

**Before Start**

Brakes	SET
Seats	ADJUSTED
Seatbelts	FASTENED
Fuel Selectors	MAIN TANKS
Circuit Breakers	CHECK
Radio Master	CHECK OFF
Alternators	OFF
Alt. Static Source	NORMAL
Cowl Flaps	OPEN
Door	SECURE

**Engine Starting**

Master Switch	ON
Strobes	ON
Propellers	FULL FORWARD

For **Hot Start**, skip priming

**To Prime for Cold Start**

- Throttles HALFWAY OPEN
- Mixtures RICH
- Fuel Pumps ON
- Fuel Flows Rise to 5 gph (max 5 sec.)
- Fuel Pumps OFF

Mixtures	BOTH IDLE CUTOFF
Throttles	BOTH ½ INCH OPEN

**\*\* Start one engine at a time \*\***

Magnetos (engine #1 or #2)	L & R ON
Propeller Area	“CLEAR”
Starter (max 30 sec)	ENGAGE on engine #1 or #2
Mixture	ADVANCE to RICH while cranking
Throttle	SET 1000 RPM
Oil Pressure	GREEN within 30 seconds
Alternator (L or R)	ON, verify positive

**After Start**

Alternators	CHECK EACH, then BOTH ON
Vacuum Gauge	CHECK
Radio Master	ON
Mixtures	LEAN FOR TAXI
Lights	AS REQUIRED
Flaps	UP, visually confirm
Fuel gauges	CHECK, select tank
Instruments	SET & CHECK
Transponder	ALT & SQUAWK
ATIS & Taxi	CHECK, GET CLEARANCE & BRIEF

**Taxiing**

Brakes	CHECK
TC, HI, Compass	CHECK

**Run-up**

Brakes	SET
Flight Controls	FREE & CORRECT
Trim Tabs	SET FOR TAKEOFF
Cowl Flaps	OPEN
Mixtures	RICH
Throttles to 1500 RPM	
- Feather test	< 500 RPM drop
- Mag check	< 175 drop, < 50 diff, smooth
Throttles to 2000 RPM	
- Cycle each prop 1-3x	Check RPM, MP, Oil Press
- Vacuum	Check (4.8-5.1” Hg)
- Ammeter	Check positive indication
- Oil Temp & Press	Check

Throttles	IDLE, then 1000 RPM
Flight Instruments	CHECK & SET
Landing Gear	DOWN & GREEN
GPS/NAV	SET FOR DEPARTURE
Radios	SET FOR DEPARTURE
Transponder	ALT & SQUAWK

**Takeoff Briefing COMPLETE**

This will be a normal (short-field) takeoff, flaps set at 0° (15°), departing runway \_\_\_\_\_ with an initial climb to \_\_\_\_\_ feet and heading \_\_\_\_\_. V<sub>R</sub> is 90, V<sub>X</sub> is 90, V<sub>Y</sub> is 112, V<sub>MC</sub> is 90, and V<sub>YSE</sub> is 105 MPH. Ground roll is \_\_\_\_\_, 50' obstacle clearance is \_\_\_\_\_, and accelerate-stop is \_\_\_\_\_.

-For an abnormality at a low airspeed, I will close the throttles, maintain directional control and bring the airplane to a stop on the remaining runway.

-For an emergency before V<sub>MC</sub>, I will close the throttles, apply maximum braking, maintain directional control and bring the airplane to a stop on the remaining runway.

-For an engine fire or failure with runway remaining and gear down, I will close the throttles, land straight ahead, and apply maximum braking.

-For an engine failure with no remaining runway and above V<sub>MC</sub>, I will pitch for blue line, apply maximum thrust, retract gear and flaps, then identify, verify, and feather the failed engine.

-For an emergency or abnormality with altitude available, I will perform the appropriate checklist.

Emergency training scenarios below 3,000'AGL will be simulated by reducing throttle. Questions?

**Before Takeoff**

Trim	SET FOR TAKEOFF
Flaps	UP (15° for Short/Soft Field)
Cowl Flaps	OPEN
Mixtures	RICH
Props	FULL FORWARD
Lights	AS REQUIRED
Fuel Pumps & Gauges	ON & CHECKED
Doors & Windows	CLOSED

**ENGINE FAILURE DURING CLIMB** (at/below 1500' AGL)

Pitch for <b>Blue Line</b>	<b>105 MPH</b>
Aileron	BANK 3° - 5° into good engine
Rudder	BALL ½ DEFLECTED into good engine
Mix, Props, Throttles	FULL FORWARD
Gear	UP
Flaps	UP
Identify	DEAD FOOT
Verify	CONFIRM by reducing affected throttle
Prop	Decide to FIX or FEATHER

Feather (perform on dead engine only)

- Prop **Verify** & Feather
- Climb Pattern altitude or as appropriate
- Return to airport (or one nearby if it's better suited) and review guidance for Single-Engine Approach and Landing in the Pattern

Engine Securing (perform on dead engine only, if time permits)

- Mixture **Verify** & Idle Cut-Off
  - Fuel selector **Verify** & OFF
  - Fuel pump **Verify** & OFF
  - Mags **Verify** & OFF
  - Cowl flap CLOSED (open on operating engine)
  - Alternator OFF
  - Electrical load REDUCE if necessary
  - Other engine Monitor temps & reduce power if able
  - ATC Declare emergency
  - Fuel selector Cross-feed as required
  - Review single-engine landing guidance
- \* Zero thrust = 10" MP & 2200 RPM \*

**Climb** (above 1000' AGL or safe altitude)

Gear, flaps & nose light	VERIFY UP & OFF
Airspeed	130 MPH
Throttles	25" MP
Props	2500 RPM
Lights	AS REQUIRED, nose light OFF
Fuel pumps	OFF (one at a time)
Engine instruments	CHECK

**Cruise**

Throttles (max 75% power)	SET @ 21-23" MP
Props	SET 2400 RPM & SYNC
Engine instruments	CHECK & MONITOR
Mixture	LEAN FOR ALTITUDE
Cowl flaps	CLOSED

\*\* Aux fuel tanks may be used in level flight only \*\*

**Descent / Prior to IAF**

ATIS/AWOS/ASOS	CHECK, set altimeters
Approach briefing	COMPETE
Throttles	DECREASE max 2" MP per minute
Airspeed	120-140 MPH, KEEP CHTs GREEN
Mixtures	ENRICHEN GRADUALLY

**Before Landing / at FAF**

Seats	ADJUSTED
Seatbelts	FASTENED
Cabin heater	OFF
Fuel selectors	MAIN TANKS
Mixtures	RICH
Fuel pumps	ON
Landing gear (<130MPH)	DOWN & GREEN
Flaps (<110MPH)	AS REQUIRED (max 15° single-eng)
Approach speed	95 MPH (90 short/soft, 105 single-eng)

**After Landing**

Fuel pumps	OFF
Lights	AS REQUIRED
Props	FULL FORWARD
Mixtures	LEAN FOR TAXI
Cowl flaps	OPEN
Flaps	UP
Trim	SET FOR TAKEOFF
Taxi clearance	OBTAIN

**Shutdown**

Throttles	1000 RPM
Radio master	OFF
Alternators	OFF
Mixtures	IDLE CUT-OFF
Lights	ALL OFF
Magnetos	ALL OFF
Master switch	OFF

**Securing Aircraft**

Cowl flaps	CLOSE
Sunshades	INSTALL
Controls	SECURE
Hobbs & tach	RECORD
Window & door	CLOSE
Pitot cover	INSTALL
Tie Downs & chocks	INSTALL

**Engine Power Loss During Flight**

Pitch for <b>Blue Line</b>	<b>105 MPH</b>
Aileron	BANK 3° - 5° into good engine
Rudder	BALL ½ DEFLECTED into good engine
Mix, Props, Throttles	FULL FORWARD
Gear	UP
Flaps	UP
Identify	DEAD FOOT
Verify	Confirm by reducing affected throttle
Prop	Decide to FIX or FEATHER

Fix

- Fuel                    Mixtures, Fuel Pumps, √ Qty., Switch Tanks
- Spark                 Magnetos ON
- Air                     Alt air ON
- Gauges                Check for cause of failure
- If power is restored, fuel pump & alt air OFF

Feather (perform on dead engine only)

- Mixture                **Verify & Idle Cut-Off**
  - Prop                    **Verify & Reduce to Feather**
  - Fuel selector         **Verify & OFF**
  - Fuel pump             **Verify & OFF**
  - Mags                   **Verify & OFF** (one at a time!)
  - Cowl flap             CLOSED (open on operating engine)
  - Alternator            OFF
  - Electrical load       REDUCE if necessary
  - Other engine         Monitor temps & reduce power if able
  - ATC                    Declare emergency
  - Fuel selector         Cross-feed as required
  - Review single-engine landing guidance
- \* Zero thrust = 10" MP & 2200 RPM \*

**Air Start (unfeathering procedure)**

Fuel Selector	ON
Magnetos	ON
Throttle	½ INCH OPEN
Prop	Set for Cruise (halfway fwd)
Mixture	RICH
Starter	ENGAGE

\*Note: Fuel pump may be used just prior to cranking, if needed

Once engine starts set throttle & prop to **15"MP & 2000 RPM**

Mixture	LEAN for altitude
Oil pressure	CHECK
Cowl flaps	AS REQ.
Alternator	ON

**Engine Fire in Flight**

1. **Engine Fire checklist (on affected engine):**

Throttle	<b>Verify &amp; IDLE</b>
Mixture	<b>Verify &amp; IDLE CUTOFF</b>
Fuel selector	<b>Verify &amp; OFF</b>
Fuel pump	<b>Verify &amp; OFF</b>
2. **Emergency Descent checklist:**

Throttles	BOTH IDLE
Prop	FULL FWD on operating engine
Cowl flaps	CLOSED
Landing gear	DOWN below V <sub>LE</sub>
Airspeed	Maintain < V <sub>LE</sub> (150 MPH)

Bank 40-45° to decrease vertical lift, or slip to increase drag. Recover on operating engine once the fire is out or approaching 1500' AGL.
3. **Engine Power Loss & Securing After Engine Fire:**

Pitch for <b>Blue Line</b>	<b>105 MPH</b>
Aileron	BANK 3° - 5° into good engine
Rudder	BALL ½ DEFLECTED Mix, Prop,
Throttle	FWD on operating engine
Gear	UP or as needed
Flaps	UP
Identify	DEAD FOOT
Verify	Confirm by reducing affected throttle
Affected engine prop	<b>Verify &amp; FEATHER</b>
Affected engine mags	<b>Verify &amp; OFF</b> (one at a time!)
Affected engine alternator	<b>Verify &amp; OFF</b>
Affected engine cowl flap	CLOSED (open on operating engine)
4. **See below for single-engine approach & landing guidance**

**Single-engine Approach & Landing in the Pattern**

Downwind	18-19" MP, 2400 RPM
Abeam #s	16" MP, maintain 105+ MPH (> V <sub>YSE</sub> )
Landing gear	Landing assured, down to descend
Flaps	Landing assured, set 15°

**Single-engine IFR approach (for guidance only)**

<u>Prior to IAP</u>	DESCENT CHECKLIST
Airspeed	Approximately 120 MPH
Throttle (op. engine)	For holding altitude @ 18-20" MP
Throttle (op. engine)	For descent @ 16" MP
<u>Prior to FAF</u>	APPROACH & LANDING CHECKLIST
<u>At FAF/GS</u>	LANDING GEAR DOWN below V <sub>LE</sub>
Throttle (op. engine)	STABLE DESCENT at 16" MP (500 fpm)
V <sub>APP</sub>	MAINTAIN 105+ MPH (> V <sub>YSE</sub> )

- Once runway is in sight & landing assured, flaps may be lowered to 15°

**Flooded Start**

Mags	ON
Throttles	OPEN
Mixtures	IDLE CUTOFF
Fuel pumps	OFF
Starter	ENGAGE
- When engine fires, retard throttle & advance mixture	

**Engine Fire During Start**

Starter	CONTINUE CRANKING
Mixture	IDLE CUTOFF
Throttle	OPEN
Fuel pump	OFF
Fuel selector	OFF
Radio	CALL FOR ASSISTANCE
If fire continues	EXTINGUISH

**Electrical Fire or Smoke in Flight**

Master Switch	OFF
Vents	OPEN
Door	OPEN if necessary
Cabin Heater	OFF
Oxygen (if equipped)	As required
- Land as soon as possible without flaps, $V_{APP}$ 100 MPH	

**High Oil Temperature**

Cowl flaps	OPEN
Mixture	ENRICH
Power	REDUCE if necessary
Airspeed	MAINTAIN > 130 MPH
- If high temps continue or oil pressure is also low, land as soon as possible and investigate cause	
- Prepare for Engine Power Loss During Flight	

**Power Off Landing (Both Engines Out)**

Pitch for Best Glide	110 MPH
Landing Site	Select, spiral over if able
Propellers	FEATHER BOTH
Mixtures	IDLE
Magnetos	ALL OFF
Fuel Selectors	BOTH to OFF
Radio	Declare emergency
Landing Gear	DOWN if/when appropriate

**Emergency Descent – Oxygen System Failure**

Seatbelts	SECURE
Throttles	BOTH IDLE
Props	FULL FWD
Cowl flaps	CLOSED
Landing gear	DOWN below $V_{LE}$
Airspeed	Maintain < $V_{LE}$ (150 MPH)
- A 2,000 to 3,000 foot/minute descent is adequate to answer the emergency with minimal risk of damage to the engines and discomfort to the passengers.	
- Recover at 10,000 MSL or approaching 2000' AGL.	
Landing gear	RETRACT
Mixture	ENRICH
Throttles	INCREASE SLOWLY (warm engine)
Props	CRUISE

**Landing Gear Fault**

Master Switch	CHECK ON
Landing Gear Breaker	CHECK - Reset circuit breaker once if open

- If gear operates but no Green Light:	
Light Rheostat	CHECK
Nav Lights	OFF
Gear Indicator Light	REPLACE
*Gear light and horn inoperative during electrical failure	

- If gear doesn't operate, Manual Gear Extension:	
Airspeed	BELOW 100 MPH
Gear Handle	DOWN
Gear Motor Release Arm	DISENGAGE and push forward through full travel (gear should fall)
Gear Extension Handle	If left socket is not in clear position, place handle in right socket and twist clockwise until left socket in position
Gear Extension Handle	Left socket, extend handle and rotate FULL forward until locked
Gear Indicator Light	Verify GREEN

**Door Open in Flight**

Airspeed	< 100 MPH
Cabin vents	CLOSE
Storm window	OPEN
Slip airplane	FACE DOOR INTO WIND
Latch	SECURE
- If unable to latch door, land as soon as practical.	
- Increase approach and landing speed by 10 MPH.	