

Cabin

Gust locks / pitot tube	Remove
Flashing beacon	On
Ignition switch	Off
Avionics	Off
Master Switch	On
Flaps	Extend / Full
Exterior lights	on / check / off
Fuel Quantity (L & R)	Check
Oil pressure	Check
Ammeter	Check
Low vacuum	Check
Pitot heat	Check
Master Switch	Off
Right fuel quantity	Check
Engine oil quantity	Check
Left fuel quantity	Check
Documents	Check
POH	Available
Supplements	Available
Parking brake	Set
Control wheel lock	Remove
Flight controls	Free/Correct
Fire extinguisher (not required)	Check
Fuel selector	Check / Both
Fuel shutoff	On (in fully)
Elevator trim	Check / Takeoff
Mixture	Idle cut-off
Throttle	Closed
Alternate static source	Check / Off

Aft Fuselage & Empennage

Cargo	Secured
Baggage door	Secured
Horizontal Stabilizer	Inspect
Elevator & trim tab	Inspect
Vertical Stabilizer	Inspect
Static wicks	Inspect
Tie-down	Remove
Antennas	Inspect

Right Wing

Flap / Aileron	Inspect
Static wicks	Inspect
Wing tip / lights	Inspect
Leading edge	Inspect
Landing / taxi light	Inspect
Tie-down / chocks	Remove
Main gear	Inspect
Right fuel sump	Drain
Fuel quantity	Verify
Fuel cap / vent	Check / Secure
Overhead cabin vents	Clear

Forward Fuselage

Cabin air inlet	Clear
Oil quantity	Verify
Engine cowling	Inspect
Exhaust stack	Inspect
Reservoir / Strainer	Drain
Engine cooling Inlet	Check
Propeller	Inspect
Induction inlet / filter	Inspect
Alternator belt	Inspect
Nose gear	Inspect
Tie-down	Remove
Static source opening	Inspect
External power	Closed / latched

Left Wing

Left fuel sump	Drain
Fuel quantity	Verify
Fuel cap / vent	Check / secure
Leading edge	Inspect
Overhead cabin vents	Clear
Pitot tube	Inspect
Fuel vent	Inspect
Stall-warning opening	Inspect
Landing / taxi light	Inspect
Wing tip / lights	Inspect
Static wicks	Inspect
Flap / Aileron	Inspect
Tie-down / chocks	Remove
Main gear	Inspect
360° walk-around	Perform

Ramp Out

Master Switch	On
Avionics Switch	On
ATIS / Clearance	Obtain
Avionics Switch	Off
Master Switch	Off

Passenger Briefing

Seatbelts / Air vents
Air sickness / Fire extinguisher
Exit use / Survival kit
Traffic watch

Crew Briefing

Airport diagram / ATIS
Runway in use / Departure Clearance
V _a / PIC, PF, PM
Positive exchange of flight controls
Sterile cockpit / Safe attitude

Before Start

Fuel selector	Both
Fuel shutoff	On (in fully)
Mixture control	Idle cut-off
Throttle	Open 1/4"
Navigation lights	As required
Circuit breakers	In
Parking brake	Set
Seatbelts	On

Engine Start

Master switch	On
Prime	As required
Prop area	Clear
Brakes	Hold
Starter	Engage
Mixture	Full rich
Throttle	1000 RPM
Engine gauges	Check

Vacuum pressure	Check
Ammeter	Check
Mixture	Lean

Before Taxi

Avionics switch	On
Radios	Set
Instruments	Set
Transponder	Check / On
Annunciators	Test
Flaps	Up
Parking brake	Release

Run-Up

Parking brake	Set
Flight controls	Free / correct
Windows	Close
Fuel selector	Both
Mixture	Full rich
Throttle	1800 RPM
Magnetos [125 / 50]	Check
Engine gauges	Check
Vacuum gauge [5.0"±0.1]	Check
Throttle	Idle
Mixture	Lean
Throttle	1000 RPM
Parking brake	Release

Departure Briefing

Runway available / required
Airspeeds / crosswind / gust
Terrain / Obstacles / Wake turbulence
Noise abatement / Departure plan
Sterile cockpit / Emergency procedure

Departure

Seatbelts	On
Cabin doors	Closed / locked
Elevator trim	Set
Flaps	Set / verify
Heading indicator	Set
Flight Instruments	Set
Autopilot (if installed)	Off

Before Takeoff

Traffic	Check
Windows	Close / locked
Fuel selector	Both
Mixture	Full rich
Lights	On
Pitot heat	As required

Climb

Flaps	Up
Climb power	Set
Mixture	As required
Engine instruments	Check

Cruise

Cruise power	Set
Elevator trim	Set
Mixture	Lean
Heading indicator	Set
Engine instruments	Monitor
Fuel quantity	Monitor
Lights	On

Arrival Briefing

Arrival plan / TPA
Runway distance available / required
Approach speed / crosswind
Terrain / obstacles
Wake turbulence / wind shear
Noise abatement / sterile cockpit

Arrival

Seatbelts	On
Fuel selector	Both
Lights	On
Flight instruments	Set

Before Landing

Fuel selector	Both
Mixture	Full rich
Autopilot (if installed)	Off

After Landing

Lights	As required
Pitot heat	Off
Mixture	Lean
Flaps	Up
Elevator trim	Takeoff

Shutdown

Parking brake	Set
Avionics	Off
Throttle	1000 RPM
Mixture	Idle cut-off
Ignition switch	Off
Navigation / taxi lights	Off
Master	Off

Secure

Lights / elec. switches	Off
Flaps	Up
Control wheel lock	Install
Fuel selector	Left
Pitot tube cover	Install
Gust locks	Install (if required)
Tie-downs	Secure
Main wheels	Chock
Parking brake	Release
Trash	Remove
Windows / doors	Close / lock

Engine Failure During Takeoff Roll

Directional control	Maintain
Throttle	Close immediately
Brake	As required
<u>Insufficient Rwy for Stop:</u>	
Flaps	Up
Mixture	Idle cut-off
Ignition	Off
Master	Off

Engine Failure Immediately After Takeoff

Airspeed	70 UP/65 DOWN
Throttle	Close immediately
Fuel selector	Off
Mixture	Idle cut-off
Flaps	As required
Ignition	Off
Master	Off
Doors	Unlatch
Land	Straight ahead

Engine Failure During Flight

Airspeed	65
Flaps	Up
Landing site	Select
Fuel selector	Both
Fuel shutoff valve	On(in fully)
Mixture	Rich
Aux Fuel Pump	On
Ignition	Both(start)

If engine fails to start:

Airspeed	65
Fuel selector	Both
Fuel shutoff valve	On(in fully)
Mixture	Idle cut-off
Throttle	Full forward
Aux Fuel Pump	Off
Ignition	Both(start)

If engine fails to start:

Transponder	7700
Radio(121.5)	Mayday

Proceed with Emergency Landing without Engine Power.

Emergency Landing Without Engine Power

Passenger seats	Upright
Seatbelts	On
Fuel shutoff valve	Off(out fully)
Mixture control	Idle cut-off
Flaps	full recommended
ELT switch	On
Ignition Switch	Off
Master switch	Off(landing assured)
Cabin Doors	Unlatch
Touchdown	Slightly tail-low
Brakes	Apply heavily

Engine Fire During Start

Starter	Continue to engage
<u>If Engine Starts:</u>	
Throttle	1800 RPM (few min.)
Mixture	Idle cut-off
Engine	Inspect

If Engine Fails to Start:

Starter	Continue to engage
Fuel selector	Off
Mixture	Idle cut-off
Throttle	Full forward
Fuel pump	Off
Master	Off
Ignition	Off
Parking brake	Release
Fire extinguisher	Obtain
Airplane	Evacuate

Engine Fire in Flight

Mixture	Idle cut-off
Fuel selector	Off
Master	Off

Cabin vents	Open (as needed)
Cabin air/heat	Off
Airspeed	100+ KIAS / extinguish

Proceed with Emergency Landing without Engine Power.

Cabin Fire in Flight

Master	Off
Cabin vents/air/heat	Off
Fire extinguisher	Obtain/discharge

Once fire is extinguished:

Cabin vents/air/heat	Open
Airport	Land

Electrical Fire in Flight

Master	Off
Avionics	Off
Electrical Switches	Off
Vents/air/heat	Closed
Fire extinguisher	Obtain/discharge

Once fire is extinguished:

Cabin vents/air/heat	Open
<u>If electrical power necessary:</u>	
Circuit breakers	Check
Master	On
Avionics	On

Wing Fire in Flight

Landing/taxi lights	Off
Nav Lights	Off
Strobe	Off
Pitot heat	Off
Sideslip	(step on fire, fly away)

Carbon Monoxide Level High

Cabin heat	Off
Cabin air	On
Cabin vents	Open

Windows	Open
Airport	Land

Inadvertent Icing Encounter

Pitot heat	On
Altitude or direction	Change
Cabin heat	On
Defroster outlets	Open
Cabin air	Open/max

Airport	Plan landing
Flaps	Up
Approach speed	65-70

Spin Recovery

Throttle	Close
Ailerons	Neutral
Rudder	Opposite direction of spin
Control wheel	Full forward
<u>When rotation stops:</u>	
Rudder	Neutralize
Control wheel	Apply back pressure

Static Source Blockage

Alternate Static Source	On
-------------------------	----

Cabin heat / air	On
Vents	Closed
Airspeed	Use calibration table(sec.5)

Oil Pressure LowIf oil temp. Normal:

Airport Land

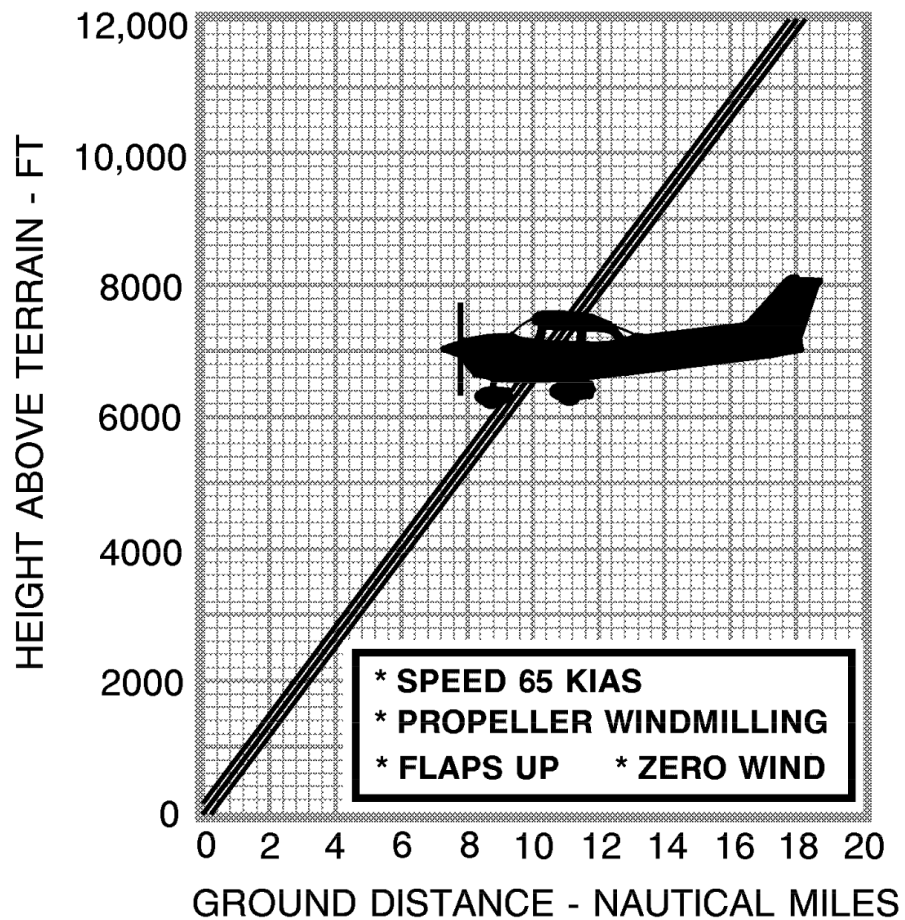
If oil temp. Rising:Power Reduce
Landing field Select
Power Minimum use**Rough Engine Operation / Loss of Power****Spark Plug Fouling**Ignition Check
Mixture AdjustIf roughness/power loss persists:Ignition As required
Airport Land**Ignition Malfunction:**Ignition Check both, R, L
Power Adjust
Mixture EnrichenIf roughness/power less persists:Ignition As required
Airport Land**High Volts**

Alternator switch Off

Electrical Load Reduce:Avionics Off (unless req.)
Pitot heat Off
Lights Off
Airport Land**Low Voltage at High RPM**Alternator Off
Alternator circuit breaker Reset
Master On
Low volts Check offIf low volts continues:

Alternator Off

Electrical Load Reduce:Avionics Off (unless req.)
Pitot heat Off
Lights Off
Airport Land**Landing with Flat Main Tire**Approach Normal
Flaps Full
Touchdown Good tire first
Directional control Maintain**Landing with Flat Nose Tire**Approach Normal
Flaps Full
Touchdown Main gear
Directional control Maintain**Landing Without Elevator Control**Flaps 20
Airspeed 65
Trim Horizontal flight
control glide with power
Landing flare Trim nose up
Throttle Close**Ditching**Radio Mayday
Heavy objects Secure/jettison
Passenger setbacks Upright
Seatbelts On
Flaps 20-Full
Power 300fpm descent@55Approach:High wind, heavy seas: Into wind
Light wind, heavy swells: Parallel swell
Cabin doors Unlatch
ELT On
Touchdown Level
Face Cushion at touchdown
Airplane Evacuate
Life vest/raft Inflate**Flooded Start**Fuel Pump Off
Mixture Idle Cut-off
Throttle Full forward
Ignition StartWhen engine starts:Mixture Full rich
Throttle 1000 RPM**Fouled Spark Plug Burn Off Procedure**Throttle Full Forward
Mixture control Lean to peak EGT
Time 45-60 seconds
Mixture Full rich
Throttle 2000 RPM



AIRSPPEED 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 92 KIAS at 2100 pounds.

SYMBOL	SPEED	KCAS	KIAS	REMARKS
V_{NE}	Never Exceed Speed	160	163	Do not exceed this speed in any operation.
V_{NO}	Maximum Structural Cruising Speed	126	129	Do not exceed this speed except in smooth air, and then only with caution.
V_A	Maneuvering Speed: 2450 Pounds 2000 Pounds 1600 Pounds	97 91 82	99 92 82	Do not make full or abrupt control movements above this speed.
V_{FE}	Maximum Flap Extended Speed: 10° Flaps 10° to 30° Flaps	108 84	110 85	Do not exceed this speed with flaps down.
----	Maximum Window Open Speed	160	163	Do not exceed this speed with windows open.

**SHORT FIELD TAKEOFF DISTANCE
AT 2450 POUNDS**

CONDITIONS:

Flaps 10°
Full Throttle Prior to Brake Release
Paved, level, dry runway
Zero Wind
Lift Off: 51 KIAS
Speed at 50 Ft: 57 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	845	1510	910	1625	980	1745	1055	1875	1135	2015
1000	925	1660	1000	1790	1075	1925	1160	2070	1245	2220
2000	1015	1830	1095	1970	1185	2125	1275	2290	1365	2455
3000	1115	2020	1205	2185	1305	2360	1400	2540	1505	2730
4000	1230	2245	1330	2430	1435	2630	1545	2830	1655	3045
5000	1355	2500	1470	2715	1585	2945	1705	3175	1830	3430
6000	1500	2805	1625	3060	1750	3315	1880	3590	2020	3895
7000	1660	3170	1795	3470	1935	3770	2085	4105	2240	4485
8000	1840	3620	1995	3975	2150	4345	2315	4775	---	---

NOTES:

1. Short field technique as specified in Section 4.
2. Prior to takeoff from fields above 3000 feet elevation, the mixture should be leaned to give maximum RPM in a full throttle, static runup.
3. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
4. For operation on dry, grass runway, increase distances by 15% of the "ground roll" figure.
5. Where distance value has been deleted, climb performance is minimal.

Figure 5-5. Short Field Takeoff Distance

**TIME, FUEL AND DISTANCE TO CLIMB
AT 2450 POUNDS**

CONDITIONS:

Flaps Up
Full Throttle
Standard Temperature

PRESS ALT FT	TEMP °C	CLIMB SPEED KIAS	RATE OF CLIMB FPM	FROM SEA LEVEL		
				TIME IN MIN	FUEL USED GAL	DIST NM
S.L.	15	79	720	0	0.0	0
1000	13	78	670	1	0.4	2
2000	11	77	625	3	0.7	4
3000	9	76	575	5	1.2	6
4000	7	76	560	6	1.5	8
5000	5	75	515	8	1.8	11
6000	3	74	465	10	2.1	14
7000	1	73	415	13	2.5	17
8000	-1	72	365	15	3.0	21
9000	-3	72	315	18	3.4	25
10,000	-5	71	270	22	4.0	29
11,000	-7	70	220	26	4.6	35
12,000	-9	69	170	31	5.4	43

NOTES:

1. Add 1.1 gallons of fuel for engine start, taxi and takeoff allowance.
2. Mixture leaned above 3000 feet for maximum RPM.
3. Increase time, fuel and distance by 10% for each 10°C above standard temperature.
4. Distances shown are based on zero wind.

Figure 5-7. Time, Fuel and Distance to Climb

CRUISE PERFORMANCE

CONDITIONS:
2450 Pounds
Recommended Lean Mixture At All Altitudes (Refer to Section 4, Cruise)

PRESS ALT FT	RPM	20°C BELOW STANDARD TEMP			STANDARD TEMPERATURE			20°C ABOVE STANDARD TEMP		
		% BHP	KTAS	GPH	% BHP	KTAS	GPH	% BHP	KTAS	GPH
2000	2250	---	---	---	79	115	9.0	74	114	8.5
	2200	79	112	9.1	74	112	8.5	70	111	8.0
	2100	69	107	7.9	65	106	7.5	62	105	7.1
	2000	61	101	7.0	58	99	6.6	55	97	6.4
	1900	54	94	6.2	51	91	5.9	50	89	5.8
4000	2300	--	---	---	79	117	9.1	75	117	8.6
	2250	80	115	9.2	75	114	8.6	70	114	8.1
	2200	75	112	8.6	70	111	8.1	66	110	7.6
	2100	66	106	7.6	62	105	7.1	59	103	6.8
	2000	58	100	6.7	55	98	6.4	53	95	6.2
	1900	52	92	6.0	50	90	5.8	49	87	5.6
6000	2350	--	---	---	80	120	9.2	75	119	8.6
	2300	80	117	9.2	75	117	8.6	71	116	8.1
	2250	76	115	8.7	71	114	8.1	67	113	7.7
	2200	71	112	8.1	67	111	7.7	64	109	7.3
	2100	63	105	7.2	60	104	6.9	57	101	6.6
	2000	56	98	6.4	53	96	6.2	52	93	6.0

NOTE:

1. Cruise speeds are shown for an airplane equipped with speed fairings. Without speed fairings, decrease speeds shown by 2 knots.

Figure 5-8. Cruise Performance (Sheet 1 of 2)

SHORT FIELD LANDING DISTANCE AT 2450 POUNDS

CONDITIONS:

Flaps 30°
Power Off
Maximum Braking
Paved, level, dry runway
Zero Wind
Speed at 50 Ft: 62 KIAS

Press Alt In Feet	0°C		10°C		20°C		30°C		40°C	
	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst	Grnd Roll Ft	Total Ft To Clear 50 Ft Obst
S. L.	525	1250	540	1280	560	1310	580	1340	600	1370
1000	545	1280	560	1310	580	1345	600	1375	620	1405
2000	565	1310	585	1345	605	1375	625	1410	645	1440
3000	585	1345	605	1380	625	1415	650	1445	670	1480
4000	605	1380	630	1415	650	1450	670	1485	695	1520
5000	630	1415	650	1455	675	1490	700	1525	720	1560
6000	655	1455	675	1490	700	1530	725	1565	750	1605
7000	680	1495	705	1535	730	1570	755	1610	775	1650
8000	705	1535	730	1575	755	1615	780	1655	810	1695

NOTES:

1. Short field technique as specified in Section 4.
2. Decrease distances 10% for each 9 knots headwind. For operation with tail winds up to 10 knots, increase distances by 10% for each 2 knots.
3. For operation on dry, grass runway, increase distances by 45% of the "ground roll" figure.
4. If landing with flaps up, increase the approach speed by 7 KIAS and allow for 35% longer distances.

Figure 5-11. Short Field Landing Distance