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 accumulation of ice or debris. Prior to flight, check that pitot heater (if installed) is warm to touch within 30 seconds of battery and pitot heat switches on. If a night flight is planned, check operation of all lights, and make sure a flashlight is available. Check the surrounding area for debris which may be drawn into or blown about by the propeller. If necessary, position the airplane to avoid creating a hazard to buildings, vehicles or persons by the propeller blast

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, or 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.

PREFLIGHT INSPECTION

CABIN

1. Documents/Hobbs/Tach/Squawks—CHECK
2. For IFR **VOR 30 Day Accuracy** – CHECK
3. Pilot's Operating Handbook and **Flyaway Book**--IN AIRPLANE
4. Control Wheel Lock--REMOVE
5. Ignition Switch--OFF place keys on glare shield
6. **Avionics Master Switch--OFF**
7. Circuit Breakers--IN
8. **Master Switch--ON**
9. Flashing Beacon--ON / CHECK
10 Fuel Quantity Indicators--CHECK FUEL QUANTITY
11. Fuel Selector Valve--**CHECK, Movement. left, right, off, SET TO BOTH**
12. Flaps--EXTEND
13. Exterior and Interior Lights (for night flight)--CHECK
14. **Master Switch--OFF**
15. Static Pressure Alternate Air Source Valve (if installed)--OFF
16. Baggage Door-- CHECK, Lock with Key.

EMPENNAGE

1. Rudder Gust Lock—REMOVE (if installed)
2. Tail Tie-Down--DISCONNECT
3. Control Surfaces--CHECK freedom of movement and security
4. Trim Tab—CHECK for security
5. Antennas—CHECK for security and general condition

RIGHT WING Trailing Edge

1. Flap--CHECK for security and damage
2. Aileron--CHECK freedom of movement and security

RIGHT WING

1. Wing Tip and Lights--CHECK
2. Wing Tie-Down--DISCONNECT
3. Main Wheel/Tire--CHECK brakes, tire condition/inflation, chocks
4. Fuel Sample--CHECK for water, sediment, proper fuel grade & color
5. Fuel Quantity--CHECK VISUALLY for desired level
6. Fuel Filler Cap—SECURE **(this should be a vented cap)**
7. Cabin Vent—CHECK

NOSE

1. Engine Oil Level--CHECK, **do not operate with less than four quarts.** Fill to six quarts for extended flight
2. Fuel Strainer--DRAIN before first flight of the day and after each refueling. Pull out strainer knob for about four seconds to clear strainer of water / sediment. CHECK STRAINER DRAIN CLOSED
3. Propeller and Spinner--CHECK for nicks and security
4. Engine Cooling Air Inlets—CLEAR of obstructions, check for cylinder cooling baffle integrity, oil leaks, alternator belt security and tension.
5. Cowling--CHECK FOR SECURITY
6. Landing/Taxi Lights--CHECK condition and cleanliness
7. Carburetor Air Filter--CHECK for restrictions, dust, or foreign matter
8. Nose Wheel Strut and Tire--CHECK condition, inflation, and security
9. Nose Tie-Down--DISCONNECT, remove chocks
10. Static Port (left side of fuselage)--CHECK for stoppage

LEFT WING

1. Fuel Quantity--CHECK VISUALLY for desired level
2. Fuel Filler Cap—SECURE **(this should be a vented cap)**
3. Fuel Sample--CHECK for water, sediment, proper fuel grade & color
4. Cabin Vent—CHECK
5. Main Wheel/Tire--CHECK brakes, tire condition/inflation, chocks

LEFT WING Leading Edge

1. Pitot Tube Cover--REMOVE, check opening for stoppage
2. Fuel Tank Vent Opening--CHECK for stoppage
3. Stall Warning Opening--CHECK for stoppage. To check operation, place a handkerchief over the vent opening and apply suction; a sound from the warning horn will confirm system operation
4. Wing Tie-Down--DISCONNECT
5. Wing Tip and Lights--CHECK

LEFT WING Trailing Edge

1. Aileron--CHECK freedom of movement and security
2. Flap--CHECK for security and damage

SECTION 4
NORMAL PROCEDURES

SPEEDS FOR NORMAL OPERATION

STC SA2196CE FOR 2400# GW AND 30° Flaps

Unless otherwise noted, the following speeds are based on a maximum weight of 2400 pounds 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.

	KNOTS IAS
Takeoff, Flaps Up:	
Normal Climb Out	70-80
Short Field Takeoff, Flaps 10°, Speed at 50 Feet	56
Enroute Climb, Flaps Up:	
Normal, Sea Level	75-85
Normal, 10,000 Feet	70-80
Best Rate of Climb, Sea Level	76
Best Rate of Climb, 10,000 Feet	71
Best Angle of Climb, Sea Level	60
Best Angle of Climb, 10,000 Feet	65
Landing Approach:	
Normal Approach, Flaps Up	65-75
Normal Approach, Flaps 30°	60-70
Short Field approach, Flaps 30°	61
Balked Landing:	
Maximum Power, Flaps 20°	55
Maximum Recommended Turbulent Air Penetration Speed:	
2400 Lbs	99
2000 Lbs	92
1600 Lbs	82
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing	15 Knots

BEFORE STARTING ENGINE

1. Surrounding Area--CHECK FOR PERSONNEL AND HAZARDS; REMOVE CHOCKS AND TOW BAR. IF REQUIRED MOVE AIRCRAFT TO AVOID PROPWASH ON PARKING AREA/HANGAR
2. Preflight Inspection--COMPLETE
3. Seats--ADJUST AND LOCK
4. Seat Belts and Shoulder Harnesses--ADJUST and LOCK
5. Passengers--BRIEFED
6. Fuel Selector Valve—CHECK BOTH
7. Electrical Switches – CHECK OFF
8. Circuit Breakers--RECHECK IN
9. **Avionics Master Switch – CHECK OFF**

CAUTION

AVIONICS MASTER SWITCH MUST BE OFF DURING ENGINE START TO PREVENT POSSIBLE DAMAGE TO AVIONICS

10. Flashing Beacon Switch--RECHECK ON
11. Brakes--TEST and SET

STARTING ENGINE

1. Mixture--RICH
2. Carburetor Heat--COLD
3. Master Switch--ON
4. Prime--AS REQUIRED (2-6 strokes, none if engine is warm)
5. Throttle--OPEN 1/8 INCH
6. Propeller Area--CLEAR
7. Ignition Switch--START (release when engine starts),set 1000 RPM
8. Oil Pressure--CHECK
9. Flashing Beacon and Navigation Lights--ON as required
10. **Avionics Master Switch - ON**
11. Radios -- SET & CHECK OPERATION.
12. Electrical Equipment--ON as required
13. Transponder -- SQUAWK STBY
14. Flaps--RETRACT

TAXI CHECK

1. Radio— **Contact FSS and Activate Flight Plan** prior to taxi
2. TAXI- REQUEST Taxi Clearance or announce intentions
2. Brakes--CHECK during initial movement
3. Maintain 1000 RPM minimum and lean mixture during taxi to reduce plug fouling
3. Nose Wheel Steering--CHECK
4. Ailerons--POSITION for crosswind taxi
5. Magnetic Compass, Directional Gyro, Turn Coordinator—CHECK

BEFORE TAKEOFF

1. Parking Brake--SET
2. Seats, Seat Belts, Shoulder Harnesses--CHECK SECURE
3. Cabin Doors and Windows--CLOSED and LOCKED
4. Flight Controls--FREE, and CORRECT
5. Flight Instruments--SET (Attitude Ind, Directional Gyro, Altimeter)
6. Primer--IN and LOCKED
7. Fuel Quantity--CHECK
8. Fuel Selector Valve--RECHECK ON BOTH
9. Mixture--RICH (below 3000 feet)
10. Elevator and Rudder Trim --SET FOR TAKEOFF
11. High/Low Voltage Light and Alternator Function--CHECK
12. Throttle--1700 RPM
    a. Magnetos--CHECK (RPM drop should not exceed 125 RPM on either magneto or 50 RPM differential between magnetos)
    b. Carburetor Heat--CHECK for RPM drop
    c. Engine Instruments and Ammeter--CHECK
    d. Suction Gauge—CHECK

13 Throttle--1000 RPM Mimimum- Relean mixture for extended taxi
14 Navigation Lights and Strobes--ON as required
15. Flaps--AS REQUIRED
16. Throttle Friction Lock--ADJUST
17. Radios (comm and nav)--SET, Call Tower for Takeoff Clearance or announce takeoff intentions.
18. Transponder --SET CODE & SQUAWK ALTITUDE
19. Record Time Off

LINE-UP CHECK

1. **Taxi into position –Perform Visual Check of runway final approaches for conflicting Traffic**.
2. Compass and Directional Gyro Heading—CHECK
3. Landing / Taxi Lights--AS REQUIRED
4. Brakes—RELEASE

TAKEOFF

NORMAL TAKEOFF

1. Wing Flaps—UP
2. Carburetor Heat—COLD
3. Throttle--FULL OPEN - **Confirm Max RPM and Oil pressure early in takeoff roll**
4. Elevator Control--LIFT NOSE WHEEL (at 55 KIAS)
5. Climb Speed--70-80 KIAS

SHORT FIELD TAKEOFF

1. Wing Flaps--10°
2. Carburetor Heat--COLD
3. Brakes—APPLY
4. Throttle--FULL OPEN - **Confirm Max RPM and Oil pressure early in takeoff roll**
5. Mixture--RICH (above 3000 feet LEAN to obtain maximum RPM)
6. Brakes--RELEASE
7. Elevator Control--SLIGHTLY TAIL LOW
8. Climb Speed-59 KIAS (until all obstacles are cleared)
9. Accelerate to normal climb or 73 (Vy) if required
10. Wing Flaps—RETRACT slowly after obstacle

SOFT FIELD TAKEOFF

1. Wing Flaps--10°
2. Carburetor Heat--COLD
3. Use ROLLING TAKEOFF Technique
4. Throttle--FULL OPEN - **Confirm Max RPM and Oil pressure early in takeoff roll**

5. Elevator Control--LIFT AIRCRAFT off ground as soon as practical
6. LEVEL AIRCRAFT just above runway surface
7. ACCELERATE to Appropriate Airspeed for Climb
8. Wing Flaps--RETRACT slowly after reaching 60 KIAS

NORMAL CLIMB

1. Airspeed--70-85 KIAS

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

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

CRUISE

1. Power--2200-2700 RPM (no more than 75% is recommended)
2. Elevator and Rudder Trim (if installed)--ADJUST
3. Mixture--LEAN for maximum RPM
4. Directional Gyro--CHECK / SET

NOTE

WHEN CRUISING AT 75% OR LESS POWER, MIXTURE MAY BE LEANED TO MAXIMUM RPM AT ANY ALTITUDE (INCLUDING BELOW 3000 FEET)

DESCENT

1. Power--AS DESIRED
2. Mixture--ADJUST for smooth operation (full rich for idle power)
3. Fuel Selector Valve—BOTH
4. Carburetor Heat--AS REQUIRED (to prevent carburetor icing)

BEFORE LANDING

1. Seats, Seat Belts, Shoulder Harnesses--SECURE
2. Fuel Selector Valve--BOTH
3. Mixture--RICH
4. Carburetor Heat--ON (apply full heat before reducing power)

LANDING

NORMAL LANDING

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

SHORT FIELD LANDING

1. Airspeed 65-75 KIAS (flaps up)
2. Wing Flaps--FULL DOWN (30°)
3. Airspeed--61 KIAS (until flare)
4. Power--REDUCE to idle after clearing obstacle
5. Touchdown--MAIN WHEELS FIRST
6. Brakes--APPLY HEAVILY
7. Wing Flaps—RETRACT

SOFT FIELD LANDING

1. Normal Approach and Landing Configuration
2. Power—AS REQUIRED on final approach and through touchdown
   (Approx 1400-1500 RPM)
3 Touchdown—SOFTLY on main wheels. Maintain nose high
   attitude with minimum weight on nose wheel through roll-out
4. Brakes—NONE unless absolutely necessary

BALKED LANDING

1. Throttle--FULL OPEN
2. Carburetor Heat--COLD
3. Wing Flaps--20° (Immediately)
4. Climb Speed--55 KIAS
5. Wing Flaps--10° until obstacles are cleared. RETRACT (after reaching a safe altitude and 60 KIAS)

AFTER LANDING

1. Wing Flaps--UP
2. Carburetor Heat--COLD
3. Transponder--STBY
4. Strobe Lights—OFF
5. Landing/Taxi Lights—OFF (as required at night)
6. Radio Call--TAXI INSTRUCTIONS / INTENTIONS
7. Close Flight Plan after Tower frequency release

NOTE

THE FOLLOWING PROCEDURE IS PROVIDED FOR AIRCRAFT SHUTDOWN AT THE FUEL TANKS FOR REFUELING AS REQUIRED BY SOP.

1. Parking Brake—SET as required
2. Flight Plan--CLOSED
3. **Avionics Master Switch -- OFF**
4. Electrical Equipment --OFF
5. Mixture--IDLE CUT-OFF
6. Ignition Switch--OFF REMOVE KEYS -**YOU WILL NEED THEM TO UNLOCK FUEL PUMP-**
7. Master Switch--OFF

8. Fuel Selector –**SET to RIGHT OR LEFT**
9. Chock Airplane -CHECK
10. Connect Fueling Grounding Wire --CHECK
11. Unlock Pump –TURN ON
12. Position Ladder and Fuel Hose-CHECK
13. After Refueling –NOTE fuel quantity for log
14. Replace hose at pump, lock pump, get keys, move hose to safe area-
15. Disconnect and roll up Grounding wire- CHECK
16. Remove Chocks- CHECK
17. Attach tow bar, and move aircraft to parking position-CHECK

SECURING AIRPLANE

1. Parking Brake—SET as required
2. Tiedown Wings, then tighten tail tiedown -CHECK
3. Chock Main wheel- CHECK
4. Hobbs, Tach, fuel and Squawks--RECORD
5. Control Lock--INSTALL
6. Clean Cabin, Store Belts, Replace Sun Screens and Covers --CHECK
8. Collect Keys and Airplane Book, pilot gear –CHECK
9. Log Aircraft back in—CHECK. Note Squawks, fuel, oil, flight time.
10. Return keys to Key box - CHECK

SECTION 3
EMERGENCY PROCEDURES

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:	KNOTS IAS
Wing Flaps Up	65
Wing Flaps Down	60
Maneuvering Speed:	
2400 Lbs	99

2000 Lbs 92
1600 Lbs 82
Maximum Glide 65
Precautionary Landing With Engine Power 60
Landing Without Engine Power:
Wing Flaps Up 65
Wing Flaps Down 60

OPERATIONAL CHECKLISTS

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

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

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Airspeed-- 65 KIAS (flaps up)
   60 KIAS (flaps down)
2. Mixture--IDLE CUTOFF
3. Fuel Selector Valve--OFF
4. Ignition Switch--OFF
5. Wing Flaps--AS REQUIRED
6. Master Switch--OFF

ENGINE FAILURE DURING FLIGHT

1. Airspeed-- 65 KIAS
2. Carburetor Heat--ON
3. Fuel Selector Valve--BOTH
4. Mixture--RICH
5. Master Switch--ON
6. Ignition Switch--BOTH (or START if prop is stopped)
7. Primer--IN and LOCKED
8. Radio--TRANSMIT “MAYDAY” CALL 121.5 MHz
9. Transponder—7700

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

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

PRECAUTIONARY LANDING WITH ENGINE POWER

1. Wing Flaps 20°
2. Airspeed--60 KIAS
3. Selected Field--FLY OVER, noting terrain and obstructions, then retract flaps upon reaching a safe altitude and airspeed
4. Radios and Electrical Switches--OFF
5. Wing Flaps--30° (on final approach)
6. Airspeed--60 KIAS
7. Master Switch--OFF
8. Doors--UNLATCH PRIOR TO TOUCHDOWN
9. Touchdown--SLIGHTLY TAIL LOW
10. Ignition Switch--OFF
11. Brakes--APPLY HEAVILY

DITCHING

1. Radio--TRANSMIT MAYDAY on 121.5 MHz , giving location and intentions and SQUAWK 7700
2. Heavy Objects --SECURE OR JETTISON
3. Approach--High Winds, Heavy Seas--INTO THE WIND
   Light Winds, Heavy Swells--PARALLEL TO SWELLS
4. Wing Flaps--30° recommended
5. Power--ESTABLISH 300 FPM DESCENT AT 55 KIAS

NOTE

If no power is available, approach at 65 KIAS (flaps up) or 60 KIAS with 10° flaps

6. Cabin Doors--UNLATCH

7. Touchdown--LEVEL ATTITUDE AT ESTABLISHED RATE OF DESCENT
8. Face--CUSHION at touchdown with folded coat
9. Airplane--EVACUATE through cabin doors. If necessary, open window and flood cabin to equalize pressure so doors can be opened.
10. Life Vests and Raft—INFLATE

FIRES

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
3. Engine--SHUT DOWN and inspect for damage

If Engine Fails to Start:

4. Throttle--FULL OPEN
5. Mixture--IDLE CUT-OFF
6. Cranking--CONTINUE
7. Fire Extinguisher--OBTAIN

(have ground attendants obtain if not installed)
8. Engine--SECURE
   a. Master Switch--OFF
   b. Ignition Switch--OFF
   c. Fuel Selector Valve--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--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. Avionics Power Switch--OFF
3. All Other Switches (except ignition switch)--OFF
4. Vents / Cabin Air / Heat--CLOSED
5. Fire Extinguisher--ACTIVATE (if available)

WARNING

After discharging an extinguisher in a closed cabin, ventilate the cabin

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

6. Master Switch--ON
7. Circuit Breakers--CHECK for faulty circuit, do not reset
8. Radio Switches--OFF
9. Avionics Power Switch--ON
10. Radios / Electrical Switches--ON one at a time, with delay after each until short circuit is located
11. Vents / Cabin Air / Heat--OPEN when it is ascertained that fir e is completely extinguished

CABIN FIRE

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

WARNING

After discharging an extinguisher in a closed cabin,ventilate the cabin

4. Land the airplane as soon as possible to inspect for damage

WING FIRE

1. Navigation Light Switch--OFF
2. Pitot Heat Switch (if installed) --OFF
3. Strobe Light Switch (if installed) -- OFF

NOTE

Perform a side slip to keep flames away from fuel tank and cabin, and land as soon as possible using flaps only as required on final approach.

ICING

INADVERTENT ICING ENCOUNTER

1. Turn pitot heat switch ON (if installed)
2. Turn back or change altitude to obtain an outside temperature that is less conducive to icing
3. Pull cabin heat control full out and open defroster outlets to obtain maximum windshield defroster airflow. Adjust cabin air control to get maximum defroster heat and airflow
4. Open the throttle to increase engine speed and minimize ice build-up on propeller blades
5. Watch for signs of carburetor air filter ice and apply carburetor heat as required. An unexplained loss in engine speed could be caused by carburetor ice or air intake filter ice. Lean the mixture for maximum RPM if carburetor heat is used continuously
6. Plan a landing at the nearest airport. With an extremely rapid ice build-up, select a suitable “off airport” landing site
7. With an ice accumulation of 1/4 inch or more on the wing leading edges, be prepared for a significantly higher stall speed.

8. Leave wing flaps retracted. With a severe build-up on the horizontal tail, the change in wing wake airflow direction caused by wing flap extension could result in loss of elevator effectiveness.
9. Open left window and, if practical, scrape ice from a portion of the windshield for visibility in the landing approach
10. Perform a landing approach using a forward slip, of necessary for improved visibility
11. Approach at 65-75 KIAS depending upon the amount of the accumulation

12 Perform a landing in a level attitude

STATIC SOURCE BLOCKAGE

(Erroneous Instrument Reading Suspected)

1. Alternate Static Source Valve--PULL ON
2. Airspeed--Consult calibration tables in Section V

LANDING WITH A FLAT MAIN TIRE

1. Approach--NORMAL
2. Touchdown--GOOD TIRE FIRST, hold airplane off flat tire as long as possible

ELECTRICAL POWER SUPPLY SYSTEM MALFUNCTIONS

AMMETER SHOWS EXCESSIVE RATE OF CHARGE

(Full Scale deflection)

1. Alternator--OFF
2. Alternator Circuit Breaker--PULL
3. Nonessential Electrical Equipment--OFF
4. Flight--TERMINATE as soon as practical

LOW VOLTAGE LIGHT ILLUMINATES DURING FLIGHT (Ammeter Indicates Discharge)

NOTE

Illumination of the low-voltage light may occur during low RPM conditions with an electrical load on the system such as during a low RPM taxi. Under these conditions, the light will go out at higher RPM. the master switch need not be recycled since an over-voltage condition has not occurred to de-activate the alternator system.

1. Avionics Master Switch--OFF
2. Alternator Circuit Breaker--CHECK IN
3. Master Switch--OFF (both sides)
4. Master Switch--ON
5. Low Voltage Light--CHECK OFF
6. Avionics Master Switch--ON

If Low Voltage Light Illuminates Again:

7. Alternator—OFF (Left side of master switch)
8. Non-essential Radio and Electrical Equipment--OFF
9. Flight--TERMINATE as soon as practical