

# SECTION 2 LIMITATIONS

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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 have been approved by the Federal Aviation Administration. When applicable, limitations associated with optional systems or equipment are included in Section 9.

Your Cessna is certificated under FAA Type Certificate No. 3A19 as Cessna Model No. 152.

## AIRSPEED LIMITATIONS

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

	SPEED	KCAS	KIAS	REMARKS
V <sub>NE</sub>	Never Exceed Speed	145	149	Do not exceed this speed in any operation.
V <sub>NO</sub>	Maximum Structural Cruising Speed	108	111	Do not exceed this speed except in smooth air, and then only with caution.
V <sub>A</sub>	Maneuvering Speed: 1670 Pounds 1500 Pounds 1350 Pounds	101 96 91	104 98 93	Do not make full or abrupt control movements above this speed.
V <sub>FE</sub>	Maximum Flap Extended Speed	87	85	Do not exceed this speed with flaps down.
	Maximum Window Open Speed	139	143	Do not exceed this speed with windows open.

Figure 2-1. Airspeed Limitations

## AIRSPEED INDICATOR MARKINGS

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

MARKING	KIAS VALUE OR RANGE	SIGNIFICANCE
White Arc	35 - 85	Full Flap Operating Range. Lower limit is maximum weight V <sub>S0</sub> in landing configuration. Upper limit is maximum speed permissible with flaps extended.
Green Arc	40 - 111	Normal Operating Range. Lower limit is maximum weight V <sub>S</sub> at most forward C.G. with flaps retracted. Upper limit is maximum structural cruising speed.
Yellow Arc	111 - 149	Operations must be conducted with caution and only in smooth air.
Red Line	149	Maximum speed for all operations.

Figure 2-2. Airspeed Indicator Markings

## POWER PLANT LIMITATIONS

Engine Manufacturer: Avco Lycoming.

Engine Model Number: O-235-L2C.

Engine Operating Limits for Takeoff and Continuous Operations:

Maximum Power: 110 BHP.

Maximum Engine Speed: 2550 RPM.

### NOTE

The static RPM range at full throttle (carburetor heat off and mixture leaned to maximum RPM) is 2280 to 2380 RPM.

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

Oil Pressure, Minimum: 25 psi.

Maximum: 100 psi.

Propeller Manufacturer: McCauley Accessory Division.

Propeller Model Number: 1A103/TCM6958.

Propeller Diameter, Maximum: 69 inches.

Minimum: 67.5 inches.

## POWER PLANT INSTRUMENT MARKINGS

Power plant instrument markings and their color code significance are shown in figure 2-3.

INSTRUMENT	RED LINE	GREEN ARC	RED LINE
	MINIMUM LIMIT	NORMAL OPERATING	MAXIMUM LIMIT
Tachometer	---	1900 - 2550 RPM	2550 RPM
Oil Temperature	---	100° - 245°F	245°F
Oil Pressure	25 psi	60 - 90 psi	100 psi

Figure 2-3. Power Plant Instrument Markings

## WEIGHT LIMITS

Maximum Takeoff Weight: 1670 lbs.

Maximum Landing Weight: 1670 lbs.

Maximum Weight in Baggage Compartment:

Baggage Area 1 (or passenger on child's seat) - Station 50 to 76: 120 lbs.

See note below.

Baggage Area 2 - Station 76 to 94: 40 lbs. See note below.

### NOTE

The maximum combined weight capacity for baggage areas 1 and 2 is 120 lbs.

## CENTER OF GRAVITY LIMITS

Center of Gravity Range:

Forward: 31.0 inches aft of datum at 1350 lbs. or less, with straight line variation to 32.65 inches aft of datum at 1670 lbs.

Aft: 36.5 inches aft of datum at all weights.

Reference Datum: Front face of firewall.

## MANEUVER LIMITS

This airplane is certificated in the utility category and is designed for limited aerobatic flight. In the acquisition of various certificates such as commercial pilot, instrument pilot and flight instructor, certain maneuvers are required. All of these maneuvers are permitted in this airplane.

No aerobatic maneuvers are approved except those listed below:

MANEUVER	MAXIMUM ENTRY SPEED*
Chandelles . . . . .	.95 knots
Lazy Eights . . . . .	.95 knots
Steep Turns . . . . .	.95 knots
Spins . . . . .	Use Slow Deceleration
Stalls (Except Whip Stalls) . . . . .	Use Slow Deceleration

\*Higher speeds can be used if abrupt use of the controls is avoided.

Aerobatics that may impose high loads should not be attempted. The important thing to bear in mind in flight maneuvers is that the airplane is clean in aerodynamic design and will build up speed quickly with the nose down. Proper speed control is an essential requirement for execution of any maneuver, and care should always be exercised to avoid excessive speed which in turn can impose excessive loads. In the execution of all maneuvers, avoid abrupt use of controls.

## FLIGHT LOAD FACTOR LIMITS

Flight Load Factors:

\*Flaps Up: +4.4g, -1.76g

\*Flaps Down: +3.5g

\*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 is equipped for day VFR 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 refer-

ence 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

- 2 Standard Tanks: 13 U.S. gallons each.  
Total Fuel: 26 U.S. gallons.  
Usable Fuel (all flight conditions): 24.5 U.S. gallons.  
Unusable Fuel: 1.5 U.S. gallons.
- 2 Long Range Tanks: 19.5 U.S. gallons each.  
Total Fuel: 39 U.S. gallons.  
Usable Fuel (all flight conditions): 37.5 U.S. gallons.  
Unusable Fuel: 1.5 U.S. gallons.

NOTE

Due to cross-feeding between fuel tanks, the tanks should be re-topped after each refueling to assure maximum capacity.

NOTE

Takeoffs have not been demonstrated with less than 2 gallons total fuel (1 gallon per tank).

- Approved Fuel Grades (and Colors):  
100LL Grade Aviation Fuel (Blue).  
100 (Formerly 100/130) Grade Aviation Fuel (Green).

### PLACARDS

The following information is 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.)

This airplane is approved in the utility category and must be operated in compliance with the operating limitations as stated in the form of placards, markings and manuals.

————— MAXIMUMS —————	
MANEUVERING SPEED (IAS) . . . . .	104 knots
GROSS WEIGHT . . . . .	1670 lbs
FLIGHT LOAD FACTOR	Flaps Up . . . . +4.4, -1.76
	Flaps Down . . . . . +3.5

——— NO ACROBATIC MANEUVERS APPROVED ———  
EXCEPT THOSE LISTED BELOW

Maneuver	Recm. Entry Speed	Maneuver	Recm. Entry Speed
Chandelles . . . . .	95 knots	Spins . . . . .	Slow Deceleration
Lazy Eights . . . . .	95 knots	Stalls (except	
Steep Turns . . . . .	95 knots	whip stalls).	Slow Deceleration

Abrupt use of controls prohibited above 104 knots.  
Intentional spins with flaps extended are prohibited. Altitude loss in stall recovery - 160 ft. 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. In the baggage compartment:

120 lbs. maximum baggage and/or auxiliary seat passenger. For additional loading instructions see Weight and Balance Data.

3. Near fuel shutoff valve (standard tanks):

FUEL - 24.5 GALS - ON-OFF

Near fuel shutoff valve (long range tanks):

FUEL - 37.5 GALS - ON-OFF

4. Near fuel tank filler cap (standard tanks):

FUEL  
100LL/100 MIN. GRADE AVIATION GASOLINE  
CAP. 13 U.S. GAL.

Near fuel tank filler cap (long range tanks):

FUEL  
100LL/100 MIN. GRADE AVIATION GASOLINE  
CAP. 19.5 U.S. GAL.  
CAP 13.0 U.S. GAL. TO BOTTOM OF FILLER COLLAR

5. On the instrument panel near the altimeter:

SPIN RECOVERY

1. VERIFYAILERONS NEUTRAL AND THROTTLE CLOSED
2. APPLY FULL OPPOSITE RUDDER
3. MOVE CONTROL WHEEL BRISKLY FORWARD TO BREAK STALL
4. NEUTRALIZE RUDDER AND RECOVER FROM DIVE