

SECTION 1 GENERAL

CESSNA MODEL 172N

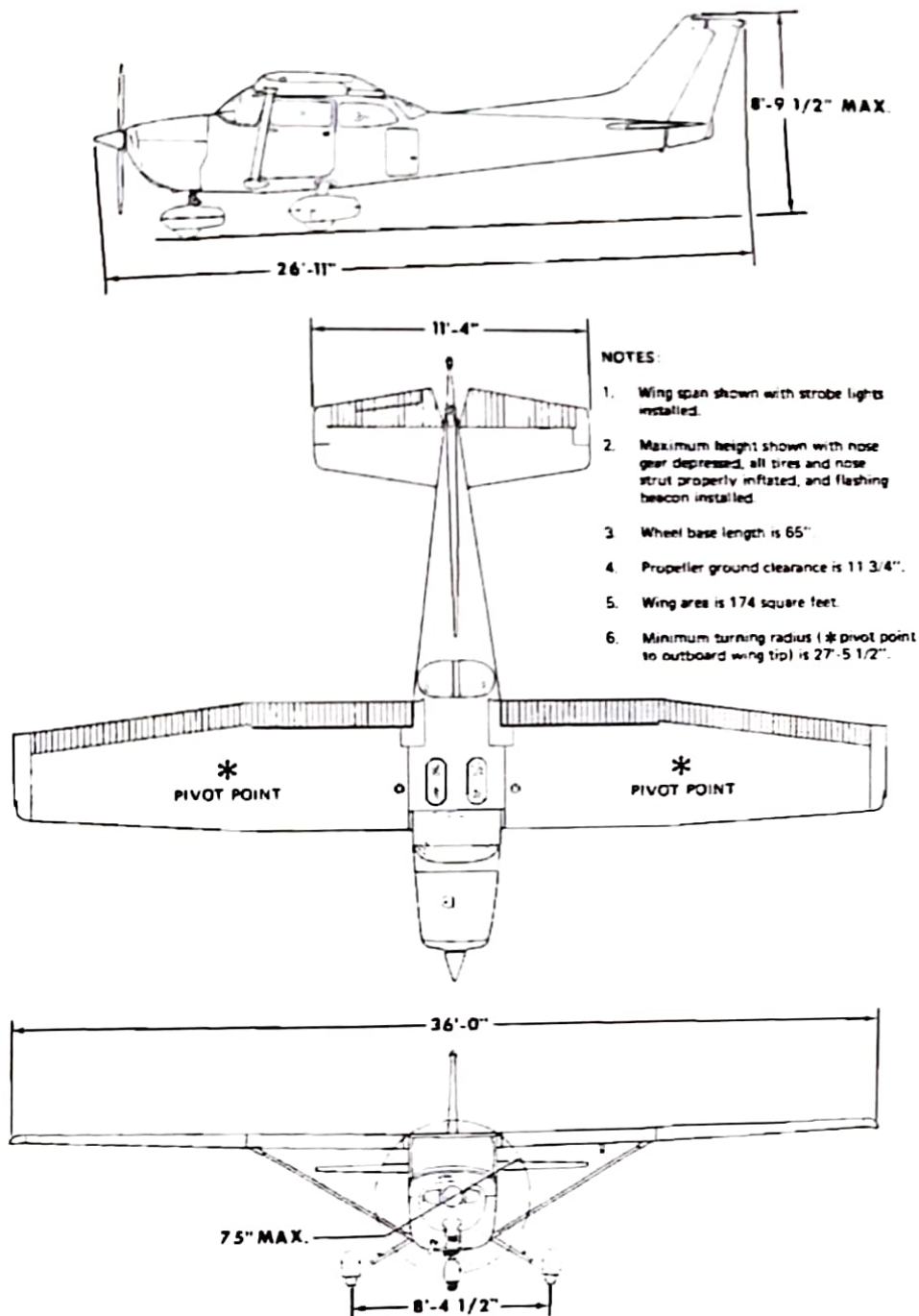


Figure 1-1. Three View

INTRODUCTION

This handbook contains 9 sections, and includes the material required to be furnished to the pilot by CAR Part 3. It also contains supplemental data supplied by Cessna Aircraft Company.

Section 1 provides basic data and information of general interest. It also contains definitions or explanations of symbols, abbreviations, and terminology commonly used.

DESCRIPTIVE DATA

ENGINE

Number of Engines: 1.

Engine Manufacturer: Avco Lycoming.

Engine Model Number: O-320-H2AD.

Engine Type: Normally-aspirated, direct-drive, air-cooled, horizontally-opposed, carburetor equipped, four-cylinder engine with 320 cu. in. displacement.

Horsepower Rating and Engine Speed: 160 rated BHP at 2700 RPM.

PROPELLER

Propeller Manufacturer: McCauley Accessory Division.

Propeller Model Number: 1C160/DTM7557.

Number of Blades: 2.

Propeller Diameter, Maximum: 75 inches.

Minimum: 74 inches.

Propeller Type: Fixed pitch.

FUEL

Approved Fuel Grades (and Colors):

100LL Grade Aviation Fuel (Blue).

100 (Formerly 100/130) Grade Aviation Fuel (Green).

SECTION 1 GENERAL

CESSNA
MODEL 172N

Fuel Capacity:

Standard Tanks:

Total Capacity: 43 gallons.

Total Capacity Each Tank: 21.5 gallons.

Total Usable: 40 gallons.

Long Range Tanks:

Total Capacity: 54 gallons.

Total Capacity Each Tank: 27 gallons.

Total Usable: 50 gallons.

NOTE

To ensure maximum fuel capacity when refueling and minimize cross-feeding when parked on a sloping surface, place the fuel selector valve in either LEFT or RIGHT position.

OIL

Oil Grade (Specification):

MIL-L-6082 Aviation Grade Straight Mineral Oil: Use to replenish supply during first 25 hours and at the first 25-hour oil change. Continue to use until a total of 50 hours has accumulated or oil consumption has stabilized.

NOTE

The airplane was delivered from the factory with a corrosion preventive aircraft engine oil. This oil should be drained after the first 25 hours of operation.

MIL-L-22851 Ashless Dispersant Oil: This oil must be used after first 50 hours or consumption has stabilized.

Recommended Viscosity for Temperature Range:

MIL-L-6082 Aviation Grade Straight Mineral Oil:

SAE 50 above 16°C (60°F).

SAE 40 between -1°C (30°F) and 32°C (90°F).

SAE 30 between -18°C (0°F) and 21°C (70°F).

SAE 20 below -12°C (10°F).

MIL-L-22851 Ashless Dispersant Oil:

SAE 40 or SAE 50 above 16°C (60°F).

SAE 40 between -1°C (30°F) and 32°C (90°F).

SAE 30 or SAE 40 between -18°C (0°F) and 21°C (70°F).

SAE 30 below -12°C (10°F).

Oil Capacity:

Sump: 6 Quarts.

Total: 7 Quarts (if oil filter installed).

MAXIMUM CERTIFICATED WEIGHTS

Ramp, Normal Category: 2307 lbs.

Utility Category: 2007 lbs.

Takeoff, Normal Category: 2300 lbs.

Utility Category: 2000 lbs.

Landing, Normal Category: 2300 lbs.

Utility Category: 2000 lbs.

Weight in Baggage Compartment, Normal Category:

Baggage Area 1 (or passenger on child's seat) - Station 82 to 108: 120 lbs. See note below.

Baggage Area 2 - Station 108 to 142: 50 lbs. See note below.

NOTE

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

Weight in Baggage Compartment, Utility Category: In this category, the baggage compartment and rear seat must not be occupied.

STANDARD AIRPLANE WEIGHTS

Standard Empty Weight, Skyhawk: 1397 lbs.

Skyhawk II: 1424 lbs.

Maximum Useful Load:

| | Normal Category | Utility Category |
|-------------|-----------------|------------------|
| Skyhawk: | 910 lbs. | 610 lbs. |
| Skyhawk II: | 883 lbs. | 583 lbs. |

CABIN AND ENTRY DIMENSIONS

Detailed dimensions of the cabin interior and entry door openings are illustrated in Section 6.

BAGGAGE SPACE AND ENTRY DIMENSIONS

Dimensions of the baggage area and baggage door opening are illustrated in detail in Section 6.

SPECIFIC LOADINGS

Wing Loading: 13.2 lbs./sq. ft.

Power Loading: 14.4 lbs./hp.

SYMBOLS, ABBREVIATIONS AND TERMINOLOGY

GENERAL AIRSPEED TERMINOLOGY AND SYMBOLS

| | |
|-----------|--|
| KCAS | Knots Calibrated Airspeed is indicated airspeed corrected for position and instrument error and expressed in knots. Knots calibrated airspeed is equal to KTAS in standard atmosphere at sea level. |
| KIAS | Knots Indicated Airspeed is the speed shown on the airspeed indicator and expressed in knots. |
| KTAS | Knots True Airspeed is the airspeed expressed in knots relative to undisturbed air which is KCAS corrected for altitude and temperature. |
| V_A | Maneuvering Speed is the maximum speed at which you may use abrupt control travel. |
| V_{FE} | Maximum Flap Extended Speed is the highest speed permissible with wing flaps in a prescribed extended position. |
| V_{NO} | Maximum Structural Cruising Speed is the speed that should not be exceeded except in smooth air, then only with caution. |
| V_{NE} | Never Exceed Speed is the speed limit that may not be exceeded at any time. |
| V_S | Stalling Speed or the minimum steady flight speed at which the airplane is controllable. |
| V_{S_0} | Stalling Speed or the minimum steady flight speed at which the airplane is controllable in the landing configuration at the most forward center of gravity. |
| V_X | Best Angle-of-Climb Speed is the speed which results in the greatest gain of altitude in a given horizontal distance. |
| V_Y | Best Rate-of-Climb Speed is the speed which results in the greatest gain in altitude in a given time. |

METEOROLOGICAL TERMINOLOGY

| | |
|-----|--|
| OAT | Outside Air Temperature is the free air static temperature. |
|-----|--|

It is expressed in either degrees Celsius or degrees Fahrenheit.

Standard Temperature

Standard Temperature is 15°C at sea level pressure altitude and decreases by 2°C for each 1000 feet of altitude.

Pressure Altitude

Pressure Altitude is the altitude read from an altimeter when the altimeter's barometric scale has been set to 29.92 inches of mercury (1013 mb).

ENGINE POWER TERMINOLOGY

BHP

Brake Horsepower is the power developed by the engine.

RPM

Revolutions Per Minute is engine speed.

Static RPM

Static RPM is engine speed attained during a full-throttle engine runup when the airplane is on the ground and stationary.

AIRPLANE PERFORMANCE AND FLIGHT PLANNING TERMINOLOGY

Demonstrated Crosswind Velocity

Demonstrated Crosswind Velocity is the velocity of the crosswind component for which adequate control of the airplane during takeoff and landing was actually demonstrated during certification tests. The value shown is not considered to be limiting.

Usable Fuel

Usable Fuel is the fuel available for flight planning.

Unusable Fuel

Unusable Fuel is the quantity of fuel that can not be safely used in flight.

GPH

Gallons Per Hour is the amount of fuel (in gallons) consumed per hour.

NMPG

Nautical Miles Per Gallon is the distance (in nautical miles) which can be expected per gallon of fuel consumed at a specific engine power setting and/or flight configuration.

g

g is acceleration due to gravity.

WEIGHT AND BALANCE TERMINOLOGY

| | |
|--------------------------|--|
| Reference Datum | Reference Datum is an imaginary vertical plane from which all horizontal distances are measured for balance purposes. |
| Station | Station is a location along the airplane fuselage given in terms of the distance from the reference datum. |
| Arm | Arm is the horizontal distance from the reference datum to the center of gravity (C.G.) of an item. |
| Moment | Moment is the product of the weight of an item multiplied by its arm. (Moment divided by the constant 1000 is used in this handbook to simplify balance calculations by reducing the number of digits.) |
| Center of Gravity (C.G.) | Center of Gravity is the point at which an airplane, or equipment, would balance if suspended. Its distance from the reference datum is found by dividing the total moment by the total weight of the airplane. |
| C.G. Arm | Center of Gravity Arm is the arm obtained by adding the airplane's individual moments and dividing the sum by the total weight. |
| C.G. Limits | Center of Gravity Limits are the extreme center of gravity locations within which the airplane must be operated at a given weight. |
| Standard Empty Weight | Standard Empty Weight is the weight of a standard airplane, including unusable fuel, full operating fluids and full engine oil. |
| Basic Empty Weight | Basic Empty Weight is the standard empty weight plus the weight of optional equipment. |
| Useful Load | Useful Load is the difference between ramp weight and the basic empty weight. |
| Maximum Ramp Weight | Maximum Ramp Weight is the maximum weight approved for ground maneuver. (It includes the weight of start, taxi, and runup fuel.) |
| Maximum Takeoff Weight | Maximum Takeoff Weight is the maximum weight approved for the start of the takeoff run. |

Maximum
Landing
Weight

Maximum Landing Weight is the maximum weight approved for the landing touchdown.

Tare

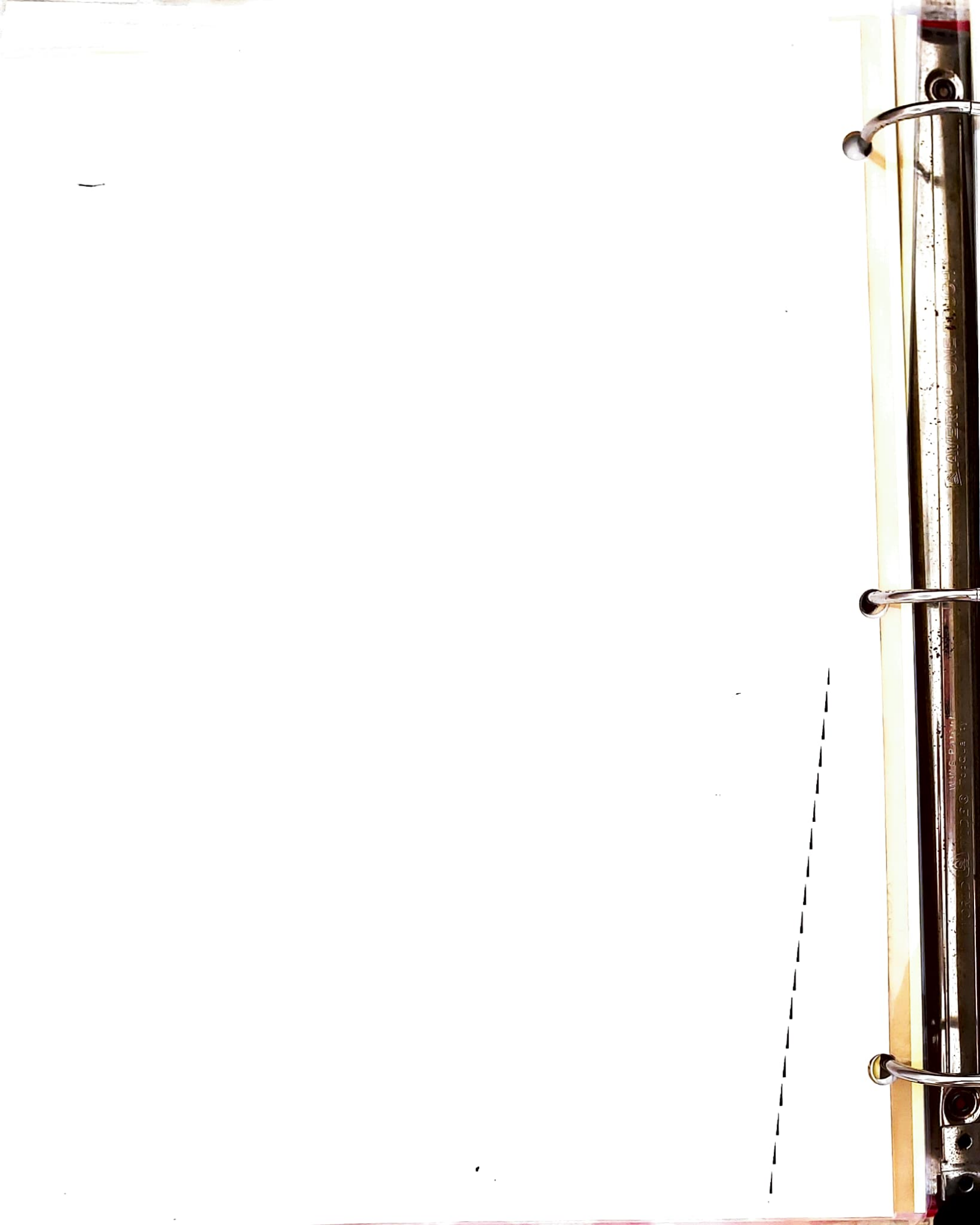
Tare is the weight of chocks, blocks, stands, etc. used when weighing an airplane, and is included in the scale readings. Tare is deducted from the scale reading to obtain the actual (net) airplane weight.



SECTION 2 LIMITATIONS

TABLE OF CONTENTS

| | Page |
|---|------|
| Introduction | 2-3 |
| Airspeed Limitations | 2-4 |
| Airspeed Indicator Markings | 2-5 |
| Power Plant Limitations | 2-5 |
| Power Plant Instrument Markings | 2-6 |
| Weight Limits | 2-6 |
| Normal Category | 2-6 |
| Utility Category | 2-7 |
| Center Of Gravity Limits | 2-7 |
| Normal Category | 2-7 |
| Utility Category | 2-7 |
| Maneuver Limits | 2-7 |
| Normal Category | 2-7 |
| Utility Category | 2-7 |
| Flight Load Factor Limits | 2-8 |
| Normal Category | 2-8 |
| Utility Category | 2-8 |
| Kinds Of Operation Limits | 2-9 |
| Fuel Limitations | 2-9 |
| Other Limitations | 2-9 |
| Flap Limitations | 2-9 |
| Placards | 2-10 |



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. 3A12 as Cessna Model No. 172N.

**SECTION 2
LIMITATIONS**

**CESSNA
MODEL 172N**

AIRSPEED LIMITATIONS

Airspeed limitations and their operational significance are shown in figure 2-1. Maneuvering speeds shown apply to normal category operations. The utility category maneuvering speed is 97 KIAS at 2000 pounds.

| | SPEED | KCAS | KIAS | REMARKS |
|-----------------|---|----------------|----------------|--|
| V _{NE} | Never Exceed Speed | 158 | 160 | Do not exceed this speed in any operation. |
| V _{NO} | Maximum Structural Cruising Speed | 126 | 128 | Do not exceed this speed except in smooth air, and then only with caution. |
| V _A | Maneuvering Speed: 2300 Pounds 1950 Pounds 1600 Pounds | 96 88 80 | 97 89 80 | Do not make full or abrupt control movements above this speed. |
| V _{FE} | Maximum Flap Extended Speed: 10° Flaps 10° - 40° Flaps | 108 86 | 110 85 | Do not exceed this speed with flaps down. |
| | Maximum Window Open Speed | 158 | 160 | 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 | 41 - 85 | Full Flap Operating Range. Lower limit is maximum weight V_{S_0} in landing configuration. Upper limit is maximum speed permissible with flaps extended. |
| Green Arc | 47 - 128 | Normal Operating Range. Lower limit is maximum weight V_S at most forward C.G. with flaps retracted. Upper limit is maximum structural cruising speed. |
| Yellow Arc | 128 - 160 | Operations must be conducted with caution and only in smooth air. |
| Red Line | 160 | Maximum speed for all operations. |

Figure 2-2. Airspeed Indicator Markings

POWER PLANT LIMITATIONS

Engine Manufacturer: Avco Lycoming.

Engine Model Number: O-320-H2AD.

Engine Operating Limits for Takeoff and Continuous Operations:

Maximum Power: 160 BHP.

Maximum Engine Speed: 2700 RPM.

NOTE

The static RPM range at full throttle (carburetor heat off and full rich mixture) is 2280 to 2400 RPM.

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

Oil Pressure, Minimum: 25 psi.

Maximum: 100 psi.

Propeller Manufacturer: McCauley Accessory Division.

Propeller Model Number: 1C160/DTM7557.

Propeller Diameter, Maximum: 75 inches.

Minimum: 74 inches.

SECTION 2 LIMITATIONS

CESSNA
MODEL 172N

POWER PLANT INSTRUMENT MARKINGS

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

| INSTRUMENT | RED LINE | GREEN ARC | YELLOW ARC | RED LINE |
|---|---------------------------------------|---|---------------|---------------|
| | MINIMUM LIMIT | NORMAL OPERATING | CAUTION RANGE | MAXIMUM LIMIT |
| Tachometer: Sea Level 5000 Feet 10000 Feet | --- | 2100-2450 RPM 2100-2575 RPM 2100-2700 RPM | --- | 2700 RPM |
| Oil Temperature | --- | 100°-245°F | --- | 245°F |
| Oil Pressure | 25 psi | 60-90 psi | --- | 100 psi |
| Fuel Quantity (Standard Tanks) | E (1.5 Gal. Unusable Each Tank) | --- | --- | --- |
| Fuel Quantity (Long Range Tanks) | E (2.0 Gal. Unusable Each Tank) | --- | --- | --- |
| Suction | --- | 4.5-5.4 in. Hg | --- | --- |

Figure 2-3. Power Plant Instrument Markings

WEIGHT LIMITS

NORMAL CATEGORY

Maximum Ramp Weight: 2307 lbs.

Maximum Takeoff Weight: 2300 lbs.

Maximum Landing Weight: 2300 lbs.

Maximum Weight in Baggage Compartment:

Baggage Area 1 (or passenger on child's seat) - Station 82 to 108: 120 lbs. See note below.

Baggage Area 2 - Station 108 to 142: 50 lbs. See note below.

NOTE

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

UTILITY CATEGORY

Maximum Ramp Weight: 2007 lbs.

Maximum Takeoff Weight: 2000 lbs.

Maximum Landing Weight: 2000 lbs.

Maximum Weight in Baggage Compartment: In the utility category, the baggage compartment and rear seat must not be occupied.

CENTER OF GRAVITY LIMITS

NORMAL CATEGORY

Center of Gravity Range:

Forward: 35.0 inches aft of datum at 1950 lbs. or less, with straight line variation to 38.5 inches aft of datum at 2300 lbs.

Aft: 47.3 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall.

UTILITY CATEGORY

Center of Gravity Range:

Forward: 35.0 inches aft of datum at 1950 lbs. or less, with straight line variation to 35.5 inches aft of datum at 2000 lbs.

Aft: 40.5 inches aft of datum at all weights.

Reference Datum: Lower portion of front face of firewall.

MANEUVER LIMITS

NORMAL CATEGORY

This airplane is certificated in both the normal and utility 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 turns in which the angle of bank is not more than 60°. Aerobatic maneuvers, including spins, are not approved.

UTILITY CATEGORY

This airplane is not designed for purely aerobatic flight. However, in the acquisition of various certificates such as commercial pilot and flight instructor, certain maneuvers are required by the FAA. All of these maneuvers are permitted in this airplane when operated in the utility category.

CESSNA MODEL 172N

SECTION 2 LIMITATIONS

In the utility category, the baggage compartment and rear seat must not be occupied. No aerobatic maneuvers are approved except those listed below:

RECOMMENDED ENTRY SPEED*

| MANEUVER | |
|-----------------------------|-------------------|
| Chandelles | 105 knots |
| Lazy Eights | 105 knots |
| Steep Turns | 95 knots |
| Spins | Slow Deceleration |
| Stalls (Except Whip Stalls) | Slow Deceleration |

*Abrupt use of the controls is prohibited above 97 knots.

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. Intentional spins with flaps extended are prohibited.

FLIGHT LOAD FACTOR LIMITS

NORMAL CATEGORY

Flight Load Factors (Maximum Takeoff Weight - 2300 lbs.):

| | |
|-------------|---------------|
| *Flaps Up | +3.8g, -1.52g |
| *Flaps Down | +3.0g |

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

UTILITY CATEGORY

Flight Load Factors (Maximum Takeoff Weight - 2000 lbs.):

| | |
|-------------|---------------|
| *Flaps Up | +4.4g, -1.76g |
| *Flaps Down | +3.0g |

*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 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 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

- 2 Standard Tanks: 21.5 U.S. gallons each.
 - Total Fuel: 43 U.S. gallons.
 - Usable Fuel (all flight conditions): 40 U.S. gallons.
 - Unusable Fuel: 3 U.S. gallons.
- 2 Long Range Tanks: 27 U.S. gallons each.
 - Total Fuel: 54 U.S. gallons.
 - Usable Fuel (all flight conditions): 50 U.S. gallons.
 - Unusable Fuel: 4 U.S. gallons.

NOTE

To ensure maximum fuel capacity when refueling and minimize cross-feeding when parked on a sloping surface, place the fuel selector valve in either LEFT or RIGHT position.

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

Fuel remaining in the tank after the fuel quantity indicator reads empty (red line) cannot be safely used in flight.

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

OTHER LIMITATIONS

FLAP LIMITATIONS

- Approved Takeoff Range: 0° to 10°.
- Approved Landing Range: 0° to 40°.



SECTION 2
LIMITATIONS

CESSNA
MODEL 172N

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 must be operated in compliance with the operating limitations as stated in the form of placards, markings, and manuals.

MAXIMUMS

| | Normal Category | Utility Category |
|-------------------------|-----------------|------------------|
| MANEUVERING SPEED (IAS) | 97 knots | 97 knots |
| GROSS WEIGHT | 2300 lbs. | 2000 lbs. |
| FLIGHT LOAD FACTOR | | |
| Flaps Up | +3.8, -1.52 | +4.4, -1.76 |
| Flaps Down | +3.0 | +3.0 |

Normal Category - No Acrobatic maneuvers including spins approved.

Utility Category - Baggage compartment and rear seat must not be occupied.

NO ACROBATIC MANEUVERS APPROVED EXCEPT THOSE LISTED BELOW

| Maneuver | Recm. Entry Speed | Maneuver | Recm. Entry Speed |
|-------------|-------------------|----------------|-------------------|
| Chandelles | 105 knots | Spins | Slow Deceleration |
| Lazy Eights | 105 knots | Stalls (except | |
| Steep Turns | 95 knots | whip stalls) | Slow Deceleration |

Altitude loss in stall recovery -- 180 feet.

Abrupt use of the controls prohibited above 97 knots.

Spin Recovery: opposite rudder - forward elevator - neutralize controls. Intentional spins with flaps extended are prohibited. 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