRAFT CORPORATION
Wheat Ridge, Colorado

CITATION EXTENDED RANGE
FUEL SYSTEM SPECIFICATION

I. GENERAL DESCRIPTION

The Citation Extended Range Fuel System is located in the fuselage between the existing pressure bulkhead and a new pressure bulkhead over the rear spar. The bottom of the new pressure bulkhead is located approximately six inches above the rear spar and tapers back to the baggage floor channel on the existing pressure bulkhead. Above the spar the new pressure bulkhead covers the full cabin area.

The fuel tank is constructed with a double wall and a complete vent space all around which drains overboard. The tank is fabricated of aluminum with double sealed joints on both the vent space and the inner tank.

Pressure loads are carried back to the existing bulkhead through intercostals around the periphery which attach to the main beams and vertical beams on the inside located coincident with the existing pressure bulkhead vertical beams. A zee-section around the front outside seals the new pressure bulkhead to the existing fuselage frame at F.S. 290.69. The bottom is sealed to the existing stringers and aft pressure bulkhead.

The tapered bottom permits access to the maintenance areas under the aft baggage compartment floorboards. The height above the spar of six inches is adequate for removal of any equipment items and inspections of the area.

The installation fully meets the transport category requirements of FAR Part 25.

II. FUEL TANK

The fuel tank is fabricated from aluminum and is sealed integrally. The sealant is Pro Seal 890 B-12, which meets MIL S-8802 Rev. D, and serves equally well as a pressure seal or a fuel seal. Sealing consists of both

faying surface and fillet seals. All fasteners are sealed. The tank inside is coated with epoxy primer manufactured by Bostik-Finch Company, number 454-4-1.

The usable fuel in the tank is 120 gallons. With the tapered bottom a natural sump exists on the centerline of the aircraft. Adequate vent space is provided at the top of the tank.

III. CONTROL

The fuel system is controlled by a rotary switch located on the right-hand meter panel. FULL, EMPTY, and INTRANSIT lights show the tank condition. The switch has FILL, OFF, and XFER positions.

IV. FUEL SYSTEM LINES AND VALVES

The fuel tank is filled from the left-hand wing tank using the existing boost pump. A fill valve is opened and the boost pump turned on when the operating switch is moved to the FILL position. A float switch automatically reverses the above procedures when the tank is filled and activates the FULL light. The INTRANSIT light is activated when either a FILL or XFER operation is taking place.

When the operating switch is moved to the XFER position, the transfer valve opens and fuel flows to both left-hand and right-hand wing tanks. A float switch activates the EMPTY light.

The fill and transfer valves are electrically operated ball valves manufactured by Whittaker Controls, Part No. 230125. Both inlet and outlet holes are one inch size. An INTRANSIT light shows that either of these systems is in operation.

All fuel, vent, and drain lines will be fabricated from 5052-0 aluminum tubing. Standard AN flared fittings will be used. Bulkhead fittings will include Parker Stat-O-Seal gaskets. All valves and lines in the tail cone are shrouded in fuel vapor-proof compartments and shroud lines. A fuel strainer is included in the tank line at the tank exit to provide strained fuel into and out of the tank. All fuel lines are properly identified.

V. VENTING

The Citation wing scoop will be modified to fit under the fuselage to provide vent pressure for the tank. The vent line ends close to the top centerline of the tank. Hose and clamp fittings are used to attach the vent line segments. Bulkhead fittings are used at the tank and existing pressure bulkhead. The vent line will have a mesh screen installed for lightning protection.

VI. DRAINS

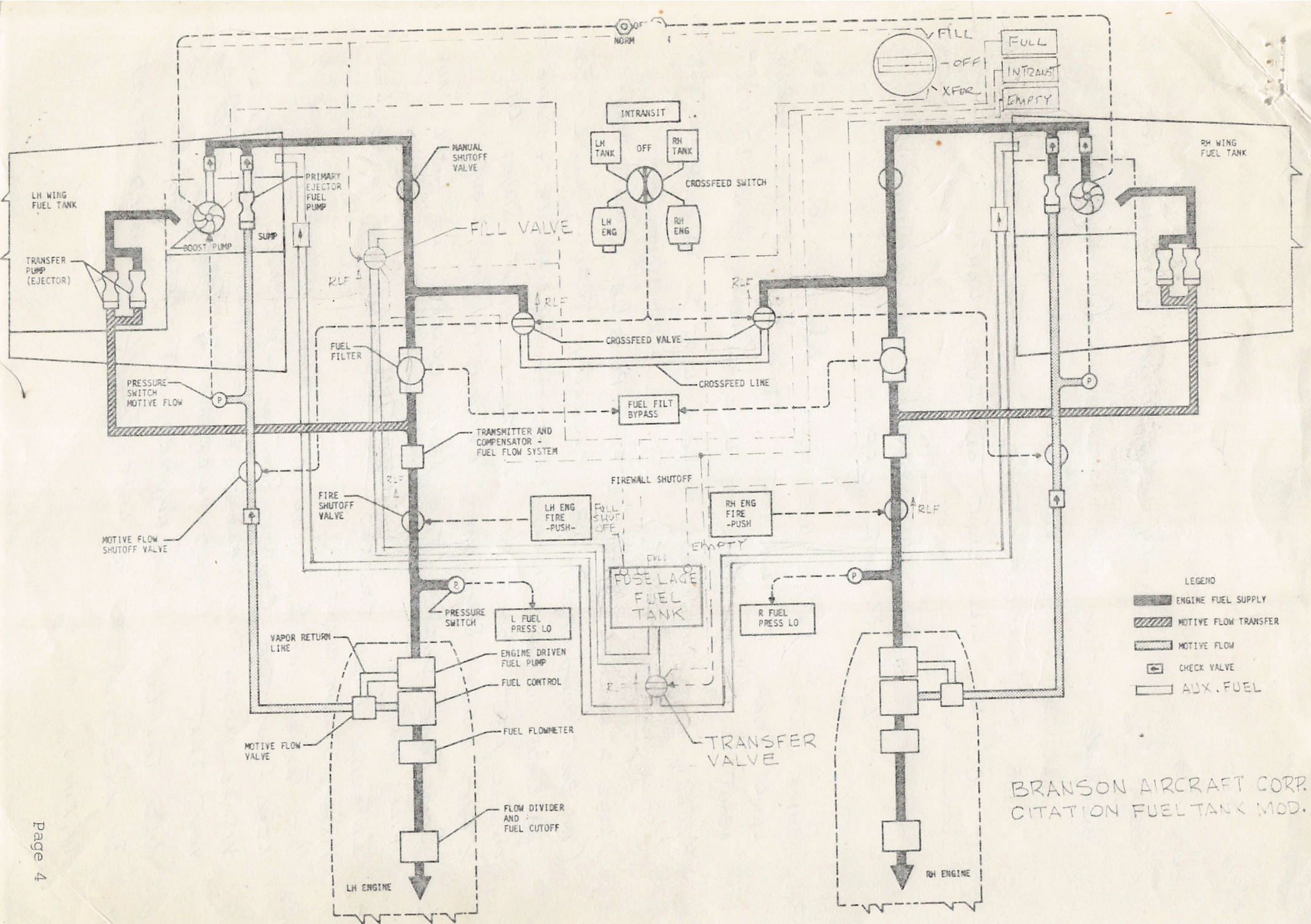
Both the tank sump and vent space are drained. The vent space drains into the tank line shroud which discharges into the wing root fillet. The tank sump is drained through a push-to-open valve located in the left-hand aft wing fillet.

VII. FULL AND EMPTY GAGING

Lights showing the fuselage tank full and empty conditions is located on the right-hand meter panel. The lights are activated by float switches in the tank.

VIII. OPERATION

The minimum wing fuel for fuselage tank transfer is based on maximum fuel flow to the engines compared to transfer rate and maximum gust structural loads with a full fuselage tank.



800 lbs ON LANDING - NO EMPTY LITE.

AFTER LANDING -

1. FUEL SW. TO FILL TO FILL TANK
2. XFEED RT TO SUPPLY LEFT WING FUEL FOR FUSEL. TANK.

SOMETIME DURING THIS OPERATION - (UNMONITORED)

- A. THE FUSEL. TANK FILLED SHUTTING OFF LT BOOST.
- B. RT TANK FED OUT PUTTING 150-200 lbs IN LT. TANK.
- C. NO FILL LIGHT ON FUSEL LIGHT.

A/C WAS REFUELED WITH NO OBVIOUS MALFUNCTIONS
ALL POWER OFF

3. SOME 20" LATER WE WERE INFORMED OF A FUEL LEAK FROM LT TANK VENT. UPON CHKING WE FOUND ABOUT A 1" IN DIAMETER LEAK POURING FROM LT VENT.
4. BATTERY WAS TURNED ON XFEED LEFT TO RT & LEAK STOPPED.
(STILL NO FILL LIGHT.) LFT FULL - RT 100# LOW
5. AFTER A NORMAL START "L FUEL PRESS LO" LIGHT STAYED ON
(NO BOOST PUMP OPER.) BY MANUALLY TURNING ON LT BOOST THE LIGHT WOULD FLICKER - GO OFF FOR AWHILE & COME BACK ON FOR A BIT. BOOST OFF & PRESS LO LIGHT STAYED LIT.
XFEED WOULD SOMETIMES EXTINGUISH THE LIGHT.
6. SOMETIME DURING THE ABOVE CHECKS THE FUSEL TANK FILL LIGHT LIT.
7. INTERNAL FUEL DROPPED ~~400-500~~ 600-700 lbs IN 10" - NO LEAKS VISIBLE FROM COCKPIT.
8. WE TAXIED OUT FOR RUN UP & TOWER INFORMED US OF A LEAK FROM THE CENTER SECTION AMIDSHIP.
9. VISUAL INSPECTION SHOWED A LEAK FROM FUSEL TANK VENT THAT WE COULD INCREASE BY TURNING ON ^{ANY} BOOST.
10. WHEN THE LEFT WING EMPTIED OUT LEAK STOPPED.
11. BY XFEEDING RT TO LEFT THE LEAK WOULD START AGAIN