

SECTION 2 LIMITATIONS

TABLE OF CONTENTS

Page

Introduction	2-3
Airspeed Limitations	2-4
Airspeed Indicator Markings	2-5
Powerplant Limitations	2-5
Powerplant Instrument Markings	2-6
Weight Limits	2-7
Center Of Gravity Limits	2-7
Maneuver Limits	2-8
Flight Load Factor Limits	2-8
Kinds Of Operation Limits	2-8
Fuel Limitations	2-8
Other Limitations	2-9
Flap Limitations	2-9
Placards	2-10

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INTRODUCTION

Section 2 includes operating limitations, instrument markings, and basic placards necessary for the safe operation of the airplane, its engine, standard systems and standard equipment. The limitations included in this section and in Section 9 have been approved by the Federal Aviation Administration. Observance of these operating limitations is required by Federal Aviation Regulations.

NOTE

Refer to Section 9 of this Pilot's Operating Handbook for amended operating limitations, operating procedures, performance data and other necessary information for airplanes equipped with specific options.

NOTE

The airspeeds listed in the Airspeed Limitations chart (Figure 2-1) and the Airspeed Indicator Markings chart (Figure 2-2) are based on Airspeed Calibration data shown in Section 5 with the normal static source. If the alternate static source is being used, ample margins should be observed to allow for the airspeed calibration variations between the normal and alternate static sources as shown in Section 5.

Your Cessna is certificated under FAA Type Certificate No. 3A13 as Cessna Model No. 182S.

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in Figure 2-1.

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	170	175	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	137	140	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 3100 Pounds 2600 Pounds 2000 Pounds	109 101 89	110 101 88	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: 0° to 10° Flaps 10° to 20° Flaps 20° to FULL Flaps	137 118 100	140 120 100	Do not exceed this speed with flaps down.
---	Maximum Window Open Speed	170	175	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations

AIRSPPEED INDICATOR MARKINGS

Airspeed indicator markings and their color code significance are shown in Figure 2-2.

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	36 - 100	Full Flap Operating Range.
Green Arc	43 - 140	Normal Operating Range.
Yellow Arc	140-175	Operations must be conducted with caution and only in smooth air.
Red Line	175	Maximum speed for all operations.

Figure 2-2. Airspeed Indicator Markings

POWERPLANT LIMITATIONS

Engine Manufacturer: Textron Lycoming.

Engine Model Number: IO-540-AB1A5.

Maximum Power: 230 BHP rating.

Engine Operating Limits for Takeoff and Continuous Operations:

Maximum Engine Speed: 2400 RPM.

Maximum Cylinder Head Temperature: 500°F (260°C).

Maximum Oil Temperature: 245°F (118°C).

Oil Pressure, Minimum: 20 PSI.

Maximum: 115 PSI.

Fuel Grade: See Fuel Limitations.

Oil Grade (Specification):

MIL-L-6082 Aviation Grade Straight Mineral Oil or MIL-L-22851

Ashless Dispersant Oil.

Propeller Manufacturer: McCauley Propeller Systems.

Propeller Model Number: 2-Bladed: B2D34C235/90DKB-8.

3-Bladed: B3D36C431/80VSA-1

Propeller Diameter, 2-Bladed Maximum: 82.0 inches.

2-Bladed Minimum: 80.5 inches.

3-Bladed Maximum: 79.0 inches.

3-Bladed Minimum: 77.5 inches.

Propeller Blade Angle at 30 Inch Station:

- 2-Bladed Low Pitch: 17.0°.
- 2-Bladed High Pitch: 31.8°.
- 3-Bladed Low Pitch: 14.9°.
- 3-Bladed High Pitch: 31.7°.

POWERPLANT INSTRUMENT MARKINGS

Powerplant instrument markings and their color code significance are shown in Figure 2-3.

INSTRUMENT	RED LINE (MINIMUM)	GREEN ARC (NORMAL OPERATING)	RED LINE (MAX)
Tachometer:	----	2000 - 2400 RPM	2400
Manifold Pressure	----	15 - 23 In. Hg.	----
Cylinder Head Temperature	----	200 - 500°F	500°F
Oil Temperature	----	100 - 245°F	245°F
Oil Pressure	20 PSI	50 - 90 PSI	115 PSI
Fuel Quantity	E (2.0 Gal. Unusable Each Tank)	----	----
Fuel Flow (Pressure)	----	0 to 15 GPH	----
Suction Gage	----	4.5 - 5.5 in.Hg	----

Figure 2-3. Powerplant Instrument Markings

WEIGHT LIMITS

Maximum Ramp Weight: 3110 lbs.

Maximum Takeoff Weight: 3100 lbs.

Maximum Landing Weight: 2950 lbs.

Maximum Weight in Baggage Compartment:

Baggage Area A - Station 82 to 109: 120 lbs. See note below.

Baggage Area B - Station 109 to 124: 80 lbs. See note below.

Baggage Area C - Station 124 to 134: 80 lbs. See note below.

NOTE

The maximum allowable combined weight capacity for baggage in areas A, B and C is 200 pounds. The maximum allowable weight capacity for baggage in areas B and C is 80 pounds.

CENTER OF GRAVITY LIMITS

Center of Gravity Range:

Forward: 33.0 inches aft of datum at 2250 lbs. or less, with straight line variation to 40.9 inches aft of datum at 3100 lbs.

Aft: 46.0 inches aft of datum at all weights.

Reference Datum: Front face of firewall.

MANEUVER LIMITS

This airplane is certificated in the normal category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and steep turns in which the angle of bank is not more than 60°.

Aerobatic maneuvers, including spins, are not approved.

FLIGHT LOAD FACTOR LIMITS

Flight Load Factors:

*Flaps Up + 3.8g, -1.52g
*Flaps Down + 2.0g

*The design load factors are 150% of the above, and in all cases, the structure meets or exceeds design loads.

KINDS OF OPERATION LIMITS

The airplane as delivered is equipped for day, night, VFR, IFR and may be equipped for night VFR and/or IFR operations. FAR Part 91 establishes the minimum required instrumentation and equipment for these operations. The reference to types of flight operations on the operating limitations placard reflects equipment installed at the time of Airworthiness Certificate issuance.

Flight into known icing conditions is prohibited.

FUEL LIMITATIONS

Total Fuel: 92 U.S. gallons (2 tanks at 46.0 gallons each).

Usable Fuel (all flight conditions): 88.0 U.S. gallons.

Unusable Fuel: 4.0 U.S. gallons (2.0 gallons each tank).

NOTE

To ensure maximum fuel capacity and minimize cross-feeding when refueling, always park the airplane in a wings-level, normal ground attitude and place the fuel selector in the Left or Right position. Refer to Figure 1-1 for normal ground attitude definition.

Takeoff and land with the fuel selector valve handle in the BOTH position.

Operation on either LEFT or RIGHT tank limited to level flight only.

With 1/4 tank or less, prolonged uncoordinated flight is prohibited when operating on either left or right tank.

Approved Fuel Grades (and Colors):

- 100LL Grade Aviation Fuel (Blue).
- 100 Grade Aviation Fuel (Green).

OTHER LIMITATIONS

FLAP LIMITATIONS

Approved Takeoff Range: 0° to 20°
Approved Landing Range: 0° to FULL

PLACARDS

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

1. In full view of the pilot: (The "DAY-NIGHT-VFR-IFR" entry, shown on the example below, will vary as the airplane is equipped).

The markings and placards installed in this airplane contain operating limitations which must be complied with when operating this airplane in the Normal Category. Other operating limitations which must be complied with when operating this airplane in this category are contained in the Pilot's Operating Handbook and FAA Approved Airplane Flight Manual.

No acrobatic maneuvers, including spins, approved.

Flight into known icing conditions prohibited.

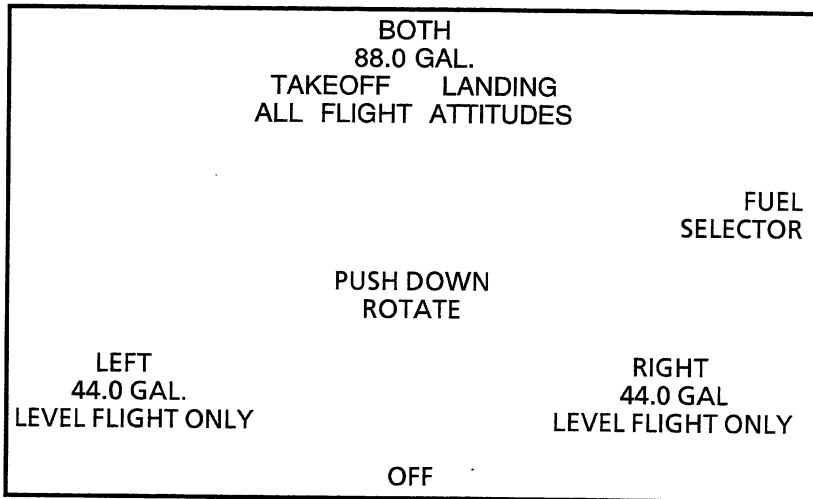
This airplane is certified for the following flight operations as of date of original airworthiness certificate:

DAY-NIGHT-VFR-IFR

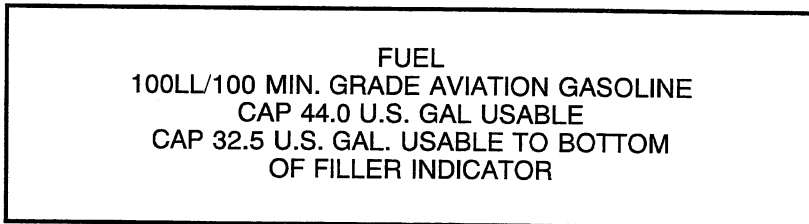
2. On control lock:

CAUTION
CONTROL LOCK
REMOVE BEFORE STARTING ENGINE

3. On the fuel selector valve:



4. Near the fuel tank filler cap:



5. On flap control indicator:

0° to 10°	140 KIAS	(Partial flap range with dark blue color code; also, mechanical detent at 10°.)
10° to 20°	120 KIAS	(Light blue color code; also mechanical detent at 20°)
20° to FULL	100 KIAS	(White color code)

6. On baggage door:

120 POUNDS MAXIMUM
BAGGAGE FORWARD OF BAGGAGE DOOR LATCH
AND

80 POUNDS MAXIMUM
BAGGAGE AFT OF BAGGAGE DOOR LATCH

MAXIMUM 200 POUNDS COMBINED

FOR ADDITIONAL LOADING INSTRUCTIONS
SEE WEIGHT AND BALANCE DATA

7. A calibration card must be provided to indicate the accuracy of the magnetic compass in 30° increments.

8. On the oil filler cap:

OIL
9 QTS

9. Near airspeed indicator:

MANEUVER SPEED - 110 KIAS

10. On the upper right instrument panel:

SMOKING PROHIBITED

11. On auxiliary power plug door and second placard on battery box:

CAUTION 24 VOLTS D.C.
**THIS AIRCRAFT IS EQUIPPED WITH ALTERNATOR AND A
NEGATIVE GROUND SYSTEM. OBSERVE PROPER POLARITY.
REVERSE POLARITY WILL DAMAGE ELECTRICAL
COMPONENTS.**

12. On Upper Right Side of the Aft Cabin Partition:

**EMERGENCY LOCATOR TRANSMITTER
INSTALLED AFT OF THIS PARTITION
MUST BE SERVICED IN ACCORDANCE
WITH FAR PART 91.207**

13. Near the fuel flow gauge:

MAXIMUM POWER FUEL FLOW

<u>ALTITUDE</u>	<u>FUEL FLOW</u>
S.L.	20.5 GPH
2000'	19.0 GPH
4000'	17.5 GPH
6000'	16.5 GPH
8000'	15.5 GPH
10000'	14.5 GPH
12000'	13.5 GPH

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