

APPENDIX 86-19-11
PILOT OPERATING PROCEDURES
PRE-FLIGHT FUEL SYSTEM CHECK

FUEL SAMPLING: Fuel Strainer, Wing Tank and Reservoir Quick Drains.

1. Place a suitable container under the fuel strainer drain outlet prior to operating the strainer drain control for at least 4 second. Check strainer drain closed.
2. Inspect the fluid drained from the fuel strainer and each wing tank quick drain for evidence of fuel contamination in the form of water, rust, sludge, ice or any other substance not compatible with fuel. Also, check for proper fuel grade before the first flight of each day and after each refueling. If any contamination is detected, comply with 4 below.
3. Repeat steps 1 and 2 on each wing tank quick drain.
4. If the A/C has been exposed to rain, sleet or snow, or if the wing fuel tanks or fuel strainer drains produce water, the fuel reservoir(s) must be checked for the presence of water by operating the fuel reservoir quick drains. The A/C fuel system must be purged to the extent necessary to insure that there is no water, ice or other fuel contamination.

NOTE 1 The fuel reservoir(s) are located under the fuselage between the firewall and forward door post on all A/C models. Consult the pilot's operating handbook or owner's manual in order to determine if one or two reservoir(s) are installed.

NOTE 2 A check for the presence of water using the fuel reservoir quick drains prior to the 1st flight of each day is considered good operating practice.

SECTION 4

NORMAL PROCEDURES

TABLE OF CONTENTS

	Page
Introduction	4-3
Speeds For Normal Operation	4-3
CHECKLIST PROCEDURES	
Preflight Inspection	4-5
Cabin	4-5
Empennage	4-5
Right Wing, Trailing Edge	4-5
Right Wing	4-6
Nose	4-6
Left Wing	4-6
Left Wing, Leading Edge	4-6
Left Wing, Trailing Edge	4-7
Before Starting Engine	4-7
Starting Engine	4-7
Before Takeoff	4-8
Takeoff	4-8
Normal Takeoff	4-8
Short Field Takeoff	4-9
Enroute Climb	4-9
Normal Climb	4-9
Maximum Performance Climb	4-9
Cruise	4-10
Descent	4-10
Before Landing	4-10
Landing	4-10
Normal Landing	4-10
Short Field Landing	4-11
Balked Landing	4-11
After Landing	4-11
Securing Airplane	4-11

TABLE OF CONTENTS (Continued)

Page

AMPLIFIED PROCEDURES

Starting Engine	4-13
Taxiing	4-15
Before Takeoff	4-15
Warm-Up	4-15
Magnetos Check	4-15
Alternator Check	4-16
Takeoff	4-16
Power Check	4-16
Wing Flap Settings	4-16
Short Field Takeoff	4-17
Crosswind Takeoff	4-17
Landing Gear Retraction	4-17
Enroute Climb	4-17
Cruise	4-18
Leaning With A Cessna Economy Mixture Indicator (EGT)	4-19
Stalls	4-20
Before Landing	4-20
Landing	4-21
Normal Landing	4-21
Short Field Landing	4-21
Crosswind Landing	4-21
Balked Landing	4-21
Cold Weather Operation	4-22
Noise Abatement	4-22

INTRODUCTION

Section 4 provides checklist and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Section 9.

SPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 3800 pounds and may be used for any lesser weight. However, to achieve the performance specified in Section 5 for takeoff distance and climb performance, the speed appropriate to the particular weight must be used.

Takeoff:

Normal Climb Out	80-90 KIAS
Short Field Takeoff, Flaps 10°, Speed at 50 Feet	69 KIAS

Enroute Climb, Flaps and Gear Up:

Normal	100-110 KIAS
Best Rate of Climb, Sea Level	96 KIAS
Best Rate of Climb, 10,000 Feet	89 KIAS
Best Angle of Climb, Sea Level	79 KIAS
Best Angle of Climb, 10,000 Feet	80 KIAS

Landing Approach:

Normal Approach, Flaps Up	80-90 KIAS
Normal Approach, Flaps 30°	70-80 KIAS
Short Field Approach, Flaps 30°	72 KIAS

Balked Landing:

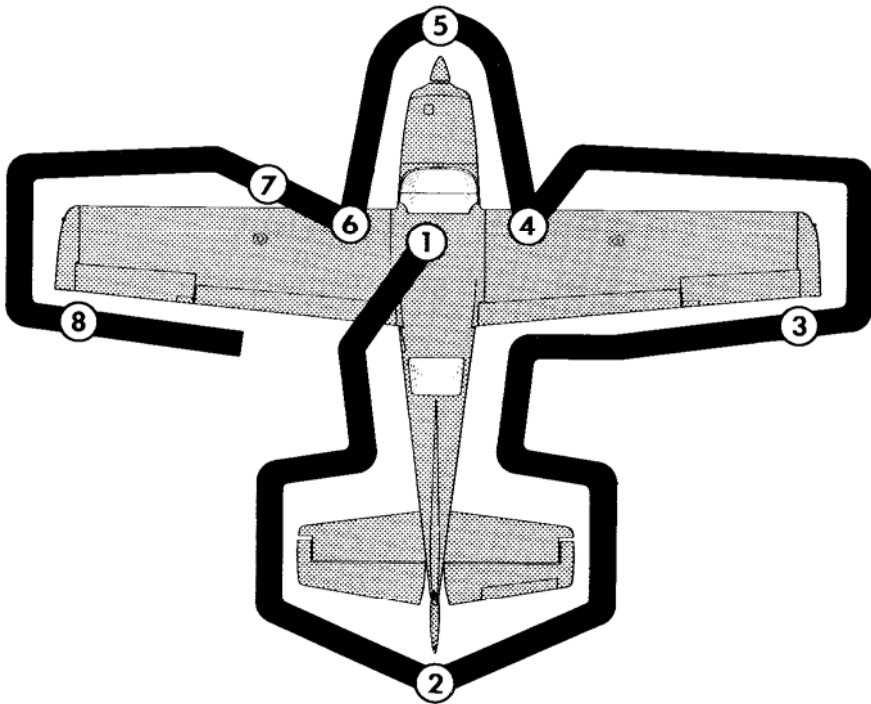
Maximum Power, Flaps 20°	70 KIAS
------------------------------------	---------

Maximum Recommended Turbulent Air Penetration Speed:

3800 Lbs	125 KIAS
3150 Lbs	113 KIAS
2500 Lbs	101 KIAS

Maximum Demonstrated Crosswind Velocity:

Takeoff or Landing	21 KNOTS
------------------------------	----------



NOTE

Visually check airplane for general condition during walk-around inspection. In cold weather, remove even small accumulations of frost, ice or snow from wing, tail and control surfaces. Also, make sure that control surfaces contain no internal accumulations of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch within 30 seconds with battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available.

Figure 4-1. Preflight Inspection

CHECKLIST PROCEDURES

PREFLIGHT INSPECTION

① CABIN

1. Pilot's Operating Handbook -- AVAILABLE IN THE AIRPLANE.
2. Landing Gear Lever -- DOWN.
3. Control Wheel Lock -- REMOVE.
4. Ignition Switch -- OFF.
5. Radar (if installed) -- OFF.
6. Avionics Power Switch -- OFF.
7. Master Switch -- ON.

WARNING

When turning on the master switch, using an external power source, or pulling the propeller through by hand, treat the propeller as if the ignition switch were on. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

8. Fuel Quantity Indicators -- CHECK QUANTITY.
9. Fuel Selector Valve -- ON fuller tank.
10. Master Switch -- OFF.
11. Trim Controls -- NEUTRAL.
12. Suction Gage Warning Buttons (if installed) -- CHECK both extended .
13. Static Pressure Alternate Source Valve (if installed) -- OFF.
14. Static Source Openings (both sides of fuselage) -- CHECK for stoppage.
15. Baggage Door -- CHECK for security.

② EMPENNAGE

1. Rudder Gust Lock -- REMOVE.
2. Tail Tie-Down -- DISCONNECT.
3. Control Surfaces -- CHECK freedom of movement and security.

③ RIGHT WING Trailing Edge

1. Aileron -- CHECK for freedom of movement and security.
2. Aileron Gap Seal -- CHECK security and fit.
3. Fuel Tank Vent at Wing Tip Trailing Edge -- CHECK for stoppage.

④ RIGHT WING

1. Wing Tie-Down -- DISCONNECT.
2. Main Wheel Tire -- CHECK for proper inflation.
3. Retractable Cabin Step (if installed) -- CHECK for security and cleanliness, and retraction well for cleanliness.
4. Before first flight of the day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick-drain valve to check for water, sediment, and proper fuel grade.
5. Fuel Quantity -- CHECK VISUALLY for desired level.
6. Fuel Filler Cap -- SECURE and vent unobstructed.
7. Radome (if weather radar is installed) -- CHECK for condition and security.

⑤ NOSE

1. Propeller and Spinner -- CHECK for nicks, security and oil leaks.
2. Landing and Taxi Lights -- CHECK for condition and cleanliness.
3. Nose Gear Doors -- CHECK for security.
4. Nose Wheel Strut and Tire -- CHECK for proper inflation.
5. Nose Tie-Down -- DISCONNECT.
6. Engine Oil Level -- CHECK, do not operate with less than seven quarts. Fill to 10 quarts for extended flight.
7. Before first flight of the day and after each refueling, pull out strainer drain knob for about four seconds to clear fuel strainer of possible water and sediment. Check strainer drain closed. If water is observed, the fuel system may contain additional water, and further draining of the system at the strainer, fuel tank sumps, and fuel reservoir drain valves will be necessary.

⑥ LEFT WING

1. Main Wheel Tire -- CHECK for proper inflation.
2. Before first flight of the day and after each refueling, use sampler cup and drain small quantity of fuel from fuel tank sump quick-drain valve to check for water, sediment, and proper fuel grade.
3. Fuel Quantity -- CHECK VISUALLY for desired level.
4. Fuel Filler Cap -- SECURE and vent unobstructed.

⑦ LEFT WING Leading Edge

1. Pitot Tube Cover -- REMOVE and check opening for stoppage.
2. Stall Warning Vane -- CHECK for freedom of movement while master switch is momentarily turned on (horn should sound when vane is pushed upward).
3. Wing Tie-Down -- DISCONNECT.

⑧ LEFT WING Trailing Edge

1. Fuel Tank Vent at Wing Tip Trailing Edge -- CHECK for stoppage.
2. Aileron -- CHECK for freedom of movement and security.
3. Aileron Gap Seal -- CHECK security and fit.

BEFORE STARTING ENGINE

1. Preflight Inspection -- COMPLETE.
2. Seats, Belts, Shoulder Harnesses -- ADJUST and LOCK.
3. Brakes -- TEST and SET.
4. Cowl Flaps -- OPEN (move lever out of locking hole to reposition).
5. Avionics Power Switch, Electrical Equipment, Autopilot and Radar (if installed) -- OFF.

CAUTION

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

6. Landing Gear Lever -- DOWN.
7. Master Switch -- ON.
8. Landing Gear Lights and Horn -- PRESS TO TEST.
9. Circuit Breakers -- CHECK IN.
10. Fuel Selector Valve -- FULLER TANK.

STARTING ENGINE

1. Mixture -- RICH.
2. Propeller -- HIGH RPM.
3. Throttle -- CLOSED.
4. Auxiliary Fuel Pump Switch -- ON.
5. Throttle -- ADVANCE to obtain 50-60 lbs/hr fuel flow, then RETURN to IDLE POSITION.
6. Auxiliary Fuel Pump Switch -- OFF.
7. Propeller Area -- CLEAR.
8. Ignition Switch -- START.
9. Throttle -- ADVANCE slowly.
10. Ignition Switch -- RELEASE when engine starts.

NOTE

The engine should start in two or three revolutions. If it does not continue running, start again at step 3 above. If the engine does not start, leave auxiliary fuel pump switch off, set mixture to idle cut-off, open throttle, and crank until engine fires or for approximately 15 seconds. If still unsuccessful, start again using the normal starting procedure after allowing the starter motor to cool.

11. Throttle -- RESET to desired idle speed.
12. Oil Pressure -- CHECK.
13. Low-Voltage Light -- OFF (at approximately 800 RPM).

BEFORE TAKEOFF

1. Parking Brake -- SET.
2. Cabin Doors and Windows -- CLOSED and LOCKED.
3. Cowl Flaps -- FULL OPEN.
4. Flight Controls -- FREE and CORRECT.
5. Flight Instruments -- CHECK.
6. Fuel Selector Valve -- FULLER TANK.
7. Mixture -- RICH (below 3000 feet).
8. Elevator and Rudder Trim -- TAKEOFF.
9. Throttle -- 1700 RPM.
 - a. Magnetos -- CHECK (RPM drop should not exceed 150 RPM on either magneto or 50 RPM differential between magnetos).
 - b. Propeller -- CYCLE from high to low RPM; return to high RPM (full forward).
 - c. Engine Instruments and Ammeter -- CHECK.
 - d. Suction Gage -- CHECK in green arc and low-vacuum warning buttons retracted (if installed).
10. Avionics Power Switch -- ON.
11. Radios -- SET.
12. Autopilot (if installed) -- OFF.
13. Flashing Beacon, Navigation Lights and/or Strobe Lights -- ON as required.
14. Throttle Friction Lock -- ADJUST.
15. Parking Brake -- RELEASE.

TAKEOFF

NORMAL TAKEOFF

1. Wing Flaps -- 0°- 10° (10° preferred).
2. Power -- FULL THROTTLE and 2850 RPM.

3. Mixture -- RICH (lean for field elevation per fuel flow placard above 3000 feet).
4. Elevator Control -- LIFT NOSE WHEEL at 60 to 70 KIAS.

NOTE

When the nose wheel is lifted the gear motor may run 2-3 seconds to restore hydraulic pressure.

5. Climb Speed -- 80-90 KIAS.
6. Brakes -- APPLY momentarily when airborne.
7. Landing Gear -- RETRACT in climb out.
8. Wing Flaps -- RETRACT.

SHORT FIELD TAKEOFF

1. Wing Flaps -- 10°.
2. Brakes -- APPLY.
3. Power -- FULL THROTTLE and 2850 RPM.
4. Mixture -- RICH (lean for field elevation per fuel flow placard above 3000 feet).
5. Brakes -- RELEASE.
6. Elevator Control -- SLIGHTLY TAIL-LOW.
7. Climb Speed -- 69 KIAS until all obstacles are cleared.
8. Landing Gear -- RETRACT after obstacles are cleared.
9. Wing Flaps -- RETRACT after reaching 80 KIAS.

NOTE

Do not reduce power until wing flaps and landing gear have been retracted.

ENROUTE CLIMB

NORMAL CLIMB

1. Airspeed -- 100-110 KIAS.
2. Power -- 25 INCHES Hg and 2550 RPM.
3. Mixture -- LEAN to 108 lbs./hr.
4. Cowl Flaps -- OPEN as required.

MAXIMUM PERFORMANCE CLIMB

1. Airspeed -- 96 KIAS at sea level to 89 KIAS at 10,000 feet.
2. Power -- FULL THROTTLE and 2700 RPM.

3. Mixture -- LEAN per fuel flow placard.
4. Cowl Flaps -- FULL OPEN.

CRUISE

1. Power -- 15-25 INCHES Hg, 2200-2550 RPM (no more than 75%).
2. Elevator and Rudder Trim -- ADJUST.
3. Mixture -- LEAN for cruise fuel flow using the EGT gage (if installed), a Cessna Power Computer, or the data in Section 5.
4. Cowl Flaps -- CLOSED (open if required).

DESCENT

1. Power -- AS DESIRED.
2. Mixture -- ADJUST for smooth operation (full rich for idle power).
3. Cowl Flaps -- CLOSED.

BEFORE LANDING

1. Seats, Belts, Shoulder Harnesses -- SECURE.
2. Fuel Selector Valve -- FULLER TANK.
3. Landing Gear -- EXTEND (below 165 KIAS).
4. Landing Gear -- CHECK (observe main gear down and green indicator light on).
5. Mixture -- RICH.
6. Propeller -- HIGH RPM.
7. Wing Flaps -- AS DESIRED (0° to 10° below 150 KIAS, 10° to 30° below 115 KIAS).
8. Autopilot (if installed) -- OFF.
9. Elevator Trim -- ADJUST.

LANDING

NORMAL LANDING

1. Airspeed -- 80-90 KIAS (flaps UP).
2. Wing Flaps -- AS DESIRED (flaps down preferred).
3. Airspeed -- 70-80 KIAS (flaps DOWN).
4. Elevator Trim -- ADJUST.

5. Touchdown -- MAIN WHEELS FIRST.
6. Landing Roll -- LOWER NOSE WHEEL GENTLY.
7. Braking -- MINIMUM REQUIRED.

SHORT FIELD LANDING

1. Wing Flaps -- FULL DOWN.
2. Airspeed -- 72 KIAS.
3. Elevator Trim -- ADJUST.
4. Power -- REDUCE to idle after clearing obstacle.
5. Touchdown -- MAIN WHEELS FIRST.
6. Brakes -- APPLY HEAVILY.
7. Wing Flaps -- RETRACT.

BALKED LANDING

1. Power -- FULL THROTTLE and 2850 RPM.
2. Wing Flaps -- RETRACT to 20° (immediately).
3. Climb Speed -- 70 KIAS (until obstacles are cleared).
4. Mixture -- RICH (lean for field elevation per fuel flow placard above 3000 feet).
5. Wing Flaps -- RETRACT slowly (after reaching safe altitude and 75-80 KIAS).
6. Cowl Flaps -- OPEN.

AFTER LANDING

1. Wing Flaps -- RETRACT.
2. Cowl Flaps -- OPEN.
3. Radar (if installed) -- OFF.

SECURING AIRPLANE

1. Parking Brake -- SET.
2. Avionics Power Switch, Electrical Equipment -- OFF.
3. Mixture -- IDLE CUT-OFF (pulled full out).
4. Ignition Switch -- OFF.
5. Master Switch -- OFF.
6. Control Lock -- INSTALL.

AMPLIFIED PROCEDURES

STARTING ENGINE

Proper fuel management and throttle adjustments are the determining factors in securing an easy start from your continuous-flow fuel-injection engine. The procedure outlined below should be followed closely as it is effective under nearly all operating conditions.

Conventional full rich mixture and high RPM propeller settings are used for starting; the throttle, however, should be fully closed initially. When ready to start, place the auxiliary fuel pump switch in the ON position and advance the throttle to obtain 50-60 lbs/hr fuel flow. Then promptly return the throttle to idle and turn off the auxiliary fuel pump. Place the ignition switch in the START position. While cranking, slowly advance the throttle until the engine starts. Slow throttle advancement is essential since the engine will start readily when the correct fuel/air ratio is obtained. When the engine has started, reset the throttle to the desired idle speed.

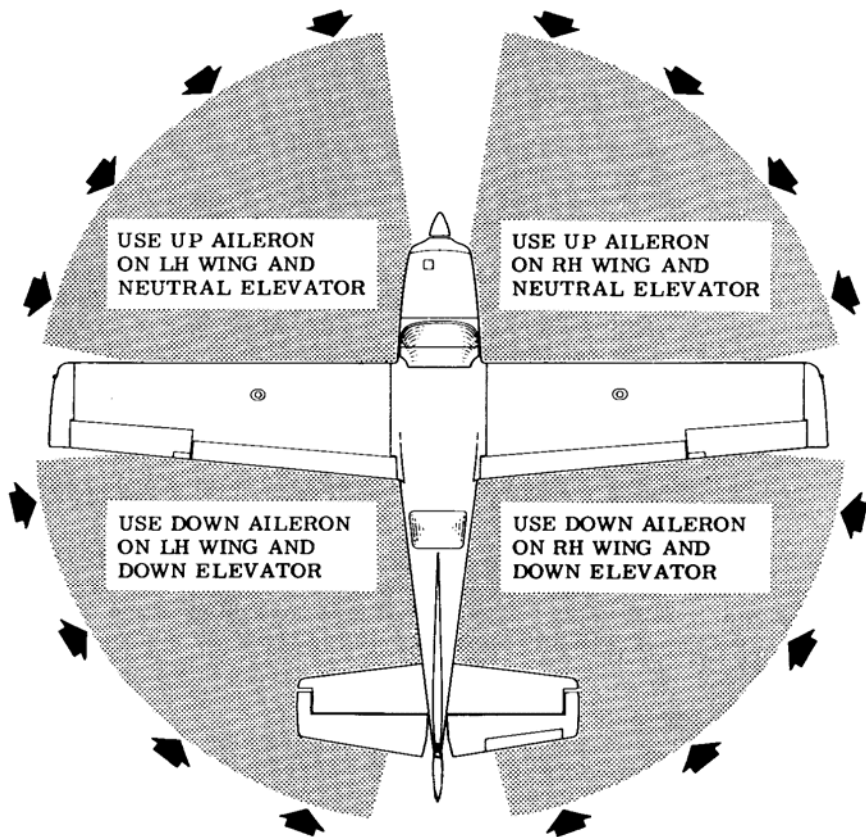
When the engine is hot or outside air temperatures are high, the engine may die after running several seconds because the mixture became either too lean due to fuel vapor, or too rich due to excessive prime fuel. The following procedure will prevent over-priming and alleviate fuel vapor in the system:

1. Set the throttle 1/3 to 1/2 open.
2. When the ignition switch is in the BOTH position and you are ready to engage the starter, place the right half of the auxiliary fuel pump switch in the ON position until the indicated fuel flow comes up to 25 to 35 lbs/hr; then turn the switch off.

NOTE

During a restart after a brief shutdown in extremely hot weather, the presence of fuel vapor may require the use of the auxiliary fuel pump switch in the ON position for up to 1 minute or more before the vapor is cleared sufficiently to obtain 25 to 35 lbs/hr for starting. If the above procedure does not obtain sufficient fuel flow, fully depress and hold the left half of the switch in the HI position to obtain additional fuel pump capability.

3. Without hesitation, engage the starter and the engine should start in 3 to 5 revolutions. Adjust throttle for 1200 to 1400 RPM.



CODE

WIND DIRECTION



NOTE

Strong quartering tail winds require caution. Avoid sudden bursts of the throttle and sharp braking when the airplane is in this attitude. Use the steerable nose wheel and rudder to maintain direction.

Figure 4-2. Taxiing Diagram

4. If there is fuel vapor in the lines, it will pass into the injector nozzles in 2 to 3 seconds and the engine will gradually slow down and stop. When engine speed starts to decrease, hold the left half of the auxiliary fuel pump switch in the HI position for approximately one second to clear out the vapor. Intermittent use of the HI position of the switch is necessary since prolonged use of the HI position after vapor is cleared will flood out the engine during a starting operation.
5. Let the engine run at 1200 to 1400 RPM until the vapor is eliminated and the engine idles normally.

If prolonged cranking is necessary, allow the starter motor to cool at frequent intervals, since excessive heat may damage the armature.

After starting, if the oil pressure gage does not begin to show pressure within 30 seconds in normal temperatures and 60 seconds in very cold weather, shut off the engine and investigate. Lack of oil pressure can cause serious engine damage.

TAXIING

Taxiing over loose gravel or cinders should be done at low engine speed to avoid abrasion and stone damage to the propeller tips. Refer to figure 4-2 for additional taxiing instructions.

BEFORE TAKEOFF

WARM-UP

Since the engine is closely cowled for efficient in-flight cooling, precautions should be taken to avoid overheating on the ground. Full throttle checks on the ground are not recommended unless the pilot has good reason to suspect that the engine is not turning up properly.

MAGNETO CHECK

The magneto check should be made at 1700 RPM as follows. Move ignition switch first to R position and note RPM. Next move switch back to BOTH to clear the other set of plugs. Then move switch to the L position, note RPM and return the switch to the BOTH position. RPM drop should not exceed 150 RPM on either magneto or show greater than 50 RPM differential between magnetos. If there is a doubt concerning operation of the ignition system, RPM checks at higher engine speeds will usually confirm whether a deficiency exists.

An absence of RPM drop may be an indication of faulty grounding of one side of the ignition system or should be cause for suspicion that the magneto timing is set in advance of the setting specified.

ALTERNATOR CHECK

Prior to flights where verification of proper alternator and alternator control unit operation is essential (such as night or instrument flights), a positive verification can be made by loading the electrical system momentarily (3 to 5 seconds) with the landing light during the engine runup (1700 RPM). The ammeter will remain within a needle width of the initial indication if the alternator and alternator control unit are operating properly.

TAKEOFF

POWER CHECK

It is important to check takeoff power early in the takeoff run. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff.

Full power runups over loose gravel are especially harmful to propeller tips. When takeoffs must be made over a gravel surface, it is very important that the throttle be advanced slowly. This allows the airplane to start rolling before high RPM is developed, and the gravel will be blown back of the propeller rather than pulled into it.

After full power is applied, adjust the throttle friction lock clockwise to prevent the throttle from creeping from a maximum power position. Similar friction lock adjustments should be made as required in other flight conditions to maintain a fixed throttle setting.

For maximum engine power, the mixture should be adjusted during the initial takeoff roll to the fuel flow corresponding to the field elevation. (Refer to the fuel flow placard located adjacent to fuel flow indicator.) The power increase is significant above 3000 feet and this procedure should always be employed for field elevations greater than 5000 feet above sea level.

WING FLAP SETTINGS

Using 10° wing flaps reduces the ground run and total distance over the obstacle by approximately 10 percent. Soft field takeoffs are performed with 10° flaps by lifting the nose wheel off the ground as soon as practical and leaving the ground in a slightly tail-low attitude. However, the

airplane should be leveled off immediately to accelerate to a safe climb speed. Flap settings greater than 10° are not approved for takeoff.

SHORT FIELD TAKEOFF

If an obstruction dictates the use of a steep climb angle, after liftoff accelerate to and climb out at an obstacle clearance speed of 69 KIAS with 10° flaps and gear extended. This speed provides the best overall climb speed to clear obstacles when taking into account the turbulence often found near ground level. The takeoff performance data in Section 5 is based on this speed and configuration.

CROSSWIND TAKEOFF

Takeoffs into strong crosswinds normally are performed with the minimum flap setting necessary for the field length, to minimize the drift angle immediately after takeoff. With the ailerons partially deflected into the wind, the airplane is accelerated to a speed higher than normal, and then pulled off abruptly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

LANDING GEAR RETRACTION

Landing gear retraction normally is started after reaching the point over the runway where a wheels-down, forced landing on that runway would become impractical. Since the landing gear swings downward approximately two feet as it starts the retraction cycle, damage can result by retracting it before obtaining at least that much ground clearance.

Before retracting the landing gear, the brakes should be applied momentarily to stop wheel rotation. Centrifugal force caused by the rapidly-spinning wheel expands the diameter of the tire. If there is an accumulation of mud or ice in the wheel wells, the rotating wheel may rub as it is retracted into the wheel well.

ENROUTE CLIMB

A cruising climb at 25 inches of manifold pressure, 2550 RPM (approximately 75% power) and 100-110 KIAS is normally recommended. This type of climb provides an optimum combination of performance, visibility ahead, and passenger comfort (due to lower noise level).

Cruising climbs should be conducted at 108 lbs/hr up to 4000 feet and at the fuel flow shown on the Normal Climb Chart in Section 5 for higher altitudes.

If it is necessary to climb rapidly to clear mountains or reach favorable weather or winds at high altitudes, the best rate-of-climb speed should be used with maximum continuous power. This speed is 96 KIAS at sea level, decreasing to 89 KIAS at an altitude of 10,000 feet. The mixture should be leaned in accordance with the fuel flow placard located adjacent to the fuel flow indicator.

If an obstruction dictates the use of a steep climb angle, climb with flaps retracted and maximum continuous power at 79 KIAS at sea level to 80 KIAS at 10,000 feet.

CRUISE

Normal cruising is performed between 55% and 75% power. The corresponding power settings and fuel consumption for various altitudes can be determined by using your Cessna Power Computer or the data in Section 5.

NOTE

Cruising should be done at 65% to 75% power until a total of 50 hours has accumulated or oil consumption has stabilized. This is to ensure proper seating of the rings and is applicable to new engines, and engines in service following cylinder replacement or top overhaul of one or more cylinders.

The Cruise Performance Table, figure 4-3, illustrates the advantage of higher altitude on both true airspeed and nautical miles per gallon. In addition, the beneficial effect of lower cruise power on nautical miles per gallon at a given altitude can be observed. This table should be used as a guide, along with the available winds aloft information, to determine the most favorable altitude and power setting for a given trip. The selection of cruise altitude on the basis of the most favorable wind conditions and the use of low power settings are significant factors that should be considered on every trip to reduce fuel consumption.

For reduced noise levels, it is desirable to select the lowest RPM in the green arc range for a given percent power that will provide smooth engine operation. The cowl flaps should be opened, if necessary, to maintain the cylinder head temperature at approximately one-half of the normal operating range (green arc).

For best fuel economy at 65% power or less, the engine should be operated at six pounds per hour leaner than shown in this handbook and on

ALTITUDE	75% POWER		65% POWER		55% POWER	
	KTAS	NMPG	KTAS	NMPG	KTAS	NMPG
3000 Feet	165	10.5	157	11.5	146	12.5
6500 Feet	171	10.9	162	11.9	150	12.8
10,000 Feet	---	---	167	12.3	154	13.2
Standard Conditions					Zero Wind	

Figure 4-3. Cruise Performance Table

the power computer. This will result in approximately 6% greater range than shown in this handbook accompanied by approximately 4 knots decrease in speed.

The fuel injection system employed on this engine is considered to be non-icing. In the event that unusual conditions cause the intake air filter to become clogged or iced over, an alternate intake air valve opens automatically. Due to a one to two inch decrease in manifold pressure and a significant increase in intake air temperature when the filter is blocked, power at full throttle decreases approximately 10%.

LEANING WITH A CESSNA ECONOMY MIXTURE INDICATOR (EGT)

Exhaust gas temperature (EGT) as shown on the optional Cessna Economy Mixture Indicator may be used as an aid for mixture leaning in cruising flight at 75% power or less. To adjust the mixture, using this indicator, lean to establish the peak EGT as a reference point and then enrichen the mixture by a desired increment based on figure 4-4.

MIXTURE DESCRIPTION	EXHAUST GAS TEMPERATURE
RECOMMENDED LEAN (Pilot's Operating Handbook and Power Computer)	25°F Rich of Peak EGT
BEST ECONOMY (65% Power or Less)	Peak EGT

Figure 4-4. EGT Table

Continuous operation at peak EGT is authorized only at 65% power or less. This best economy mixture setting results in approximately 6% greater range than shown in this handbook accompanied by approximately 4 knots decrease in speed.

NOTE

Operation on the lean side of peak EGT is not approved.

When leaning the mixture, if a distinct peak is not obtained, use the corresponding maximum EGT as a reference point for enriching the mixture to the desired cruise setting. Any change in altitude or power will require a recheck of the EGT indication.

STALLS

The stall characteristics are conventional and aural warning is provided by a stall warning horn which sounds between 5 and 10 knots above the stall in all configurations. Altitude loss during a stall recovery may be as much as 300 feet from a wings-level stall and even greater from a turning stall.

Power-off stall speeds at maximum weight for both forward and aft C.G. are presented in Section 5.

BEFORE LANDING

In view of the relatively low drag of the extended landing gear and the high allowable gear-operating speed (165 KIAS), the landing gear should be extended before entering the traffic pattern. This practice will allow more time to confirm that the landing gear is down and locked. As a further precaution, leave the landing gear extended in go-around procedures or traffic patterns for touch-and-go landing.

Landing gear extension can be detected by illumination of the gear down indicator light (green), absence of a gear warning horn with the throttle retarded below 12 inches of manifold pressure, and visual inspection of the main gear position. Should the gear indicator light fail to illuminate, the light should be checked for a burned-out bulb by pushing to test. A burned-out bulb can be replaced in flight with the landing gear up (amber) indicator light.

LANDING

NORMAL LANDING

Normal landing approaches can be made with power on or power off with any flap setting desired. Use of flaps down is normally preferred to minimize touchdown speed and subsequent need for braking. For a given flap setting, surface winds and turbulence are usually the primary factors in determining the most comfortable approach speed.

Actual touchdown should be made with power off and on the main wheels first to reduce the landing speed and subsequent need for braking in the landing roll. The nose wheel is lowered to the runway after the speed diminished to avoid unnecessary nose gear load. This procedure is especially important in rough or short field landings.

SHORT FIELD LANDING

For short field landings, make a power approach at 72 KIAS with full flaps. After all approach obstacles are cleared, progressively reduce power. Maintain 72 KIAS approach speed by lowering the nose of the airplane. Touchdown should be made with the throttle closed, and on the main wheels first. Immediately after touchdown, lower the nose gear and apply heavy braking as required. For maximum brake effectiveness after all three wheels are on the ground, retract the flaps, hold full nose up elevator and apply maximum possible brake pressure without sliding the tires.

At light operating weights, during ground roll with full flaps, hold the control wheel full back to ensure maximum weight on the main wheels for braking. Under these conditions, full nose down elevator (control wheel full forward) will raise the main wheels off the ground.

CROSSWIND LANDING

When landing in a strong crosswind, use the minimum flap setting required for the field length. Although the crab or combination method of drift correction may be used, the wing-low method gives the best control. After touchdown, hold a straight course with the steerable nose wheel and occasional braking if necessary.

BALKED LANDING

In a balked landing (go-around) climb, the wing flap setting should be reduced to 20° immediately after full power is applied. If obstacles must be cleared during the go-around climb, leave the wing flaps at 20° and maintain a safe climb speed. Above 3000 feet altitude, the mixture should

be leaned in accordance with the fuel flow placard to obtain maximum power. After all obstacles are cleared and a safe altitude and airspeed are obtained, the wing flaps may be retracted.

COLD WEATHER OPERATION

The use of an external pre-heater and an external power source is recommended whenever possible to reduce wear and abuse to the engine and the electrical system. Pre-heat will thaw the oil trapped in the oil cooler, which probably will be congealed prior to starting in extremely cold temperatures. When using an external power source, the position of the master switch is important. Refer to Section 9, Supplements, for Ground Service Plug Receptacle operating details.

In very cold weather, no oil temperature indication need be apparent before takeoff. After a suitable warm-up period (2 to 5 minutes at 1000 RPM), the engine is ready for takeoff if it accelerates smoothly and the oil pressure is normal and steady.

During let-down, observe engine temperatures closely and carry sufficient power to maintain them in the recommended operating range.

NOISE ABATEMENT

Increased emphasis on improving the quality of our environment requires renewed effort on the part of all pilots to minimize the effect of airplane noise on the public.

We, as pilots, can demonstrate our concern for environmental improvement, by application of the following suggested procedures, and thereby tend to build public support for aviation:

1. Pilots operating aircraft under VFR over outdoor assemblies of persons, recreational and park areas, and other noise-sensitive areas should make every effort to fly not less than 2000 feet above the surface, weather permitting, even though flight at a lower level may be consistent with the provisions of government regulations.
2. During departure from or approach to an airport, climb after takeoff and descent for landing should be made so as to avoid prolonged flight at low altitude near noise-sensitive areas.

NOTE

The above recommended procedures do not apply where they would conflict with Air Traffic Control clearances or instructions, or where, in the pilot's judgment, an altitude of less than 2000 feet is necessary for him to adequately exercise his duty to see and avoid other aircraft.

The certificated noise level for the Model 210N at 3800 pounds maximum weight is 79.9 dB(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.