N 99715

Avcon

* * FX - 360 * *

CESSNA

172

SUPPLEMENT

Avcon

FAA APPROVED

AIRPLANE FLIGHT MANUAL SUPPLEMENT

FOR THE

CESSNA 172 N & P

REG. NO. 99715 SER. NO. 172-76501

This supplement must be attached to the basic FAA approved airplane flight manual when this aircraft is modified to the gross weight of 2550 Lbs., in accordance with the STC SA2800CE. The information contained herein supplements or supersedes the basic manual only in those areas listed herein. For limitations, procedures, and performance information not contained in this supplement, consult the basic airplane Flight Manual.

FAA APPROVED: DM Baker
for Lawrence A. Herron

MANAGER, AIRCRAFT CERTIFICATION OFFICE
FEDERAL AVIATION ADMINISTRATION
WICHITA, KS 67209

DATE: April 6, 1992

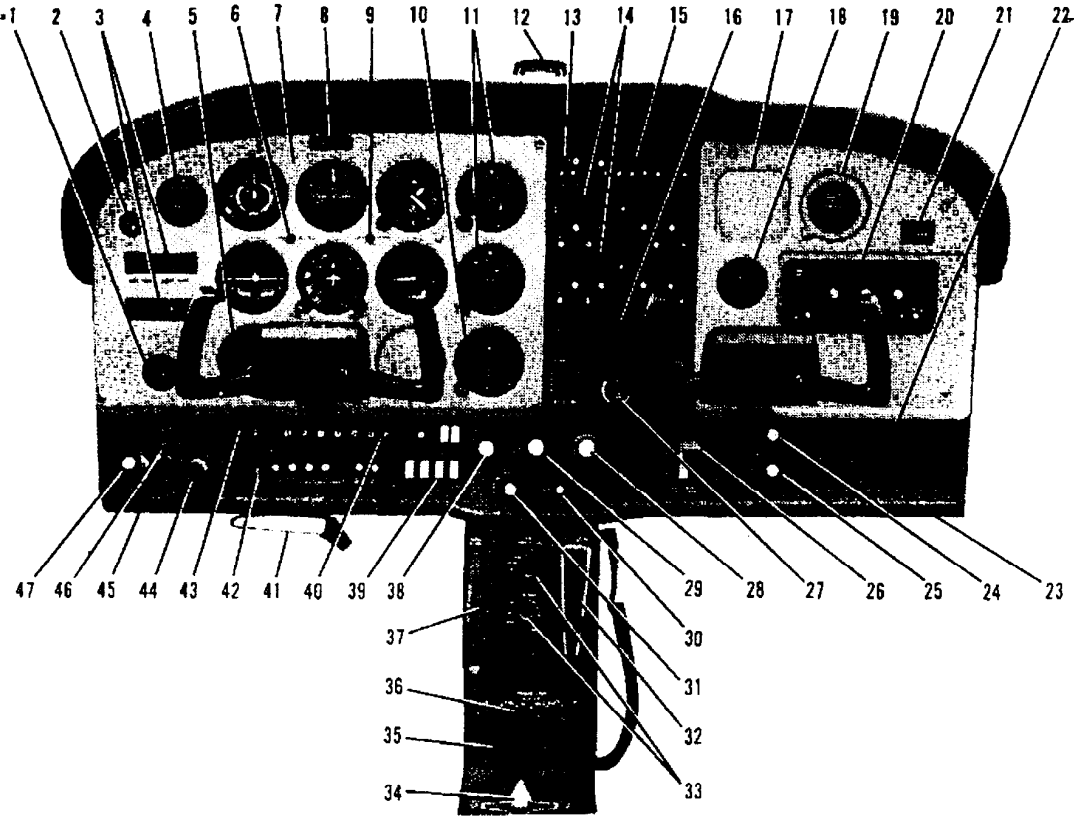


Figure 7-2. Instrument Panel (Sheet 1 of 2)

NOTE: For the List of Revisions to this Manual see Page 28.

CESSNA
MODEL 172P

1. Ammeter
2. Suction Gage
3. Oil Temperature, Oil Pressure, and Fuel Quantity Indicators
4. Digital Clock
5. Tachometer
6. Low-Voltage Warning Light
7. Flight Instrument Group
8. Airplane Registration Number
9. Low-Vacuum Warning Light
10. ADF Bearing Indicator
11. Course Deviation and Glide Slope Indicators
12. Magnetic Compass
13. Marker Beacon Indicator Lights and Switches
14. Nav/Com Radios
15. Audio Control Panel
16. Transponder
17. Additional Instrument Space
18. Economy Mixture Indicator (EGT)
19. Carbureter Air Temperature Gage
20. ADF Radio
21. Flight Hour Recorder
22. Map Compartment
23. Headset Jacks (Front Passenger)
24. Cabin Heat Control
25. Cabin Air Control
26. Wing Flap Switch and Position Indicator
27. Autopilot Control Unit
28. Mixture Control
29. Throttle (With Friction Lock)
30. Static Pressure Alternate Source Valve
31. Instrument and Radio Light Dimming Rheostats
32. Hand-held Microphone
33. Air Conditioning Controls
34. Fuel Selector Valve Handle
35. Fuel Selector Valve Handle Light
36. Rudder Trim Control Lever
37. Elevator Trim Control Wheel and Position Indicator
38. Carburetor Heat Control
39. Electrical Switches
40. Circuit Breakers and Fuse
41. Parking Brake Handle
42. Avionics Power Switch
43. Standby Vacuum Pump Switch
44. Ignition Switch
45. Headset Jacks (Pilot)
46. Master Switch
47. Primer

SECTION 7
AIRPLANE & SYSTEMS DESCRIPTIONS

TABLE OF CONTENTS

The sections in this Manual Supplement reflect the changes to the original Cessna Manual required for the STC modification. In many areas the original Manual is duplicated to simplify the supplements use for aircraft operation.

	SECTION
GENERAL	1
LIMITATIONS	2
EMERGENCY PROCEDURES	3
NORMAL PROCEDURES	4
PERFORMANCE	5 (p 15-20)
WEIGHT & BALANCE	6
AIRPLANE & SYSTEMS	7
AIRPLANE HANDLING AND SERVICE (Tires)	8
SUPPLEMENTS	9

Stall spds - max GW - 0 to 60° bank - 0-full flaps
(2 tables - essentially equivalent)

T.O. dist - short fld - max GW
TO dist - " " - lesser wgts
Rate of climb - max GW - diff. alts. & temps
Cruise performance - diff. alts, temps, pwr
Ldg dist. - short fld - max GW

SECTION I GENERAL

DESCRIPTIVE DATA

ENGINE
MANUFACTURER: AVCO (TEXTRON) LYCOMING
Models: 0-360A ( ) ( )
HORSEPOWER & RPM: 180 HP @ 2700 RPM

PROPELLER
MANUFACTURER: McCauley (Fixed Pitch)
Models: 1A170EFA-76-58
1A170CFA-76-58

MANUFACTURER: Sensenich (Fixed Pitch)
Models: 76 EM8S5-0-60
*76 EM8S14-0-60

*Note: The Sensenich model 76 EM8S14-0-60 is approved with solid shaft type engines only.

FUEL
AVIATION GRADE: 91/96, 100, 100/130, 100LL

OIL CAPACITY
SUMP: 8 Quarts
WITH FILTER: 9 Quarts

MAXIMUM WEIGHT
(NORMAL CATEGORY)
TAKEOFF: 2550 Lbs.
LANDING: 2550 Lbs.

SECTION II LIMITATIONS

The operating limitations stated in the form of markings, placards or in this FAA approved Airplane Flight Manual Supplement, apply to the airplane with the Lycoming 0-360 engine, Fixed Pitch Propeller, and the Gross Weight increased to 2550 Lbs.

AIRSPEED LIMITS		KNOTS
VNE	Never Exceed Speed	158
VNO	Maximum Structural Cruising Speed	127
VA	Maneuvering Speed	105
VFE	Maximum Flap Extended Speed	85

AIRSPEED INDICATOR MARKING

	KNOTS
White Arc	45-85
Green Arc	50-127
Yellow Arc	127-158
Red Line	158

POWERPLANT LIMITATIONS

ENGINE: Lycoming 0-360A ( )
MAXIMUM POWER: 180 BHP
MAXIMUM CONTINUOUS POWER: 2700 RPM (180 BHP)
MAXIMUM OIL TEMPERATURE: 245°F (118°C)
OIL PRESSURE: Minumum 25 PSI*
Maximum 100 PSI*

*Note: Late model Cessna 172's may have oil pressure gages marked at 20 PSI Min. and 115 PSI Max. These markings are approved for this 0-360 Lycoming installation.

PROPELLER LIMITATIONS

MANUFACTURER: McCauley
Models: 1A170EFA 76 58
1A170CFA 76 58
Diameter: Maximum 76.0 Inches
Minimum 74.0 Inches

MANUFACTURER: Sensenich
Models: 76Em8S5-0 60*
76EM8S14-0 60**
Diameter: Maximum 76.0 Inches
Minimum 76.0 Inches

Note: The Static RPM Range at full throttle (carburator heat off and mixture leaned to maximum RPM) is:

McCauley Propeller	2350 to 2475 RPM
Sensenich Propeller	2325 to 2450 RPM

*CAUTION: Placard required for Sensenich model 76EM8S5-0 ( ) when installed on hollow shaft Lycoming models. (See "PLACARDS" this section).

**CAUTION: The Sensenich model 76EM8S14-0 ( ) is approved with solid crankshaft engines only.

POWER PLANT

INSTRUMENT MARKINGS

Tachometer

Red Line ---------- 2700 RPM
Green Arc -------- 500-2700 RPM
*Red Arc --------- 2150-2350 RPM

*Applicable to Sensenich (76EM8S5) Propeller installed on hollow crankshaft model engines only.

WEIGHT LIMITS

Maximum Ramp Weight:	2558.0 Lbs.
Maximum Takeoff Weight:	2550.0 Lbs.
Maximum Landing Weight:	2550.0 Lbs.

CENTER OF GRAVITY LIMITS

Forward C.G.: 35.0 inches Aft of Datum up to 1950 Lbs. and 41.0 inches Aft of Datum at 2550 Lbs. (Straight Line Variation Between Points).

Aft C.G.: 47.3 inches Aft of Datum All Weights.

MANEUVER LIMITS

This Airplane is approved for NORMAL CATEGORY operation only, with the 0-360 engine modification installed.

Approved Maneuvers: Stalls (except Whip Stalls), Lazy Eights, Chandelles, and Steep Turns, (Not over 60° Angle of Bank).

All references to Utility Category (in the original Manufacturer's Manual, for weights, C.G., and Maneuvers) are NOT Applicable.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factor at 2550.0 Lbs.:

Flaps Up	+3.8G,-1.52G
Down	+3.0G

FUEL LIMITATIONS

Approved Aviation Fuel Grades: 91/96, 100/130, 100, & 100LL. (Minimum Approved Grade is 91/96)

FLAP LIMITATIONS

Operation Limit: Maximum flap down position is limited to 30°.

PLACARDS

(1) Reference to Utility Category on installed Placards should be disregarded. The airplane is limited to Normal Category operation with this Modification.

(2) Near Fuel Tank Filler Cap:
Placard for Grade of Aviation Gasoline
91/96, 100/130, 100, or 100LL
(Minimum approved Grade is 91/96)

(3) Near Fuel Pump Switch: Fuel Pump - Pull On
(Required for "Pressure Type" Fuel System Only).

(4) On Flap Control Indicator:
PLACARD-(Maximum Flap Down 30°)

(5) Near Tachometer:
Avoid continuous operation between 2150 and 2350 RPM. (Required for Sensenich Propeller model 76EM8S5-0 ( ) installed with hollow crankshaft model 0-360 engine only). H/P

(6) Gross Wgt Placard adjacent A/C Data Plate, (Placard No. 2550-15)

AIRSPEEDS FOR EMERGENCY OPERATIONS

Engine Failure After Takeoff:
- Wing Flaps Up ---------- 70 KIAS
- Wing Flaps Down ---------- 65 KIAS

Maneuvering Speed:
- 2550 Lbs. ---------- 105 KIAS
- 2150 Lbs. ---------- 95 KIAS
- 1750 Lbs. ---------- 85 KIAS

Precautionary Landing With Engine Power 65 KIAS

Landing Without Engine Power:
- Wing Flaps Up ---------- 70 KIAS
- Wing Flaps Down ---------- 65 KIAS

OPERATIONAL CHECKLISTS

ENGINE FAILURES

= Memory items (per POH)

ENGINE FAILURE DURING TAKEOFF ROLL

1. Throttle -- IDLE
2. Brakes -- APPLY
3. Wing Flaps -- RETRACT
4. Mixture -- IDLE CUT OFF
5. Ignition Switch -- OFF
6. Master Switch -- OFF

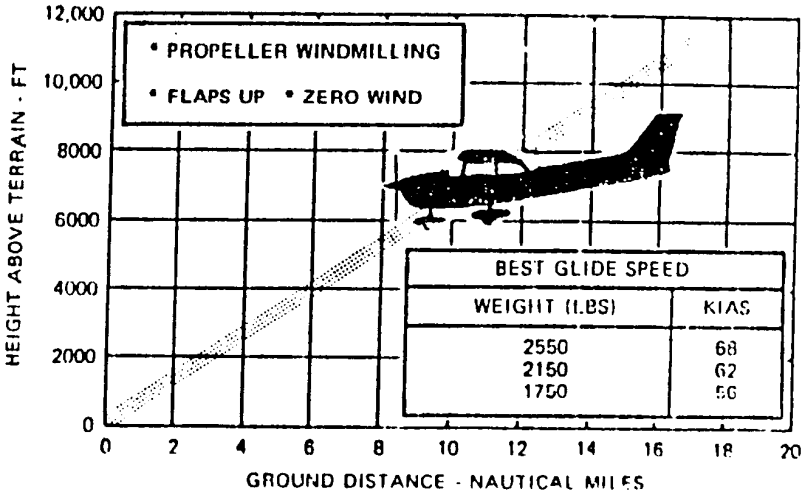
ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed -- 70 KIAS (Flaps UP)
   65 KIAS (Flaps DOWN)
2. Mixture -- IDLE CUT-OFF
3. Fuel Selector Valve -- ROTATE TO OFF
4. Ignition Switch -- OFF
5. Wing Flaps -- AS REQUIRED
6. Master Switch -- OFF

ENGINE FAILURE DURING FLIGHT (RESTART PROCEDURES)

1. Airspeed -- 75 KIAS
2. Carburator Heat -- ON
3. Fuel Selector Valve -- BOTH
4. Mixture -- RICH
5. NA ~~Auxiliary Fuel Pump~~ -- ON if fuel pressure is below 0.5 PSI (Optional Pressure System Only)
6. Ignition Switch -- BOTH (or START if propeller is stopped)
7. Primer -- IN and LOCKED

After an engine failure in flight the best glide speed, as shown in the figure below, should be established as quickly as possible. While gliding toward a suitable landing area, an effort should be made to identify the cause of the failure. If time permits, an engine restart should be attempted as shown in the checklist. If the engine cannot be restarted, a forced landing without power must be completed.



Maximum Glide

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

1. Seats, Seat Belts, Shoulder Harnesses SECURE
2. Airspeed -- 70 KIAS (Flaps UP)
   65 KIAS (Flaps DOWN)
3. Mixture -- IDLE CUT-OFF
4. Fuel Selector Valve -- ROTATE TO OFF
5. Ignition Switch -- OFF
6. Wing Flaps -- AS REQUIRED (30° recommended)
7. Master Switch -- OFF
8. Doors -- UNLATCH PRIOR TO TOUCHDOWN
9. Touchdown -- SLIGHTLY TAIL LOW
10. Brakes -- APPLY HEAVILY

DURING START ON GROUND

1. **Cranking -- CONTINUE,** to get a start which would suck the flames and accumulated fuel through the carburetor and into the engine.

If engine starts:

2. Power -- 1700 RPM for a few minutes.

a. Master Switch -- OFF.
b. Ignition Switch -- OFF.
c. Fuel Selector Valve -- PUSH DOWN AND ROTATE TO OFF.

9. Fire -- EXTINGUISH using fire extinguisher, wool blanket, or dirt.
10. Fire Damage -- INSPECT, repair damage or replace damaged components or wiring before conducting another flight.

ENGINE FIRE IN FLIGHT

1. **Mixture -- IDLE CUT-OFF.**
2. **Fuel Selector Valve -- PUSH DOWN AND ROTATE TO OFF.**
3. Master Switch -- OFF.
4. Cabin Heat and Air -- OFF (except overhead vents).
5. Airspeed -- 100 KIAS (If fire is not extinguished, increase glide speed to find an airspeed which will provide an incombustible mixture).
6. Forced Landing -- EXECUTE (as described in Emergency Landing Without Engine Power).

ELECTRICAL FIRE IN FLIGHT

1. **Master Switch -- OFF.**
2. **Vents/Cabin Air/Heat -- CLOSED.**
3. **Fire Extinguisher -- ACTIVATE** (if available).

WARNING

After discharging an extinguisher within a closed cabin, ventilate the cabin.

4. Avionics Power Switch -- OFF.
5. All Other Switches (except ignition switch) -- OFF.

If fire appears out and electrical power is necessary for continuance of flight:

6. Master Switch -- ON.

10. Airplane -- Evacuate through cabin doors. If necessary, open window and flood cabin to equalize pressure so doors can be opened.
11. Life Vests and Raft -- INFLATE

FIRES

Reference the Basic Airplane Flight Manual for procedures in case of fire.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 2550 Lbs. and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance, the speed appropriate to the particular weight must be used.

Takeoff:	
Normal Climb Out	75-85 KIAS
Short Field Takeoff, Flaps 10°, Speed at 50 Feet	57 KIAS
Enroute Climb, Flaps Up:	
Normal, Sea Level	75-85 KIAS
Normal, 10,000 Feet	70-80 KIAS
Best Rate of Climb, Sea Level	73 KIAS
Best Rate of Climb, 10,000 Feet	72 KIAS
Best Angle of Climb, Sea Level	62 KIAS
Best Angle of Climb, 10,000 Feet	67 KIAS
Landing Approach:	
Normal Approach, Flaps Up	65-75 KIAS
Normal Approach, Flaps 30°	60-70 KIAS
Short Field Approach, Flaps 30°	62 KIAS
Balked Landing:	
Maximum Power, Flaps 20°	60 KIAS
Maximum Recommended Turbulent Air Penetration Speed:	
2550 Lbs	105 KIAS
2150 Lbs	95 KIAS
1750 Lbs	85 KIAS
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing	15 KNOTS

BEFORE STARTING ENGINE

1. Preflight Inspection -- COMPLETE.
2. Passenger Briefing -- COMPLETE.
3. Seats, Seat Belts -- ADJUST and LOCK.
4. Brakes -- TEST and SET.
5. Avionics Power Switch -- OFF.

(CAUTION)

The avionics power switch must be OFF during engine start to prevent possible damage to avionics.

(Continued)

BEFORE STARTING ENGINE (Continued)

6. Circuit Breakers -- CHECK IN.
7. Electrical Equipment, Autopilot (if installed)-- OFF.
8. Fuel Slector Valve -- BOTH.

STARTING ENGINE

1. Carburetor Heat -- COLD
2. Mixture -- RICH
3. Propeller Area -- CLEAR
4. Master Switch -- ON
5. Throttle -- PUMP once or twice; leave open ¼ Inch If engine is HOT, turn auxiliary fuel pump on during start. (Optional Pressure System Only)
6. Ignition Switch -- START (release when engine starts)
7. Oil Pressure -- CHECK
8. Starter -- CHECK DISENGAGED (if starter were to remain engaged, ammeter would indicate full scale charge with engine running at 1,000 RPM)
9. Avionics Power Switch -- ON
10. Navigation Lights and Flashing Beacon -- ON as required
11. Radios -- ON

BEFORE TAKEOFF

1. Parking Brake -- SET
2. Seats, Seat Belts, Shoulder Harnesses -- CHECK SECURE
3. Cabin Doors -- CLOSED and LOCKED
4. Flight Controls -- FREE and CORRECT
5. Flight Instruments -- CHECK and SET
6. Fuel Quantity -- CHECK
7. Auxiliary Fuel Pump -- ON (Check for rise in fuel pressure), then OFF (Optional Pressure System Only)

—— NOTE ——
(OPTIONAL FUEL PRESSURE SYSTEM ONLY)

In flight, gravity feed will normally supply satisfactory fuel flow if the engine driven fuel pump should fail. However, if a fuel pump failure causes the fuel pressure to drop below 0.5 PSI, use the auxiliary fuel pump to assure proper engine operation.

BEFORE TAKEOFF (Continued)

8. Primer -- IN AND LOCKED
9. Mixture -- RICH
10. Fuel Selector Valve -- RECHECK BOTH
11. Elevator Trim and Rudder Trim (if installed) -- SET for Takeoff
12. Throttle - 1700 RPM
    a. Magnetos -- CHECK (RPM drop should not exceed 125 RPM on either magneto or 50 RPM differential magnetos)
    b. Carburator Heat -- CHECK (for RPM drop)
    c. Suction Gage -- CHECK
    d. Engine Instruments and Ammeter -- CHECK
13. Throttle -- 1000 RPM or LESS
14. Throttle Friction Lock -- ADJUST
15. Strobe Lights (if installed) -- AS DESIRED
16. Radios and Avionics -- SET
17. Autopilot (if installed) -- OFF
18. Air Conditioner (if installed) -- OFF
19. Wing Flaps -- SET for takeoff (see Takeoff checklists)
20. Brakes -- RELEASE

NOTE: Specialized Aircraft Operations - - When the aircraft is in service for Towing Banners, Gliders, or Night Sign Adverstisement, Etc., above normal engine temperatures may occur. Reference section IX (Supplements), of this manual, for installation of an optional engine cooling modification.

TAKEOFF

NORMAL TAKEOFF

1. Wing Flaps -- 0°-10° (10° reduces grnd roll + dist over obstacle by ~10%.)
2. Carburator Heat -- COLD
3. Throttle -- FULL OPEN (Flaps >10° for T/O not approved)
4. Mixture -- RICH (mixture may be leaned above 3000 feet to obtain maximum power)
5. Elevator Control -- LIFT NOSE WHEEL (at 55 KIAS)
6. Climb Speed -- 70-80 KIAS

SHORT FIELD TAKEOFF

SOFT FLD T/O: Flaps-10°

1. Wing Flaps -- 10°
2. Carburator Heat -- COLD
3. Brakes -- APPLY
4. Throttle -- FULL OPEN
5. Mixture -- RICH (above 3000 feet, LEAN to obtain maximum RPM)
6. Brakes -- RELEASE
7. Elevator Control -- SLIGHTLY TAIL LOW
8. Climb Speed -- 57 KIAS (until all obstacles are cleared)

ENROUTE CLIMB

1. Airspeed -- 75-85 KIAS

NOTE

If a maximum performance climb is necessary, use speeds shown in the Rate of Climb chart in Section 5.

2. Throttle -- FULL OPEN
3. Fuel Selector Valve -- BOTH
4. Mixture -- RICH (above 3000 feet, LEAN to obtain maximum RPM)

LANDING

NORMAL LANDING

Avoid steep slips w/ flaps >20° (elevator oscillation)

1. Airspeed -- 65-75 KIAS (flaps UP)
2. Wing Flaps -- AS DESIRED (0°-10° below 110 KIAS, 10°-30° below 85 KIAS)
3. Airspeed -- 60-70 KIAS (flaps DOWN)
4. Trim -- ADJUST
5. Touchdown -- MAIN WHEELS FIRST
6. Landing Roll -- LOWER NOSE WHEEL GENTLY
7. Braking -- MINIMUM REQUIRED

SHORT FIELD LANDING

1. Airspeed -- 65-75 KIAS (flaps UP)
2. Wing Flaps -- FULL DOWN (30°)
3. Airspeed -- 62 KIAS (until flare)
4. Trim -- ADJUST
5. Power -- REDUCE to idle after clearing obstacle
6. Touchdown -- MAIN WHEELS FIRST
7. Brakes -- APPLY HEAVILY
8. Wing Flaps -- RETRACT

BALKED LANDING

1. Throttle -- FULL OPEN
2. Carburator Heat -- COLD
3. Wing Flaps -- RETRACT TO 20° (immediately)
4. Climb Speed -- 60 KIAS
5. Wing Flaps -- 10° (obstacles are cleared) RETRACT SLOWLY after reaching a safe altitude and 65 KIAS

NOISE ABATEMENT

Reference Basic Flight Manual for suggested procedures.

The certified noise level for the 172 models modified to STC SA2800CE, and up to a maximum weight of 2550 pounds is 74.9dB(A). No determination has been made by the Federal Aviation Administration that the noise levels of this airplane are or should be acceptable or unacceptable for operation at, into, or out of, any airport.

SECTION V PERFORMANCE

STALL SPEEDS

CONDITIONS:
Power Off

NOTES:

1. Altitude loss during a stall recovery may be as much as 230 feet.
2. KIAS values are approximate.

MOST REARWARD CENTER OF GRAVITY

WEIGHT LBS	FLAP DEFLECTION	ANGLE OF BANK							
		0°		30°		45°		60°	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
2550	UP	50	53	54	57	59	63	71	75
	10°	42	50	45	54	50	59	59	71
	30°	40	48	43	52	48	57	57	68

STALL SPEEDS (Continued)

MOST FORWARD CENTER OF GRAVITY

WEIGHT LBS	FLAP DEFLECTION	ANGLE OF BANK							
		0°		30°		45°		60°	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
2550	UP	50	53	54	57	59	63	71	75
	10°	43	51	46	55	51	61	61	72
	30°	40	48	43	52	48	57	57	68

TAKEOFF DISTANCE
MAXIMUM WEIGHT 2550 Lbs
SHORT FIELD

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, Level, Dry Runway
Zero Wind

NOTES:

1. Short field technique as specified in Section 4
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 20 knots, increase distances by 10% for each 2 knots.
4. For operation on a dry, grass runway, increase distances by 15% of the "ground roll" figure.

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS
2550	48	57	S.L.	860	1520	925	1630	995	1750	1070	1880	1150	2015
			1000	940	1665	1015	1790	1090	1925	1175	2070	1260	2225
			2000	1030	1830	1110	1970	1195	2125	1290	2285	1385	2100
			3000	1130	2015	1220	2175	1315	2350	1415	2535	1520	2740
			4000	1245	2230	1345	2415	1450	2615	1560	2830	1675	3060
			5000	1370	2480	1480	2690	1595	2920	1720	3170	1850	3450
			6000	1510	2770	1635	3015	1765	3290	1900	3585	2050	3925
			7000	1670	3120	1805	3410	1950	3735	2105	4100	2270	4500
			8000	1850	3535	2000	3890	2165	4295	2340	4760	2525	5315

TAKEOFF DISTANCE
2400 LBS AND 2200 LBS
SHORT FIELD

WEIGHT LBS	TAKEOFF SPEED KIAS		PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
	LIFT OFF	AT 50 FT		GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS
2400	47	55	S.L.	745	1320	805	1415	865	1520	925	1625	995	1745
			1000	815	1445	880	1550	945	1665	1015	1785	1090	1915
			2000	895	1585	965	1705	1035	1830	1115	1965	1195	2110
			3000	980	1740	1055	1875	1135	2020	1225	2170	1315	2335
			4000	1075	1920	1160	2070	1250	2235	1345	2405	1445	2595
			5000	1185	2125	1275	2295	1375	2480	1485	2680	1595	2900
			6000	1305	2360	1410	2555	1520	2770	1635	3005	1760	3260
			7000	1440	2635	1555	2860	1680	3115	1810	3390	1950	3700
			8000	1590	2960	1720	3230	1860	3530	2005	3865	2165	4245
2200	45	53	S.L.	610	1090	660	1165	705	1245	760	1335	815	1425
			1000	670	1190	720	1270	775	1360	830	1460	890	1560
			2000	730	1295	785	1390	845	1490	910	1600	975	1710
			3000	800	1420	860	1525	930	1635	995	1755	1070	1885
			4000	875	1560	945	1675	1020	1800	1095	1935	1175	2080
			5000	965	1715	1040	1850	1120	1990	1205	2140	1295	2305
			6000	1060	1895	1145	2045	1235	2205	1325	2380	1425	2565
			7000	1170	2100	1260	2270	1360	2455	1465	2655	1575	2870
			8000	1290	2335	1395	2535	1505	2745	1620	2980	1745	3235

MAXIMUM RATE OF CLIMB

CONDITIONS:
- Flaps UP
- Full Throttle

NOTE: Mixture leaned above 3000 feet for maximum RPM.

WEIGHT LBS	PRESS ALT FT	CLIMB SPEED KIAS	RATE OF CLIMB - FPM			
			-20°C	0°C	20°C	40°C
2550	S L	73	795	730	665	600
	2000	73	705	645	585	525
	4000	73	625	565	510	450
	6000	72	540	485	430	370
	8000	72	460	405	350	295
	10,000	72	380	325	275	---
	12,000	72	300	250	---	---

TIME, FUEL, AND DISTANCE TO CLIMB

MAXIMUM RATE OF CLIMB

CONDITIONS:
- Flaps UP
- Full Throttle
- Standard Tempterature

NOTE:
1. Add 1.4 gallons of fuel for engine start, taxi, and takeoff allowance.
2. Mixture leaned above 3000 feet for maximum RPM.
3. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
4. Distances shown are based on zero wind.

WEIGHT LBS	PRESSURE ALTITUDE FT	TEMP °C	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
					TIME MIN	FUEL USED GALLONS	DISTANCE NM
2550	S.L.	15	73	680	0	0.0	0
	1000	13	73	645	2	0.4	2
	2000	11	73	615	3	0.8	4
	3000	9	73	580	5	1.3	6
	4000	7	73	545	7	1.7	8
	5000	5	73	510	9	2.2	11
	6000	3	72	475	11	2.7	14
	7000	1	72	440	13	3.1	17
	8000	-1	72	410	15	3.6	20
	9000	-3	72	375	18	4.2	24
	10,000	-5	72	340	21	4.7	28
	11,000	-7	72	305	24	5.3	32
	12,000	-9	72	270	27	5.9	37

CRUISE PERFORMANCE

CONDITIONS:
2550 Pounds
Recommended Lean Mixture (See Section IV, Cruise)

NOTE:
Cruise speeds are shown for an airplane equipped with speed fairings which increase the speeds by approximately two knots.

PRESSURE ALTITUDE FT	RPM	20°C BELOW STANDARD TEMP			STANDARD TEMPERATURE			20°C ABOVE STANDARD TEMP		
		% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2000	2550	---	---	---	76	116	10.2	72	115	9.6
	2500	77	114	10.3	72	113	9.6	68	113	9.1
	2400	69	109	9.2	64	108	8.7	61	107	8.3
	2300	61	103	8.3	58	103	7.9	55	102	7.6
	2200	55	98	7.5	52	97	7.2	49	96	6.9
	2100	49	92	6.8	46	91	6.6	43	89	6.3
4000	2600	---	---	---	76	118	10.2	72	117	9.6
	2500	73	113	9.7	68	113	9.2	65	112	8.7
	2400	65	108	8.8	62	107	8.3	58	107	8.0
	2300	58	103	8.0	55	102	7.6	52	101	7.3
	2200	52	97	7.3	49	96	6.9	47	94	6.6
	2100	46	91	6.6	44	89	6.3	41	87	6.1
6000	2650	---	---	---	76	120	10.1	72	119	9.6
	2600	77	118	10.3	72	117	9.6	68	117	9.1
	2500	69	113	9.3	65	112	8.8	62	111	8.4
	2400	62	108	8.4	59	107	8.0	56	106	7.6
	2300	56	102	7.7	53	101	7.3	50	99	7.0
	2200	50	96	7.0	47	95	6.7	44	93	6.4
8000	2700	---	---	---	76	122	10.1	71	121	9.5
	2600	73	117	9.8	69	117	9.2	65	116	8.7
	2500	66	112	8.8	62	111	8.4	59	110	8.0
	2400	59	107	8.1	56	106	7.7	53	104	7.3
	2300	53	101	7.4	50	100	7.0	47	98	6.7
	2200	47	95	6.7	45	93	6.4	42	90	6.1
10,000	2700	77	122	10.2	72	121	9.6	68	121	9.1
	2600	69	117	9.3	65	116	8.8	62	115	8.4
	2500	63	112	8.5	59	110	8.1	56	109	7.7
	2400	57	106	7.8	53	104	7.4	50	103	7.0
	2300	51	100	7.1	48	98	6.8	45	96	6.5
12,000	2650	69	119	9.3	65	118	8.8	62	117	8.4
	2600	66	116	8.9	62	115	8.4	59	114	8.0
	2500	60	111	8.2	56	109	7.7	53	107	7.4
	2400	54	105	7.5	51	103	7.1	48	100	6.7
	2300	48	98	6.8	45	96	6.5	42	93	6.2

LANDING DISTANCE

SHORT FIELD

CONDITIONS:
Flaps 30°
Power Off
Maximum Braking
Paved, Level, Dry Runway
Zero Wind

NOTE:
1. Short Field technique as specified in Section IV.
2. Decrease distances 10% for each 9 knots headwind. For operation with tailwinds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on a dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If a landing with flaps up is necessary, increase the approach speed by 9 KIAS and allow for 35% longer distances.

WEIGHT LBS	SPEED AT 50 FT KIAS	PRESS ALT FT	0°C		10°C		20°C		30°C		40°C	
			GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS	GRND ROLL FT	TOTAL FT TO CLEAR 50 FT OBS
2550	62	S.L.	545	1290	565	1320	585	1350	605	1380	625	1415
		1000	565	1320	585	1350	605	1385	625	1420	650	1450
		2000	585	1355	610	1385	630	1420	650	1455	670	1490
		3000	610	1385	630	1425	655	1460	675	1495	695	1530
		4000	630	1425	655	1460	675	1495	700	1535	725	1570
		5000	655	1460	680	1500	705	1535	725	1575	750	1615
		6000	680	1500	705	1540	730	1580	755	1620	780	1660
		7000	705	1545	730	1585	760	1625	785	1665	810	1705
		8000	735	1585	760	1630	790	1670	815	1715	840	1755

SECTION VI WEIGHT & BALANCE

This Modification consists of a larger Power Plant and an increase to the Gross Weight of the Aircraft.

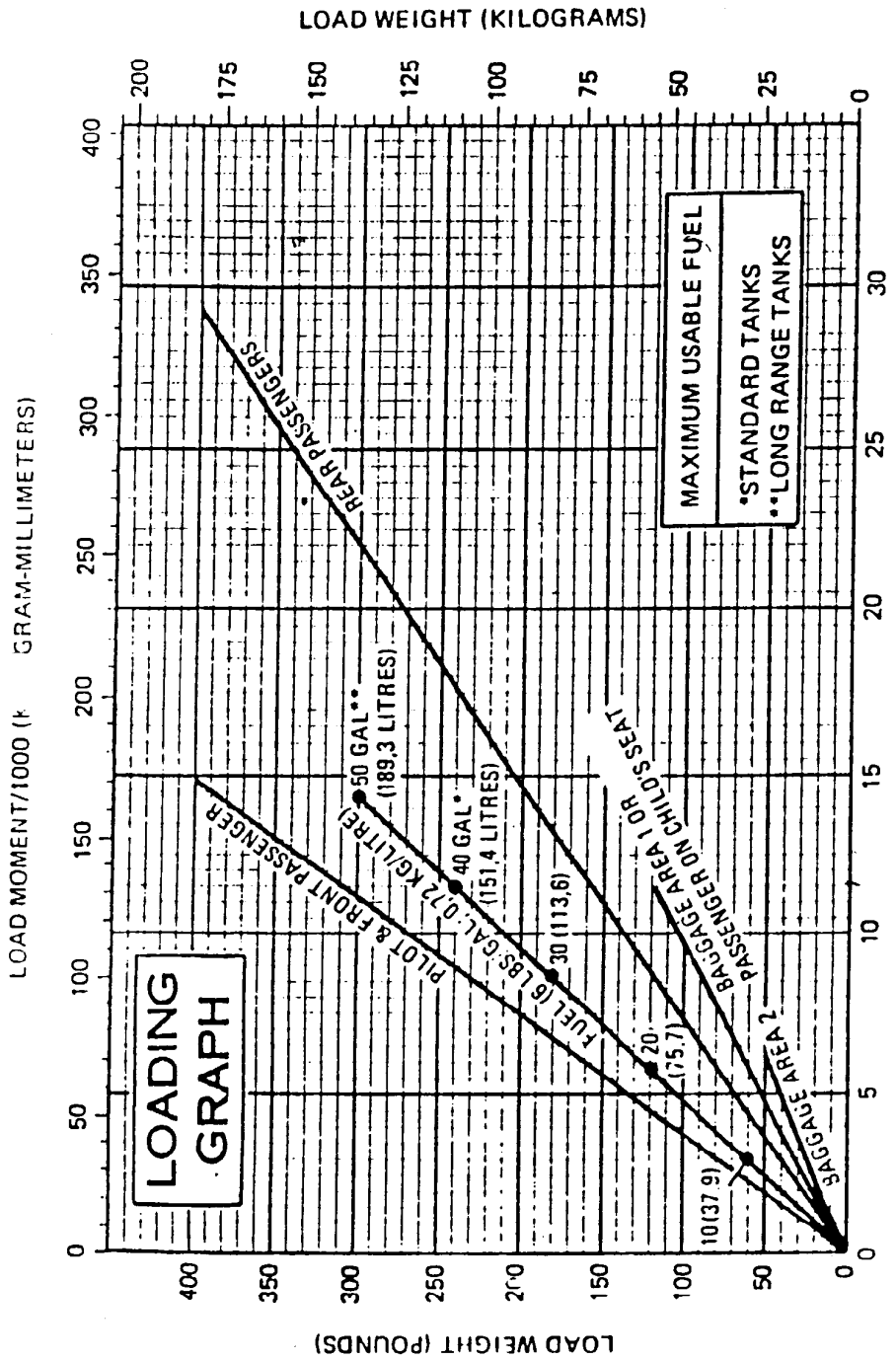
The following Weight & Balance information gives the approved loading limits at the Gross Weight of 2550.0 Lbs (this supersedes the loading limits shown in the original Airplane Manual).

N 99715

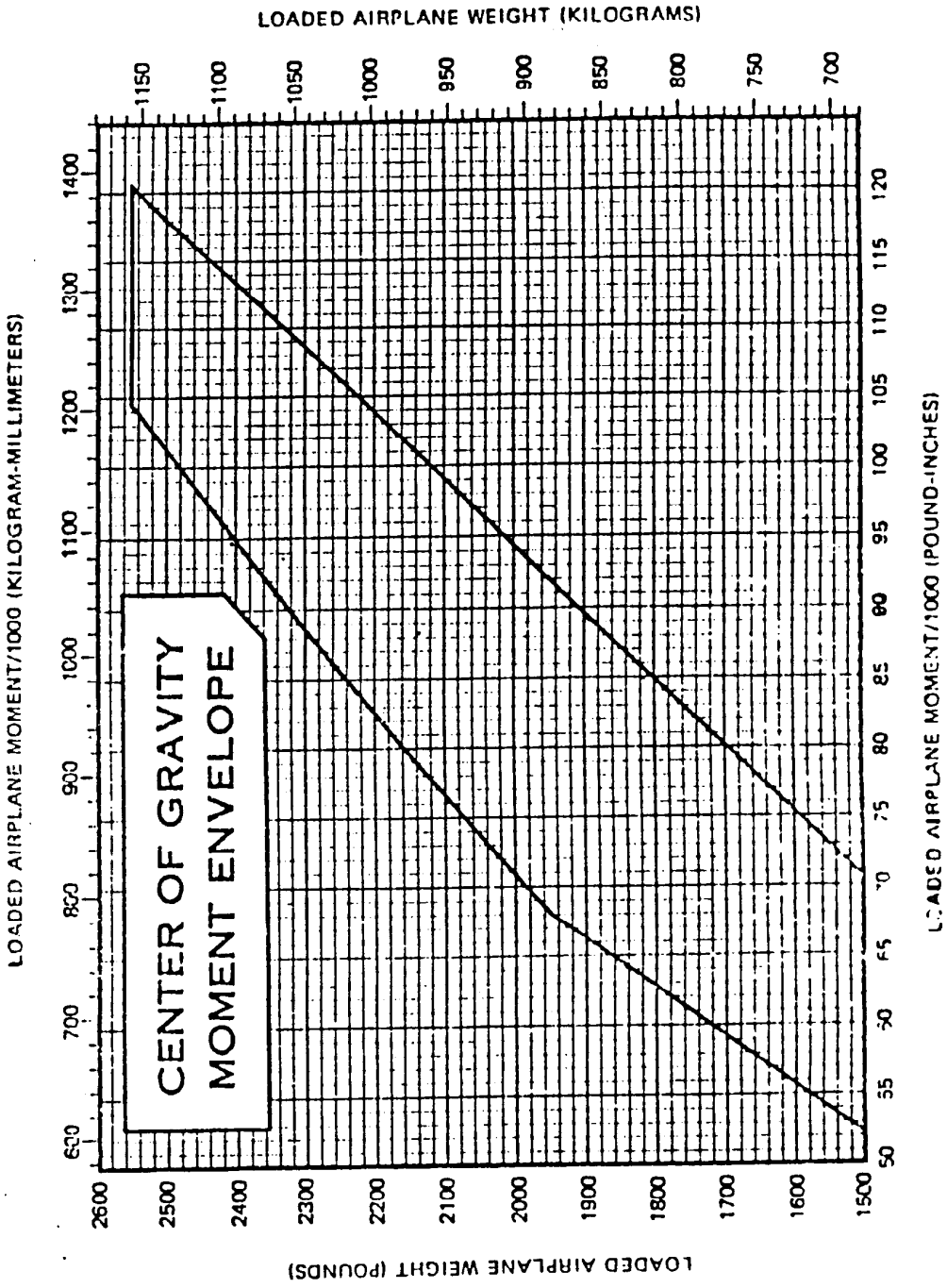
SAMPLE LOADING PROBLEM	SAMPLE AIRPLANE		YOUR AIRPLANE	
	Weight (lbs.)	Moment (lb.-ins. /1000)	Weight (lbs.)	Moment (lb.-ins. /1000)
1. Basic Empty Weight (Use the data pertaining to your airplane as it is presently equipped. Includes unusable fuel and full oil)	1513	57.9		
2. Usable Fuel (At 6 Lbs./Gal.)				
. Standard Tanks (40 Gal. Maximum)				
Long Range Tanks (50 Gal. Maximum) . . .	300	14.4		
3. Pilot and Front Passenger (Station 34 to 46)	340	12.6		
4. Rear Passengers	340	24.8		
5. * Baggage Area 1 or Passenger on Child's Seat (Station 82 to 108, 120 Lbs. Max.) . . .	65	6.2		
6. * Baggage Area 2 (Station 108 to 142, 50 Lbs. Max.) . . .				
7. RAMP WEIGHT AND MOMENT	2558	115.9		
8. Fuel allowance for engine start, taxi, and runup	-8	-.4		
9. TAKEOFF WEIGHT AND MOMENT (Subtract Step 8 from Step 7)	2550	115.5		

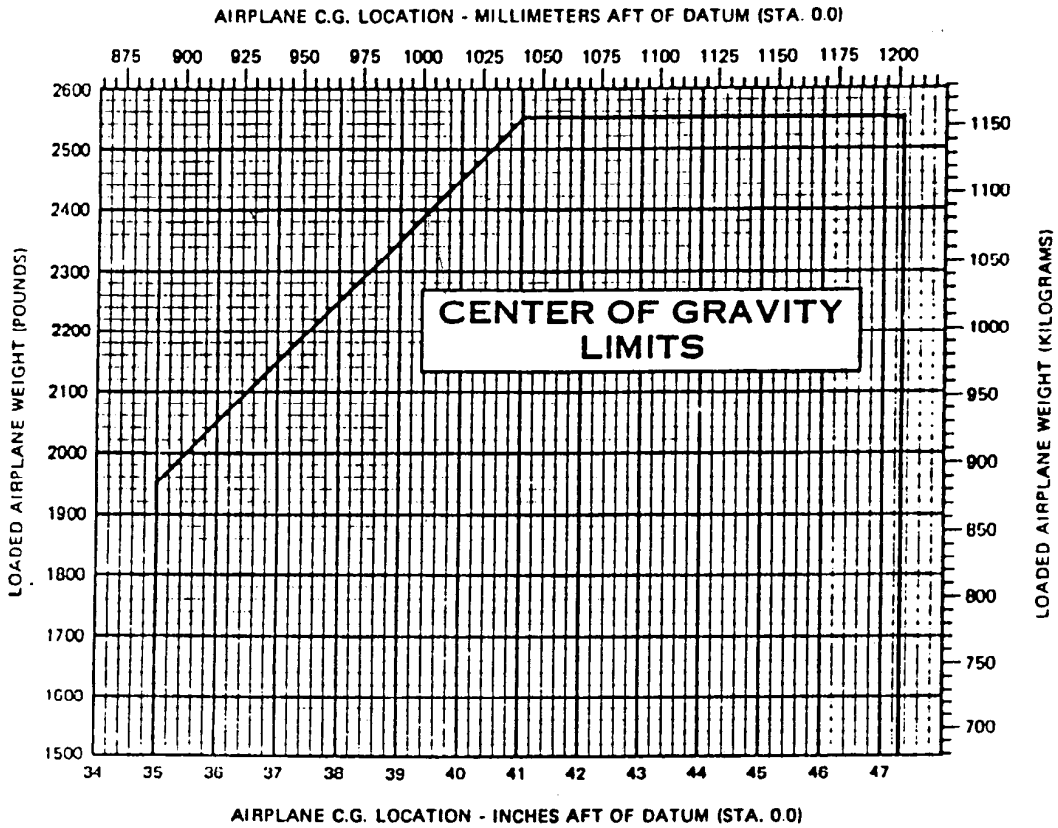
10. Locate this point (2550 at 115.5) on the Center of Gravity Moment Envelope, and since this point falls within the envelope, the loading is acceptable.

* The maximum allowable combined weight capacity for baggage areas 1 and 2 is 120 pounds.



NOTE: Line representing adjustable seats shows the pilot or passenger center of gravity on adjustable seats positioned for an average occupant. Refer to the Loading Arrangements diagram for forward and aft limits of occupant C.G. range.


CENTER OF GRAVITY
MOMENT ENVELOPE
LOADED AIRPLANE WEIGHT (KILOGRAMS)
1150
1100
1050
1000
950
900
850
800
750
700
LOADED AIRPLANE MOMENT/1000 (KILOGRAM-MILLIMETERS)
600
700
800
900
1000
1100
1200
1300
1400
LOADED AIRPLANE WEIGHT (POUNDS)
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
LOADED AIRPLANE MOMENT/1000 (POUND-INCHES)
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120



SECTION VII AIRPLANE & SYSTEMS DESCRIPTIONS

LANDING GEAR SYSTEM

NOTE: Applicable to aircraft modified with STC SA296GL (Bolen Tailwheel)

The landing gear is the conventional type with two main wheels and a steerable tail wheel. Shock absorption is provided by the steel leaf spring main landing gear struts and the multiple steel leaf tailwheel spring.

(See Section VIII for tire size and pressure).

FUEL SYSTEM

This Aircrafts original Gravity Flow Fuel System may have been modified to an Optional Pressure Type System. The Optional Pressure System consists of an Auxiliary Fuel Pump, Auxiliary Fuel Pump Switch, Pressure Gage, and an Engine Driven Fuel Pump.

NOTE: Refer to Sections III and IV of this Supplemental Manual for operation of the Pressure Type System.

If the Aircraft has this Pressure System installed, see the Fuel System Schematic on the following page for component changes to the original Gravity Type System.

NOTE: Reference the Basic Airplane Flight Manual for the original Gravity Flow System.

SECTION VIII AIRCRAFT HANDLING AND SERVICE

LANDING GEAR

Tricycle Type

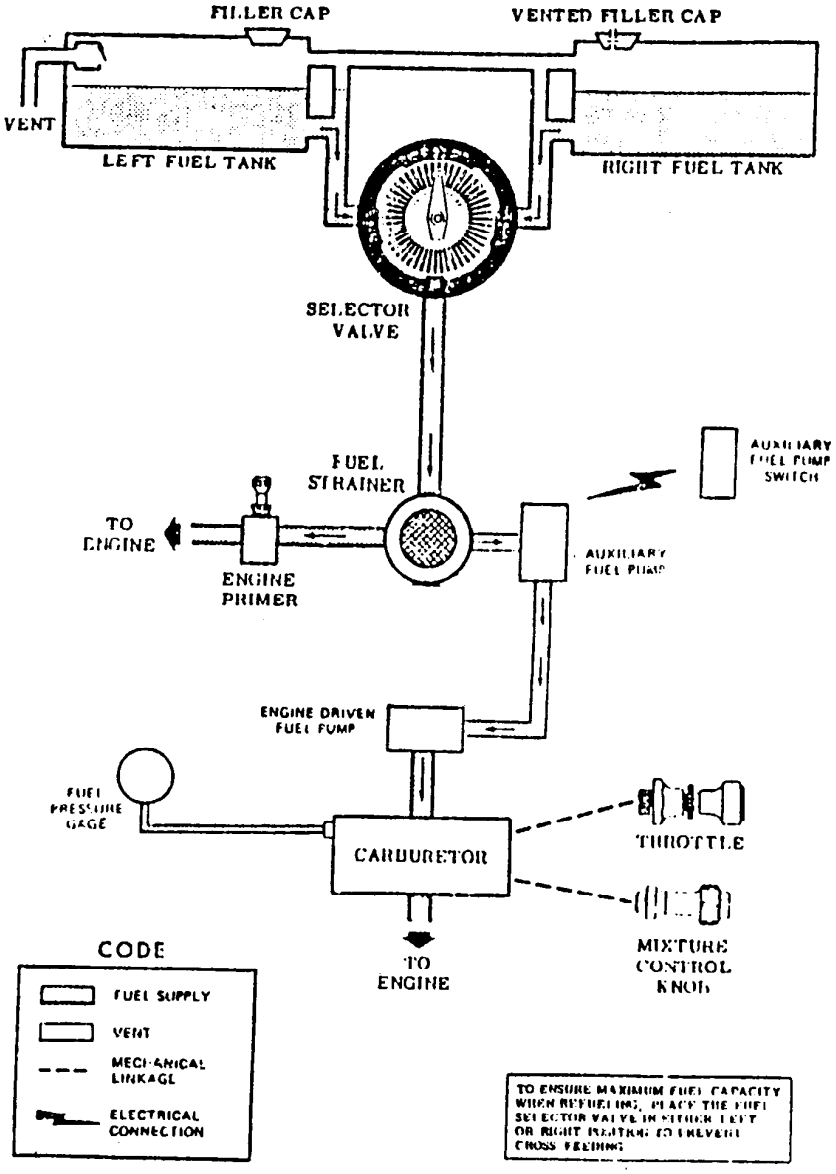
Mains	6.00 X 6	6 Ply Rating	35 - 40 PSI
Nose	5.00 X 5	4 Ply Rating	40 - 45 PSI

Conventional Type

Mains	6.00 X 6	6 Ply Rating	30 - 35 PSI
Tailwheel	8.00 X 2.80	4 Ply Rating	45 - 55 PSI

FUEL SYSTEM (Continued)

OPTIONAL FUEL SYSTEM
PRESSURE TYPE SYSTEM SCHEMATIC



NOTE: Supplements shown in Section IX of the Original Airplane Flight Manual apply to the Modified Airplane, as applicable, except when determined to be incompatible by that components Manufacturer, Installer, and/or the Federal Aviation Administration.

SUPPLEMENT

WINTERIZATION KIT

NOTICE: Special attention should be given during operation with the Winter Kit installed on the Modified Aircraft. If high engine temperature indication occurs, take corrective action as required to maintain operating limits. (Remove one or more Winter Kit components as required for normal operation).

COWL LIP - LOWER

When the aircraft is placed in service to perform certain specialized operations such as, Towing Banners, Gliders, or Night Sign Advertising, Etc., the engine may operate at above normal or desirable temperatures. Should this condition occur, and it has been determined that it is not caused by a mechanical problem, the lower cowl draft opening may be enlarged to increase engine cooling efficiency. Reference the applicable Powerplant STC installation data to accomplish the lower cowl modification, by installing the optional cowl lip, as approved by the powerplant STC.