FLINT AERO, INC.
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Doc No.: FTC453.001

FAA APPROVED
AIRPLANE FLIGHT MANUAL SUPPLEMENT
TO THE
OFFICIAL PILOT'S OPERATING HANDBOOK AND
FAA APPROVED AIRPLANE FLIGHT MANUAL
AND
SUPPLEMENTAL AIRPLANE FLIGHT MANUAL
FOR
CESSNA 170, 172, and 175 AIRPLANES
WITH
FLINT AERO AUXILIARY FUEL TANKS

The information in this document is FAA approved material and must be attached to the FAA Approved Airplane Flight Manual or carried in the airplane if the airplane does not have an FAA approved Airplane Flight Manual when the airplane has been modified by the installation of the Flint Aero Auxiliary Fuel Tanks in accordance with STC SA1614WE.

This document is applicable to the Official Pilot's Operating Handbook and FAA Approved Airplane Flight Manual for those Cessna airplanes which require the manual, and to the basic placards and markings for those airplanes without a manual. The following airplanes are included when Flint Aero, Inc. Auxiliary Fuel Tanks have been installed, and this document is applicable to the below model landplanes, ski planes, and floatplanes:

TC A-799: 170A, 170B
TC 3A12: 172, 172A, 172B, 172C, 172D, 172E, 172F, 172G, 172H, 172I, 172K, 172L, 172M, 172N, 172P, 172Q, 172R, 172S
TC A4EU: * F172F, F172G, F172H, F172K, F172L, F172M, F172N
TC A18EU: * FR172E, FR172F, FR172G, FR172H, FR172J, FR172K
TC 3A17: 175, 175A, 175B, 175C, R172K, 172RG, R172E

* Reims Aviation S.A. Cessna Models

The information contained herein appends, supplements, or supersedes the Official Pilot's Operating Handbook and FAA Approved Airplane Flight Manual or the basic placards and markings for Cessna 170, 172 and 175 series airplanes only in those areas listed herein. For limitations, procedures, and performance information not contained in this document, consult the Official Pilot's Operating Handbook and FAA Approved Airplane Flight Manual, or the basic placards and markings for the specific Cessna 170, 172 or 175 series airplanes.

FAA Approved Hien Tong

Acting **Manager, Flight Test Branch, ANM-160L**
Federal Aviation Administration
Los Angeles Aircraft Certification Office
Transport Airplane Directorate

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SECTION I – GENERAL

This Flint Aero, Inc. Supplement to the Official Pilot's Operating Handbook and FAA Approved Airplane Flight Manual or the basic placards and markings for Cessna 170, 172 175 series airplanes addresses operations when modified by installation of Flint Aero Auxiliary Fuel Tanks in accordance with STC SA1614WE. New performance data are included herein. The changes to the Performance Specifications are shown in Table 1-1 below.

Table 1-1

PERFORMANCE SPECIFICATIONS WITH INTERNAL AUXILIARY TANKS			
SPEED	Maximum (V_{NO})		No Change
	Max Cruise Power – Standard Day Conditions		No Change
CRUISE	With fuel allowance for engine start, taxi, takeoff, climb and 45 minutes reserve.		
	Additional range and endurance for Basic Airplane set in Cruise Power range @10,000 ft with 23 Gal usable auxiliary fuel.	Range	292 NM
		Time	2.3 Hrs.
CLIMB	Sea Level Std Day Rate of Climb		No Change
	Service Ceiling		No Change
TAKEOFF	Sea Level Std Day Ground Roll		No Change
	Total Distance Over 50 Ft. Obstacle		No Change
LANDING	Sea Level Std Day Ground Roll		No Change
	Total Distance Over 50 Ft. Obstacle		No Change
STALL	Flaps Up, Power Off		No Change
	Flaps Down, Power Off		No Change
MAXIMUM WEIGHT	Ramp		No Change
	Takeoff		No Change
	Landing		No Change
STANDARD EMPTY WEIGHT – Basic airplane plus			40 LBS
MAXIMUM USEFUL LOAD – Basic airplane minus			40 LBS
BAGGAGE ALLOWANCE (See applicable POH)			No Change
WING LOADING: lbs./Sq. Ft.			No Change
POWER LOADING lbs./HP			No Change
FUEL CAPACITY Basic airplane plus 23 usable US gal Aux Fuel			23 GAL
OIL CAPACITY			No Change.
ENGINE:			No Change
PROPELLER:			No Change

The above performance figures are based on fuel consumption values published in the Official Pilot's Operating Handbook and FAA Approved Airplane Flight Manual or the basic placards and markings for Cessna 170, 172, 175 series airplanes and will vary with individual airplanes and numerous factors affecting flight performance.

FAA Approved Date _____

SECTION II – LIMITATIONS

1. Airspeed Limitations

No Change

2. Airspeed Indicator Markings

No Change

3. Power Plant Instrument Markings

The following entry is added to the Powerplant Instrument Markings Table:

Power plant markings and their color-code significance.

INSTRUMENT	RED LINE (MINIMUM)	GREEN ARC (NORMAL OPERATING)	RED LINE (MAX)
Auxiliary Fuel Tank Quantity Indicators	E		
	(0.5 U.S. Gal. Unusable Each Tank)	----	----

4. Weight Limits

No change. Refer to current weight and balance documents.

5. Center of Gravity Limits

No change

6. Maneuver Limits

No change

7. Flight Load Factor Limits

No change

8. Kinds of Operations Limits

No change

9. Fuel Limitations

Fuel capacity is increased to the values in Tables 1-2 and 1-3 below:

Table 1-2

FUEL CAPACITY, U.S. GALLONS											
CESSNA MODELS	172										
	R,S	Q	N,P	I,K,L,M	C,D,E,F,G,H	B	172, A	P172D	R172K	172RG	R172E
Total Capacity	80	78	66	66	63	66	66	76	76	90	76
Total Usable	76	73	63	61	59	62	60	65	72	85	69
Total Capacity, Each Main Tank	28	27	21	21	19.5	21	21	26	26	33	26
Total Usable, Each Main Tank	26.5	25	20	19	18	19.5	18.5	21.3	24.5	31	23
Total Capacity, Each Aux Tank	12	12	12	12	12	12	12	12	12	12	12
Total Usable, Each Aux Tank	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5

Table 1-3

FUEL CAPACITY, U.S. GALLONS											
CESSNA MODELS	175				F172 (REIMS)			FR172 (REIMS)		170	
	175	175A	175B	175C	F,G,H	K,L,M	N,P	E,F,G ,H,J	K	170A	170B
Total Capacity	76	76	76	76	63	66	67	76	76	42	42
Total Usable	66	65	65	65	59	61	63	69	72	37	37
Total Capacity, Each Main Tank	26	26	26	26	19.5	21	21.5	26	26	21	21
Total Usable, Each Main Tank	21.5	21	21	20.7	18	19	20	23	24.5	18.5	18.5
Total Capacity, Each Aux Tank	12	12	12	12	12	12	12	12	12	12	12
Total Usable, Each Aux Tank	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5

9.1 Auxiliary Fuel Tank Transfer Limits

- When feeding from either or both main tanks, do not transfer auxiliary tank fuel into a main fuel tank until it is at least 15.0 gallons below full.
- When feeding from either main tank, begin tank transfer into that tank before its level drops below five gallons remaining.
- Do not transfer auxiliary fuel unless in level flight.

- Do not transfer auxiliary fuel during take off, landing, refueling, and when empty.

Note: Main fuel tank quantity below the full level can be determined by reference to fuel quantity gauges and by calculating fuel used by:

1) Estimating engine fuel flow rates versus time.
2) If installed, using engine fuel flow rate indicator vs. time.

10. Placards

The following information is displayed in the form of composite or individual placards.

10.1 In full view of pilot: "Total aux fuel 24 U.S. gals (23 gal useable)." Transfer aux fuel only in level flight when main is half empty and when main tank is not supplying engine. Aux fuel switch must be off during takeoff, landing, filling and when empty. For utility category operation aux tank fuel switch must be off and aux tanks empty."

10.2 At auxiliary fuel tank pump switches:

"Left wing aux fuel
12.0 U.S. gallons
11.5 gallons usable
ON OFF"

"Right wing aux fuel
12.0 U.S. gallons
11.5 gallons usable
ON OFF"

10.3 Installed adjacent to each auxiliary fuel tank leak detection drain (2 per side)

"Fuel or vapor from drain
requires immediate repairs"

10.4 Installed adjacent to appropriate wing tip tank pump circuit breakers or fuses:

"Aux tank L pump" Aux tank R pump"

10.5 For Models 172 through models 172M, F172F through F172M, and Models 170A and 170B; forward of each auxiliary tank filler: "12 U.S. gal. 80/87 min. grade Av. gasoline. Aux. fuel switch must be off before filling."

10.6 For Models 172N (S/N 17261445, 17267585-17259309) and F172N, F172P, FR172E through FR172J, FR172K(1977 model), R172E, R172K (S/N R1722000-1722794); forward of each auxiliary tank filler: "12 U.S. gal. 100/130 min. grade Av. Gasoline. Aux. fuel switch must be off before filling."

10.7 For Models 172N (S/N 17261578,17269310-17274009), 172P, 172Q, 172R, 172S, R172K (S/N R1722725 and on), 172RG, FR172K (1978 model on); forward of each auxiliary tank filler: "12 U.S. gal. 100LL/100 min. grade Av. gasoline. Aux. fuel switch must be off before filling."

SECTION III – EMERGENCY PROCEDURES

NOTE

With Flint Aero, Inc. Auxiliary Fuel Tanks installed, fuel transfer to the standard main wing tanks is provided by the auxiliary fuel transfer tank pumps controlled by the auxiliary fuel tank transfer pump switches.

EMERGENCY LANDING WITH OR WITHOUT ENGINE POWER

Auxiliary Fuel Tank transfer pump switches.....OFF.

WING FIRE

Auxiliary Fuel Tank transfer pump switches.....OFF.

SECTION IV – NORMAL PROCEDURES

PREFLIGHT INSPECTION – AUXILIARY FUEL TRANSFER TANKS

1. Visually inspect external areas of wing around auxiliary fuel tanks for any signs of fuel leakage.
2. Check each auxiliary tank filler cap for security and vent lines for obstructions. Visually check auxiliary fuel tanks for quantity.
3. From each auxiliary fuel tank, drain a sample quantity of fuel. Check for contamination. If any water is visible, drain additional amounts of fuel until all water is expelled from the tank.
4. Master switch on. Check auxiliary fuel tank gauges for fuel quantity.
5. With master switch on, check each auxiliary fuel tank pump for operation by operating each pump separately with auxiliary fuel tank transfer switches. Listen for pump operation. If no noise or vibration, assume pump is not operating. Check for serviceability.

Before Takeoff

a. Add the following to the before takeoff procedure:

Auxiliary fuel tank transfer pump switches.....OFF

SECTION V – PERFORMANCE

This performance data address the operation of an airplane incorporating Flint Aero STC SA1614WE Auxiliary Tanks. There are no changes to the Performance Section except for the Range and Endurance charts.

RANGE AND ENDURANCE PROFILES

With the Flint Aero auxiliary fuel tanks installed, the Cessna 170, 172, 175 series airplanes, cruise performance charts are valid for the usable fuel quantity as stated in the basic manual. The addition of two full 12.0 U.S. Gallons (11.5 gal. usable) Flint Aero auxiliary tanks increases the range and endurance shown in the Cessna Owner's Manuals and Pilot's Operating Handbook and FAA Approved Airplane Flight Manuals. The amount of increase in range and endurance will depend on the cruise speed, altitude, and power setting chosen, and will be different for each powerplant and airplane model. The increase in range and endurance of the added fuel can be calculated from the cruise speed and fuel consumption of each model at the altitude and temperature desired. The new airplane range and endurance can then be found by adding the range and endurance increases to the values tabulated in the Cessna manuals.

To calculate the range increase, find the True Airspeed and Gal/Hr fuel consumption for the cruise altitude and power setting desired. Calculate the cruise Miles per Gallon by dividing the Airspeed by the fuel consumption in gallons per mile:

Miles / Hr ÷ Gal / Hr = Miles / Gal.

Then multiply the miles per gallon by 23 gallons, the usable fuel contained in the auxiliary tanks to obtain the added range. Add this value to the range tabulated in the original Cessna manual to get the new range with the Flint Aero auxiliary tanks installed and filled.

To calculate the endurance increase, divide 23 gallons by the fuel consumption:

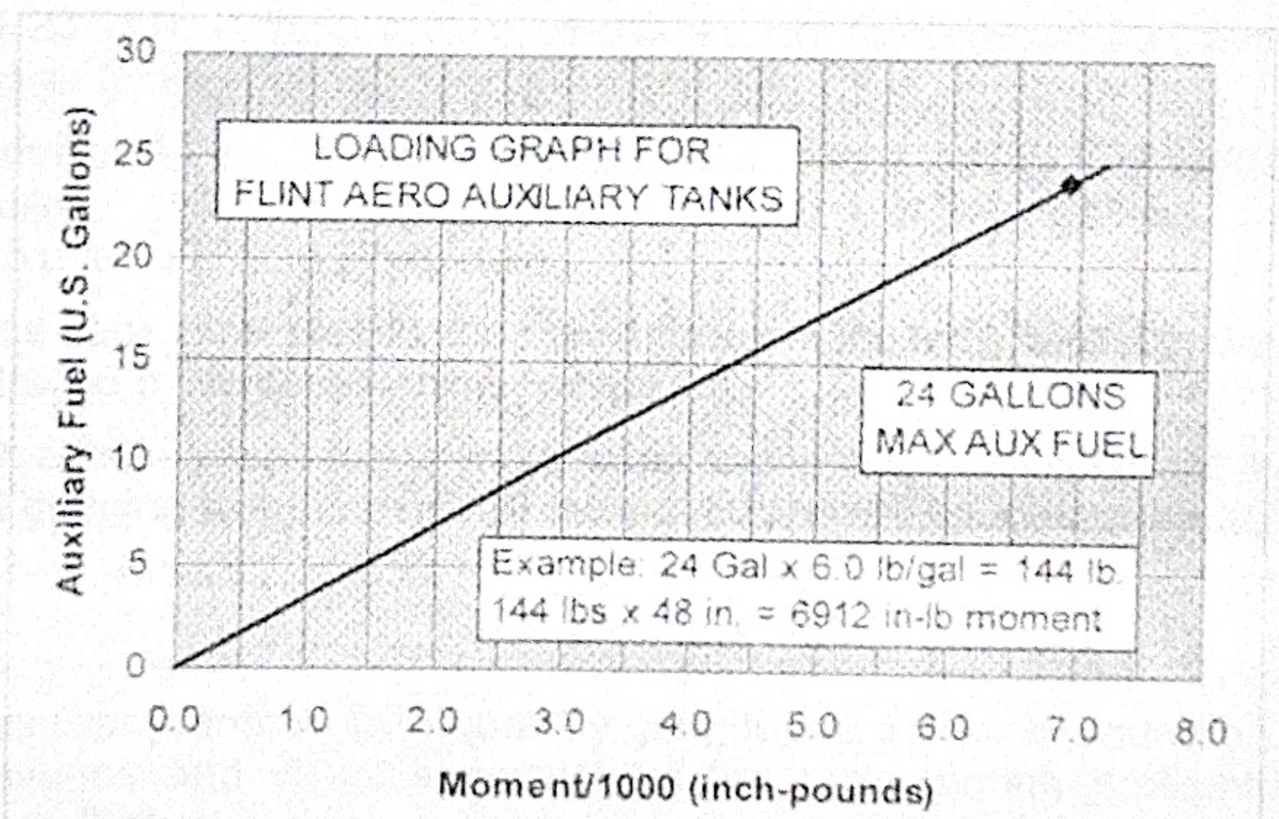
23 Gallons ÷ Gallons / Hr = Hrs Endurance. Add this number of hours to the endurance tabulated in the original Cessna manual to get the new endurance with the Flint Aero auxiliary tanks.

SECTION VI – WEIGHT AND BALANCE/EQUIPMENT LIST

ITEM NO	EQUIPMENT LIST DESCRIPTION	REF DRAWING	WEIGHT lbs.	ARM inches	MOMENT lb.-in.
2, 3	J. SPECIAL PACKAGES Install Flint Aero Aux Fuel Tank Systems	FA170	34.0	49.0	1666
	2 - Unusable fuel in Flint Aero Auxiliary Tanks (1.0 U.S. Gal. Avgas at 6.00 lbs./U.S.gal.)	FA170	6.0	50.0	300
	TOTAL INSTALLATION NET CHANGE		40.0	49.2	1966
In calculating weight and balance for full auxiliary fuel tank: 23 U.S. gal. Avgas usable x 6.0 lbs./U.S. gal. x 48 in. arm = 6624 lb.-in. or 6.624 lb.-in./1000. C.G. Arm = total moment divided by total weight.					

CENTER-OF-GRAVITY

Center of Gravity range, loading moments, and limits are unchanged. The load moment diagram for the auxiliary fuel tanks is shown below:



SECTION VII – AIRPLANE & SYSTEMS DESCRIPTIONS

1. Fuel Tank Capacities (U.S.Gallons)

   The Cessna 170, 172, 175 series airplanes have a wide range of fuel capacities. The total and usable fuel quantities for each model are shown in the Owner's Manual or in the Official Pilot's Operating Handbook and FAA Approved Airplane Flight Manual. The Flint Aero Auxiliary Fuel Tanks contain 24 total gallons and 23 usable gallons for all Cessna 170, 172, and 175 series airplanes.

2. Operation of Auxiliary Fuel Tanks (transfer)

   - To transfer, turn applicable "auxiliary fuel tank transfer switch" on. When auxiliary tanks indicate empty, turn applicable transfer switch off.
   - As a general procedure, do not transfer auxiliary tank fuel until after burning approximately 15 U.S. gallons of fuel from each main tank.

   NOTE: Should the transfer pump fail, it is not possible to transfer fuel from the affected tank in flight.

3. Electrical

   Left and right auxiliary fuel transfer tank quantity gauges and pump switches are located on sub panels in left and right wing roots or on the instrument panel or pedestal. The transfer pumps and gauges are powered from the main electrical bus through in-line fuses.

4. Fuel Quantity Data (U.S. Gallons)

   Add 23 U.S. gallons additional usable fuel to the total fuel available in the Cessna tanks.

   In addition to the Cessna main fuel tanks, two auxiliary fuel transfer tanks are installed. The capacity is 12.0 U.S. gallons each tank (11.5 usable U.S. gallons each).

   These tanks transfer to their respective main wing tank by transfer pumps controlled by switches in the cockpit.

   Each auxiliary tank has a water drain and is vented through the fuel filler cap. Fuel gauging is through either individual quantity gauges or a dual gauge.

NOTES

The auxiliary fuel (transfer) tank quantity gauges are similar in operation to the main fuel tank gauges and visual inspection of the tanks during preflight is the best assurance of fuel quantities. There are no provisions for visually determining reduced tank quantity.

The fuel in the auxiliary fuel transfer tanks is available to the engine only through the airplane's main fuel tanks. The main fuel tank gauges are the sole reference gauges for immediately available engine fuel.

Should an auxiliary fuel (transfer) tank pump fail, it is not possible to transfer fuel from the affected tank during the flight in progress and the pilot must immediately adjust his range and endurance calculations on the basis of the fuel available through the standard fuel system.

SECTION VIII – AIRPLANE HANDLING, SERVICE AND MAINTENANCE WITH AUXILIARY (TRANSFER) FUEL

NOTE

Before flight, check through the filler neck for auxiliary tank fuel quantity. No provision is made for calculating reduced capacity fuel in the auxiliary fuel tanks.