NORMAL PROCEDURES

NOTE: The inspections required by the pilot are the minimum requirement for safe flight. While making the exterior inspection, particular attention should be given to the following. Check all surfaces for general condition, antennas and access plates secure; check for fuel, oil, and hydraulic leaks; all covers removed; all vents and openings clear; check tires, brakes, and brake lines; check strut for proper extension; and airplane properly chocked. Additional checks may be performed at the discretion of the pilot.

INTERIOR INSPECTION

1.	Certificate/Documents	CHECKED
2.	Control lock	REMOVED/STOWED
3.	Hobbs/Tachometer	CHECKED
4.	Fuel selector	BOTH
5.	Mixture	IDLE CUT-OFF
6.	Elevator trim	CHECK
7.	Parking brake	RELEASED
8.	Fuel shutoff knob	SAFETY WIRED IN
9.	Auxiliary fuel pump switch	GUARDED
10.	Primer	LOCKED
11.	Ignition switch	OFF
12.	Fuel strainer	DRAIN 4 Seconds
13.	Master switch	ON
14	Flaps	LOWER
15.	Fuel quantity	CHECK
16.	Lights/Strobes	CHECK
17.	Master switch	OFF
18.	Loose articles	SECURE
19.	Fuel Sample Cup	OBTAIN

EXTERIOR INSPECTION

1. FUSELAGE LEFT SIDE

a. Baggage door. . . . . CLOSED
b. Visually check condition.. . . . . CHECK
c. Static port. . . . . CHECK
d. Antennas.. . . . . CHECK

2. EMPENNAGE

a. Vertical stabilizer & rudder. . . . . CHECK
b. Horizontal stabilizer and elevator. . . . . CHECK
c. Anti-collision light.. . . . . CHECK
d. Navigation light. . . . . CHECK
e. Stabilizer & trim tab. . . . . CHECK
f. Tie down & ground wire. . . . . REMOVE

3. FUSELAGE - RIGHT SIDE

a. Antennas . . . . . CHECK
b. Visually check condition.. . . . . CHECK
c. Static port. . . . . CHECK

4. RIGHT WING

a. Flap.. . . . . CHECK
b. Aileron.. . . . . CHECK
c. Wing tip/Strobe/Navigation light. . . . . CHECK
d. Leading edge. . . . . CHECK
e. Wing strut .. . . . . CHECK
f. Tiedown, chock. . . . . REMOVE
g. Fuel tank. . . . . CHECK VISUALLY/CAP SECURE
h. Top of wing. . . . . CHECK

i. Fuel tank drain. . . . . DRAIN
j. Landing gear/Tire. . . . . CHECK
k. Brake assembly. . . . . CHECK

5. ENGINE/COWLING

a. Fuel drain (2 places). . . . . DRAIN
b. Cowling . . . . . SECURE
c. Propeller/Propeller seal plug. . . . . CHECK
d. Nose gear assembly/Tire/Shimmy damper . . . . . CHECK
e. Nose strut (strut 1-3 in). . . . . CHECK
f. Fuel strainer **(52L only)**. . . . . DRAIN 4 Seconds
g. Oil quantity . . . . . CHECK

6 qts	Minimum
7 qts	Normal
8 qts	Maximum

h. Oil cap . . . . . SECURE
i. External power access door . . . . . SECURE
j. Windscreen . . . . . CONDITION

6. LEFT WING

a. Fuel tank drain. . . . . DRAIN
b. Fuel tank. . . . . CHECK VISUALLY/CAP SECURE
c. Top of wing. . . . . CHECKED
d. Pitot tube. . . . . PITOT COVER REMOVE/CHECK
e. Leading edge. . . . . CHECK
f. Stall warning. . . . . CHECK
g. Fuel tank vent . . . . . CHECK
h. Landing/Taxi light. . . . . CHECK
i. Wing tip/Strobe/Navigation light. . . . . CHECK
j. Aileron. . . . . CHECK
k. Flap. . . . . CHECK

l. Wing strut . . . . . CHECK
m. Tiedown, chock. . . . . REMOVE
n. Landing gear/Tire. . . . . CHECK
o. Brake assembly. . . . . CHECK

BEFORE STARTING ENGINE

1. Seatbelt & Shoulder harness . . . . . ADJUSTED/LOCKED
2. Passenger briefing . . . . . COMPLETE
3. Radios. . . . . OFF
4. Circuit breakers . . . . . CHECKED
5. Pitot heat . . . . . OFF
6. Flight controls . . . . . FREE AND CORRECT

STARTING ENGINE

1. Mixture . . . . . RICH
2. Propeller. . . . . VISUALLY CLEAR
3 Master switch. . . . . ON
4. Primer . . . . . IN AND LOCKED
5. Anti-collision lights/Strobes . . . . . ON
6. Brakes . . . . . SET
7. Throttle . . . . . IDLE, THEN 1/4 TO 1/2 IN. OPEN
8. Auxiliary fuel pump . . . . . PRIME AS REQUIRED
9. Propeller. . . . . VERBALLY & VISUALLY CLEAR
10. Ignition . . . . . START

NOTE: Release when engine starts or 30 seconds maximum continuous operation.

11. Throttle . . . . . 1000 RPM
12. Oil pressure & ammeter . . . . . CHECK

    NOTE: Oil pressure–positive indication within 30 seconds.

13. Auxiliary fuel pump. . . . . OFF & GUARDED
14. Flaps . . . . . UP

BEFORE TAXI

1. Avionics master switch. . . . . ON
2. Radios . . . . . ON/SET
3. Transponder . . . . . STANDBY
4. Clock . . . . . SET
5. Attitude/Heading indicator. . . . . SET
6. ATIS. . . . . OBTAIN
7. Altimeter . . . . . SET
8. Clearance . . . . . OBTAINED

TAXI TO RUNUP PAD

1. Aircraft area . . . . . CLEAR
2. Flight controls . . . . . POSITIONED FOR THE WIND
3. Flight insturments. . . . . CHECK/SET

   NOTE: Check and set attitude indicatior, heading indicator. Check turn and bank indicator.

ENGINE RUN-UP

1. Nose wheel . . . . . CENTERED
2. Brakes . . . . . SET
3. Mixture . . . . . RICH
4. Throttle . . . . . 1800 RPM
5. Engine instruments/Suction gage . . . . . CHECK
6. Magnetos . . . . . CHECK

NOTE: Max drop-150 RPM. Max difference-50 RPM.

7. Throttle . . . . . IDLE (watch for engine stop) then 1000 RPM

BEFORE TAKE-OFF

1. Trim. . . . . CHECK
2. Fuel selector . . . . . BOTH
3. Flight and engine instruments. . . . . CHECK
4. Mixture. . . . . RICH
5. Radio . . . . . SET
6. Doors/Windows . . . . . CLOSED and LOCKED
7. Strobes. . . . . ON
8. Landing light . . . . . ON

NORMAL TAKE-OFF

1. Flaps . . . . . UP
2. Align aircraft with runway centerline.
3. Heading Indicator . . . . . SET
4. Transponder. . . . . ALT
5. Throttle. . . . . FULL POWER

   NOTE: Minimum 2270 RPM
6. Fuel flow . . . . . CHECK
7. Rotate . . . . . 50 to 60 MPH (70 MPH for Strong Crosswinds)
8. Climb . . . . . 95 MPH

SHORT FIELD TAKE-OFF

1. Flaps . . . . . 10°
2. Throttle . . . . . FULL POWER

   NOTE: 2270 minimum RPM
3. Best Angle Of Climb (V_X) for obstacle clearance.

Weight	IAS
2500 lbs	70 MPH
2200 lbs	66 MPH

4. Clear of obstacles . . . . . ACCELERATE TO 95 MPH
5. Flaps (above 200 ft). . . . . RETRACT SLOWLY

SOFT FIELD TAKE-OFF

1. Flaps. . . . . 10°
2. Throttle . . . . . FULL POWER
3. Lift off . . . . . IN GROUND EFFECT
4. Accelerate to V_X. . . . . SEE ABOVE CHART
5. Flaps (above 200 ft). . . . . RETRACT SLOWLY
6. Reaching sufficient altitude. . . . . ACCELERATE TO 95 MPH

CLIMB

NOTE: Refer to table for climb speed vs. altitude. Interpolate for correct speed vs. weight.

Climb Speed (MPH)

Altitude (ft)	Aircraft Category	
	Utility-2200 lbs	Normal-2500 lbs
Sea Level	97	100
5,000	92	95
10,000	89	91
15,000	85	87

CRUISE

1. Power (See Performance Section) . . . . . 2300 - 2600 RPM
2. Mixture.. . . . . LEAN AS NECESSARY
   CAUTION: Improper leaning will greatly reduce endurance.
3. Landing light. . . . . OFF
4. Engine gauges/Instruments . . . . . MONITOR

DESCENT

1. Fuel quantity . . . . . CHECK
2. Mixture . . . . . RICH
3. Flight instruments . . . . . CHECK

BEFORE LANDING

1. Fuel selector. . . . . BOTH
2. Mixture . . . . . RICH
3. Landing light . . . . . ON
4. Flaps . . . . . AS REQUIRED

NORMAL LANDING

1. Flaps UP .. . . . . 85 MPH
2. Flaps DOWN . . . . . 75 MPH

   WARNING: Do not slip when using over 30 degrees of flaps due to a possible downward pitch under certain combinations of airspeed and sideslip angles.

3. Touchdown. . . . . BRAKE AS REQUIRED

SHORT FIELD LANDING

I . Flaps . . . . . 40°

2. Airspeed:

Normal Category	(2500 lbs)	75 MPH
Utility Category	(2200 lbs)	65 MPH

3. Roll-out. . . . . BRAKE AS REQUIRED

GO AROUND

1. Throttle. . . . . FULL
2. Flaps . . . . . 20°
3. Accelerate to V_X.

   NOTE: Raise the flaps to 0° after attaining a speed of 85 MPH and above 200 ft.

TOUCH-AND-GO (Private Pilots or Higher)

1. Throttle . . . . . FULL
2. Flaps. . . . . 20°
3. Climb . . . . . 85 MPH
4. Flaps (above 200 ft) . . . . . RETRACT

AFTER LANDING (clear of runway)

1. Strobe lights . . . . . AS REQUIRED
2. Pitot heat . . . . . OFF
3. Landing light . . . . . AS REQUIRED
4. Flaps. . . . . UP
5. Transponder . . . . . STANDBY

ENGINE SHUTDOWN

1. Nose wheel . . . . . CENTERED
2. Avionics master switch . . . . . OFF
3. Throttle . . . . . IDLE
4. Magnetos . . . . . GROUNDING CHECK
5. Throttle. . . . . 1000-1200 RPM
6. Mixture.. . . . . IDLE CUT-OFF
7. Ignition switch . . . . . OFF
8. Navigation lights . . . . . OFF
9. Strobe light. . . . . ON
10. Master switch . . . . . OFF
11. Fuel selector . . . . . LEFT OR RIGHT TANK

REFUEL

1. Aircraft . . . . . CHOCK and GROUND
2. Fuel counter . . . . . RESET
3. Fuel . . . . . AS REQUIRED/CAPS SECURE
4. Oil . . . . . CHECK/SERVICE
5. Windscreen . . . . . CLEAN
6. Chocks/Ground wire . . . . . REMOVED/STOWED
7. Fuel counter . . . . . RESET
8:. Tow/taxi aircraft to parking

SECURING AIRCRAFT

1. Master switch. . . . . OFF
2. Ignition switch. . . . . OFF
3. Strobe. . . . . ON
4. Control Lock . . . . . INSTALL
5. Tach time, fuel, and oil. . . . . RECORD
6. Discrepancies . . . . . RECORD
7. Personal belongings and trash . . . . . REMOVE
8. Seat belts . . . . . FASTEN
9. Window/Doors . . . . . CLOSED/LOCK
10. Pitot cover . . . . . INSTALL
11. Chocks, tiedowns, and ground wire . . . . . INSTALL

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EMERGENCY PROCEDURES

Table of Contents

EMERGENCY PROCEDURES

NON-CRITICAL ACTIONS

I. Maintain Aircraft Control

2. Analyze the situation and take proper action.

3. Land as soon as practicable.

GROUND EMERGENCIES

EMERGENCY ENGINE SHUTDOWN

NOTE: If an immediate engine shutdown becomes necessary while on the ground, proceed as follows.

1. Mixture . . . . . IDLE CUT-OFF
2. Fuel shutoff knob. . . . . PULL OUT
3. Ignition switch. . . . . OFF
4. Master switch. . . . . OFF

TAKEOFF EMERGENCIES

ABORTED TAKEOFF

NOTE: If an abort is necessary for any reason, accomplish the following.

I . Throttle. . . . . IDLE
2. Brake.. . . . . AS REQUIRED

ENGINE FAILURE IMMEDIATELY AFTER TAKEOFF

1. Glide . . . . . ESTABLISH
2. Flaps. . . . . AS REQUIRED

FLAPS UP	85 MPH
FLAPS 20	80 MPH
FLAPS OVER 20	75 MPH

3. Land straight ahead.

If Time Permits

4. Mixture.. . . . . FULL LEAN
5. Fuel shutoff knob. . . . . PULL OUT
6. Ignition switch. . . . . OFF
7. Master switch. . . . . OFF
8. Cabin doors. . . . . UNLOCKED/OPEN

IN-FLIGHT EMERGENCIES

ENGINE RESTART DURING FLIGHT

NOTE: If a restart is to be attempted accomplish the following.

1. Glide. . . . . ESTABLISH

FLAPS UP	85 MPH
FLAPS 20°	80 MPH
FLAPS OVER 20°	75 MPH

2. Mixture . . . . . RICH
3. Throttle. . . . . IN HALF-WAY

4. Fuel selector. . . . . BOTH
5. Fuel shutoff knob. . . . . IN
6. Ignition switch. . . . . BOTH
7. Master switch. . . . . ON
8. Aux fuel pump switch. . . . . LOW
9. If propeller is stopped engage starter.
10. Mixture. . . . . ADJUST
11. If restart is unsuccessful refer to Forced Landing Checklist.

PARTIAL ENGINE FAILURE DURING FLIGHT

1. Mixture. . . . . RICH
2. Fuel Selector. . . . . BOTH
3. Fuel Shutoff Knob. . . . . IN
4. Manual Primer. . . . . IN AND LOCKED
5. Master Switch. . . . . ON
6. Ignition Switch. . . . . ON
7. Auxiliary fuel pump switch. . . . . AS REQUIRED
8. Mixture. . . . . ADJUST

ENGINE FIRE DURING FLIGHT

Apply the following procedures in the event of an engine fire during flight.

1. Mixture . . . . . FULL LEAN
2. Fuel shutoff knob. . . . . PULL OUT
3. Ignition switch. . . . . OFF
4. Glide. . . . . ESTABLISH
5. Flaps. . . . . AS REQUIRED
6. Master switch. . . . . OFF

Electrical Fire/High Ammeter

1. Master switch . . . . . OFF

Smoke and Fumes Elimination

1. Cabin heat knob . . . . . IN
2. Cabin air knob . . . . . IN
3. Upper air vents . . . . . OPEN
4. Pilot's window . . . . . AS REQUIRED

   NOTE: If necessary, the window may be opened to assist in clearing the smoke or fumes from the cabin.

Negative Ammeter Reading

1. Electrical load . . . . . REDUCE

Oil System Malfunction

1. Throttle . . . . . AS REQUIRED

   NOTE: If possible, adjust the throttle to maintain the oil pressure within limits.

2. Mixture . . . . . RICH

   NOTE: A rich running engine runs cooler than a lean running engine.

FORCED LANDING

1. Glide . . . . . ESTABLISH 85 MPH
2. Mixture.. . . . . IDLE CUT-OFF
3. Fuel shutoff knob. . . . . PULL OUT
4. Ignition switch. . . . . OFF
5. Flaps . . . . . AS REQUIRED
6. Master switch. . . . . OFF
7. Seat belts. . . . . FASTENED

8. Shoulder harness . . . . . LOCKED
9. Cabin doors . . . . . UNLOCKED /OPEN

STRUCTURAL DAMAGE/CONTROLLABILITY CHECK

CAUTION: Do not reset flaps if significant structural damage is located in the wings.

1. Climb to at least 1,500' AGL (if practical) at a controllable airspeed.

2. Simulate landing approach and determine the airspeed at which the aircraft becomes difficult to control (minimum controllable airspeed).

3. Plan to fly a straight-in approach. Fly normal approach airspeed for your flap setting, or 5 to 10 MPH above the minimum controllable airspeed, which ever is higher. For asymmetrical flaps, use your minimum flap setting for approach airspeed.

4. Plan to touch down at no less than minimum controllable airspeed. Do not begin to reduce final approach airspeed until the aircraft if very close to the ground.

Pitot Static Malfunction

1. If icing is suspected, turn on the pitot heat.

2. If the airspeed indicator proves unreliable, advise ATC if appropriate.

3. Fly a wider than normal pattern maintaining 2400 RPM on downwind, maintain 1500 RPM on base and final. Close the throttle in round out.

4. Do not exceed 20 degrees of bank.

5. If you receive a stall warning indication prior to round-out, go-around.

LANDING EMERGENCIES

LANDING WITH A FLAT TIRE

1. Main Gear: Land on the side of the runway corresponding to the good tire.

2. Nose Gear: Land in the center of the runway, hold nose wheel off the ground as long as possible.

3. Stop the aircraft on the runway. Shut the aircraft down and call for assistance.

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TAKE OFF DATA TABLE

Hard-Surface Runway, Flaps 10°

			SL - 59ºF		2500' - 50ºF		5000'- 41ºF		7500'- 32ºF	
WT	IAS mph	Head Wind	Gnd Run	50' Obs	Gnd Run	50' Obs	Gnd Run	50' Obs	Gnd Run	50' Obs
2500	70	0	860	1360	1000	155 5	1135	1765	1435	2225
2500	70	10	605	1020	710	117 5	820	1350	1050	1730
2500	70	20	390	720	470	840	550	980	730	1230
2200	66	0	645	1055	750	120 0	845	1340	1070	1670
2200	66	10	440	780	520	890	595	1005	785	1265
2200	66	20	275	535	330	620	385	715	570	910
1900	61	0	470	805	540	905	610	1000	770	1230
1900	61	10	310	580	365	860	415	740	535	915
1900	61	20	180	390	220	445	260	510	340	680

1. Increase distance 10% for each 25ºF above standard temperature for a particular altitude.

2. For operation on a dry, grass runway, increase distances (both ground run and total to clear a 50 foot obstacle) by 7% of the "Total to clear 50' obstacle" figure.

LANDING DISTANCE TABLE

Landing Distance–Full Flaps–Power Off
No Wind–Hard Surface Runway

		SL–59°F		2500'–50°F		5000' - 41 ºF		7500'- 320F	
Weight	I AS MPH	Gnd Roll	Clear 50' obs	Gnd Roll	Clear 50' obs	Gnd Roll	Clear 50' obs	Gnd Roll	Clear 50' obs
2500	75	610	1320	650	1390	685	1400	725	1560

STALL SPEED TABLES

2200 lbs Power Off - CAS MPH				
Flap Position	**Angle of Bank**			
	0°	20°	40°	60°
UP	60 MPH	61 MPH	68 MPH	80 MPH
20°	55 MPH	57 MPH	63 MPH	78 MPH
40°	49 MPH	51 MPH	56 MPH	70 MPH

2500 lbs Power Off - CAS MPH				
Flap Position	**Angle of Bank**			
	0°	20°	40°	60°
UP	64 MPH	66 MPH	73 MPH	90 MPH
20°	58 MPH	60 MPH	67 MPH	83 MPH
40°	53 MPH	55 MPH	60 MPH	75 MPH

MAXIMUM RATE OF CLIMB TABLE

	SL - 59°F			5000' - 41ºF			10,000 - 23ºF		
WGT	**IAS MPH**	**ROC FPM**	**Fuel Gal**	**IAS MPH**	**ROC FPM**	**Fuel Gal**	**IAS MPH**	**ROC FPM**	**Fuel Gal**
2500	100	880	1.3	95	620	2.9	91	395	4.8
2200	97	1070	1.3	92	800	2.6	89	530	4
1900	94	1310	1.3	89	100	2.3	87	695	3.5

CRUISE PERFORMANCE TABLE

Gross Weight: 2500 lbs. Fuel: 48 Gals.(No Reserve)
Standard Conditions. Zero Wind

CAUTION: To avoid potential overspeed damage, do not operate engine above 2600 RPM.

ALTITUDE (ft)	RPM	% PWR	GPH	MPH	KNOTS
2500	2600	67	10.3	128	111
	2500	61	9.3	123	107
	2400	55	8.5	118	102
	2300	60	7.7	111	96
	2200	44	6.9	103	89
5000	2700	70	10.6	133	119
	2600	64	9.7	128	117
	2500	58	8.8	123	107
	2400	52	8.0	116	102
	2300	47	7.3	108	94
	2200	41	6.6	96	93
7500	2800	72	11.0	138	120
	2700	66	10.0	133	115
	2600	60	9.2	128	112
	2500	54	8.4	121	105
	2400	49	7.6	113	98
	2300	44	5.9	102	89
10,000	2800	68	10.4	138	120
	2700	62	9.5	133	115
	2600	57	8.7	126	109
	2500	51	7.8	118	103
	2400	46	7.2	107	93
	2300	41	6.5	90	78

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