EMERGENCY PROCEDURES

AIRSPEEDS FOR EMERGENCY OPERATION

Engine Failure After Takeoff:	
Wing Flaps Up	65 KIAS
Wing Flaps Down	60 KIAS
Maneuvering Speed:	
2300 Lbs.	97 KIAS
1950 Lbs.	89 KIAS
1600 Lbs.	80 KIAS
Maximum Glide:	
2300 Lbs.	65 KIAS
Precautionary Landing With Engine Power	60 KIAS
Landing Without Engine Power:	
Wing Flaps Up	65 KIAS
Wing Flaps Down	60 KIAS

ENGINE FAILURES

ENGINE FAILURE DURING TAKEOFF RUN

1. Throttle - IDLE
2. Brakes - APPLY
3. Wing Flaps - RETRACT
4. Mixture - IDLE CUT-OFF
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 CUT-OFF
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. Ignition Switch - BOTH (or START if propeller is stopped)
6. Primer - IN and LOCKED

FORCED LANDINGS

EMERGENCY LANDING WITHOUT ENGINE POWER

1. Airspeed - 65 KIAS (Flaps UP)
   60 KIAS (flaps DOWN)
2. Mixture - IDLE CUT-OFF
3. Fuel Selector Valve - OFF
4. Ignition Switch - OFF
5. Wing Flaps - AS REQUIRED (30° recommended)
6. Master Switch - OFF
7. Doors - UNLATCHED PRIOR TO TOUCHDOWN
8. Touchdown - SLIGHTLY TAIL LOW
9. 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. Avionics Power Switch 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
2. Heavy Objects (in baggage area) - SECURE OR JETTISON
3. Approach - High Winds, Heavy Seas - INTO THE WIND
   Light Winds, Heavy Swells - PARALLEL TO SWELLS
4. Wing Flaps - 20° to 30°
5. Power - ESTABLISH 300 FT/MIN DESCENT AT 55 KIAS

NOTE

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

6. Cabin Doors - UNLATCH
7. Touchdown - LEVEL ATTITUDE AT ESTABLISHED RATE OF DESCENT
8. Face - CUSHION at touch 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 - SHUTDOWN 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
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 within a closed cabin, ventilate the cabin.

If fire appears out and electrical equipment is necessary for continuance of 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. Radio/ Electrical Switches - ON one at a time, with delay after each until short circuit is localized
11. Vents/Cabin Air/Heat - OPEN when it is ascertained that fire 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 within 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 - OFF
3. Strobe Light Switch - OFF

NOTE

Perform a sideslip to keep the flames away from the fuel tank and cabin, and land as soon as possible using flaps only as required for final approach and touchdown

ICING

INADVERTENT ICING ENCOUNTER

1. Turn pitot heat switch ON
2. Turn back or change altitude to obtain an outside air temperature that is less conducive to icing.
3. Pull cabin heat control full out and open defroster outlet 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 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 ¼ inch or more on the wing leading edges, be prepared for significantly higher stall speed.
8. Leave wing flaps retracted. With a severe ice build-up on the horizontal tail, the change in the 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, if necessary, for improved visibility.
11. Approach at 65 to 75 KIAS depending upon the amount of the accumulation.
12. Perform a landing in level attitude.

STATIC SOURCE BLOCKAGE
(Erroneous Instrument Reading Suspected)

1. Alternate Static Source Valve - PULL ON
2. Airspeed - Consult appropriate calibration tables in Section 5

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

OVER-VOLTAGE LIGHT ILLUMINATES

1. Avionics Power Switch - OFF
2. Master Switch - OFF (both sides)
3. Master Switch - ON
4. Over-Voltage Light - OFF
5. Avionics Power Switch - ON

If over-voltage light illuminates again:

6. Flight - TERMINATE as soon as possible

AMMETER SHOWS DISCHARGE

1. Alternator - OFF (left side of master switch)
2. Nonessential Radio/Electrical Equipment - OFF
3. Flight - TERMINATE as soon as practical

NORMAL PROCEDURES

SPEEDS FOR NORMAL OPERATION

Takeoff, Flaps Up:	
Normal Climb Out	70-80 KIAS
Short Field Takeoff, Flaps Up, Speed at 50 Feet	59 KIAS
Enroute Climb, Flaps Up:	
Normal, Sea Level	75-85 KIAS
Normal, 10,000 Feet	70-80 KIAS
Best Rate of Climb, Sea Level	73 KIAS
Best Rate of Climb, 10,000 Feet	68 KIAS
Best Angle of Climb, Sea Level	59 KIAS
Best Angle of Climb, 10,000 Feet	61 KIAS
Landing Approach:	
Normal Approach, Flaps Up	60-70 KIAS
Normal Approach, Flaps 30°	55-65 KIAS
Short Field Approach, Flaps 30°	60KIAS
Balked Landing:	
Maximum Power, Flaps 20°	55 KIAS
Maximum Recommended Turbulent Air Penetration Speed:	
2300 Lbs.	97 KIAS
1950 Lbs.	89 KIAS
1600 Lbs.	80 KIAS
Maximum Demonstrated Crosswind Velocity:	
Takeoff or Landing	15 KNOTS

PREFLIGHT INSPECTION

Cabin:

1. Forms Binder -
    a. Open Discrepancies - CHECK
    b. Weight and Balance - CHECK
    c. Oil Change Time - NOTE
    d. Pilot's Name - ENTER
    e. Tach & Hobbs - CHECK
2. Airworthiness Certificate & Registration - CHECK
3. Control Wheel Lock - REMOVE
4. Ignition Switch - OFF
5. PFD (LH) and EFD (RH) Switches (center panel) - OFF
6. Master Switch – ON
7. Fuel Quantity Indicators - CHECK QUANTITY
8. Position and Landing Lights - CHECK
9. Rotating Beacon - CHECK
10. Master Switch - OFF
11. Baggage door -- OPEN, OBTAIN fuel sample cup.

Empennage:

1. Fuselage - OBSERVE condition
2. Left Side Fuselage Static Port - CHECK FOR STOPPAGE
3. Left Horizontal Stabilizer - OBSERVE condition
4. Left Elevator - CHECK freedom and hinge points
5. Rudder Gust Lock - REMOVE
6. Rudder - CHECK freedom & hinge points
7. Vertical Stabilizer - CHECK condition
8. Right Elevator and Trim Tab - OBSERVE condition & hinge points
9. Right Horizontal Stabilizer - OBSERVE condition
10. Fuselage - OBSERVE condition
11. Right Side Fuselage Static Port - CHECK for stoppage
12. Upper Wing Surface - OBSERVE condition

Right wing trailing edge:

1. Aileron - CHECK freedom of movement & security

Right wing leading edge:

1. Nav Light and Wing Tip - OBSERVE condition, security

2. Leading Edge - CHECK condition, damage
3. Wing Tie Down - REMOVE

Right Main wheel and tire:

1. Main Wheel Tire - CHECK proper inflation (38psi)
2. Brake Caliper - OBSERVE signs of fluid leakage
3. Wheel Chock - REMOVE

Right Wing fuel sump

1. Before the 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.

Right wing fuel tank

1. Fuel Quantity - CHECK VISUALLY
2. Fuel Filler Cap - SECURE

Nose:

1. Engine Oil Level - CHECK, do not operate with less than six quarts. When departing on a XC flight of 2 hours or more and oil level is below 6.5, consideration should be given to adding a quart or, at least carrying a quart along.
2. Main Fuel Sump - 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 selector valve drain plug will be necessary.
3. Shimmy Dampener - CHECK for fluid leakage and security
4. Nose Strut - CHECK for proper extension (chrome showing)
5. Nose Wheel Tire - CHECK for proper inflation (45psi)
6. Nose Wheel Chock – REMOVE
7. Cowling – CHECK **ALL** fasteners
8. Cowling - REMOVE cowl plugs
9. Cylinder Area - CHECK no birds nests
10. Alternator Belt - CHECK tension
11. Propeller and Spinner - CHECK for nicks and security
12. Landing Light - CHECK for condition
13. Carburetor Air Filter - CHECK for restrictions by dust or other foreign matter
14. Static Source Opening (fwd left side of fuselage) - CHECK for stoppage

Left main wheel and tire:

1. Main Wheel Tire - CHECK proper inflation (38psi)
2. Brake Caliper - OBSERVE signs of fluid leakage
3. Wheel Chock - REMOVE

Left Wing fuel sump:

1. Before the 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.

Left wing fuel tank:

1. Fuel quantity - CHECK VISUALLY
2. Fuel filler cap - SECURE

Left wing leading edge:

1. Pitot tube cover - REMOVE & CHECK for stoppage
2. Fuel tank vent opening - CHECK for stoppage
3. Stall warning opening - CHECK for stoppage
4. Wing Tie down - REMOVE
5. Leading edge - CHECK condition, damage
6. Nav light & wing tip - OBSERVE condition, security

Left wing trailing edge:

1. Aileron - CHECK freedom of movement & security

Baggage compartment - Close and lock

Roll aircraft forward or out of hangar:

1. Nose tire - OBSERVE during roll for flat spots
2. Main tires - OBSERVE during roll for wear, flat spots, or cord showing
3. Towbar - REMOVE

BEFORE STARTING ENGINE

1. Preflight inspection – CONFIRM COMPLETE
2. **TOWBAR - CONFIRM REMOVED/STORED**
3. Ignition Key – INSERT (Switch **OFF**)
4. Seats, Belts, Shoulder Harnesses - ADJUST and LOCK
5. Fuel Selector Valve - BOTH
6. Avionics Master Switch – OFF
7. Autopilot Power Switch – OFF
8. Circuit Breakers - CHECK IN
9. PFD & MFD Switches - OFF

STARTING ENGINE

1. Mixture - RICH
2. Carburetor Heat - COLD
3. Master Switch - ON
4. Ignition switch - BOTH
5. Rotating Beacon – ON
6. Position lights (night) - ON
7. Propeller area – YELL "CLEAR PROP"
8. Brakes – SET or HOLD
9. Prime - AS REQUIRED (2 to 6 strokes; none if engine is warm)
10. Throttle - OPEN ⅛ INCH
11. Ignition Switch - START (release when engine starts)
12. Oil Pressure - CHECK

WARM UP & TAXI

Prior to Taxi – Set Avionics:

1. Avionics master - ON
2. PFD and MFD switches - ON
3. Transponder - CONFIRM code 1200, ALT mode
4. Radio#2 – SET frequency (ASOS, ATIS, etc.)
5. Analog Altimeter – SET to field elevation
6. Garmin 430 - ACTIVATE (press ENT)
7. Garmin 430 – SET frequencies
8. Audio Panel – PRESS COM2 (listen to ASOS/ATIS, OBTAIN barometric pressure)
9. PFD & MFD – ACTIVATE (press left or right knobs)
10. Aspen PFD – SET barometric (press "BARO" Key, dial in setting using Right Knob, press knob to enter)

11. Heading Bug – SET to Takeoff runway
12. Ready to Taxi - TRANSMIT intentions

Taxi:

1. Landing Light – ON
2. Taxi Forward - BRAKES CHECK
3. Turn Indicator – CHECK
4. Proceed to Run-up Location

ENGINE RUN-UP

1. Position Aircraft - INTO WIND, nose wheel straight
2. Fuel Selector Valve – BOTH
3. Mixture - RICH below 3000 feet
4. Brakes - HOLD or Parking Brake Set
5. 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
    e. Throttle - IDLE
6. Radios - Frequencies SET
7. Transponder - CONFIRM Altitude mode and code SET
8. Flight Controls - FREE and CORRECT
9. Taxi to hold short line for departure runway

Brief takeoff and action to be taken in event of engine failure.

PREPARE FOR TAKEOFF

1. Proceed to HOLD SHORT
2. Doors and Windows – CLOSED and LATCHED
3. Seat Belts - SECURE
4. Announce departure intentions
5. Check for traffic, taxi into position

TAKEOFF

RUNWAY ALIGNMENT CHECK

1. Heading Indicator – CONFIRM runway
2. Autopilot - Switch OFF for takeoff
3. Flaps – SET
4. Mixture - RICH (above 3000 feet, lean to obtain maximum RPM)
5. Trim – SET for TAKEOFF, set elevator and rudder
6. Carburetor Heat – COLD
7. Announce Departure Intentions
8. **Perform Takeoff - AS BRIEFED**

NORMAL TAKEOFF

1. Wing Flaps - UP
2. Brakes - HOLD
3. Power - FULL THROTTLE (2600 RPM)
4. Mixture - LEAN for field elevation per fuel flow placard
5. Brakes - RELEASE (feet low on pedals)
6. Elevator Control - LIFT NOSE WHEEL at 55 KIAS
7. Climb Speed - 75-85 KIAS

SHORT FIELD TAKEOFF

1. Wing Flaps - 10°
2. Brakes - HOLD
3. Power - FULL THROTTLE (2600 RPM)
4. Mixture - LEAN for field elevation per fuel flow placard
5. Brakes - RELEASE (feet low on pedals)
6. Elevator Control - MAINTAIN SLIGHTLY TAIL LOW ATTITUDE
7. Climb Speed - 60 KIAS until clear of obstacles
8. Wing Flaps - RETRACT after clearing obstacles

ENROUTE 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 5.

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 - ADJUST
3. Mixture - LEAN

DESCENT

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

BEFORE LANDING

1. Seats, Belts, Harnesses - SECURE
2. Fuel Selector Valve - BOTH
3. Mixture - RICH
4. Carburetor Heat - ON (apply full heat before closing throttle)
5. Autopilot - OFF

LANDING

NORMAL LANDING

1. Airspeed - 60-70 KIAS
2. Wing Flaps - AS DESIRED (below 85 KIAS)
3. Airspeed - 55-65 KIAS (flaps down)
4. Touchdown - MAIN WHEELS FIRST
5. Landing Roll - LOWER NOSE WHEEL GENTLY
6. Braking - MINIMUM REQUIRED

SHORT FIELD LANDING

1. Airspeed - 60-70 KIAS (flaps up)
2. Wing Flaps - FULL DOWN (30°)
3. Airspeed - 60 KIAS (until flare)
4. Power - REDUCE to idle after clearing obstacle
5. Touchdown - MAIN WHEELS FIRST
6. Brakes - APPLY HEAVILY
7. Wing Flaps - RETRACT

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

ENGINE SHUTDOWN

1. Avionics Power Switch, Electrical Equipment, Autopilot - OFF
2. Magneto Grounding Check
3. Mixture - IDLE CUT-OFF (pulled full out)
4. Ignition Switch - OFF, key REMOVED
5. Lights - OFF
6. Master Switch – OFF
7. DID YOU CLOSE YOUR FLIGHT PLAN?

REFUEL AND THRU-FLIGHT CHECKLIST

1. Annotate Flight log with fuel and oil serviced
2. Stow receipts for cross country refuel in flight bag
3. Check fuel sumps for contamination
4. Observe for signs of oil leakage
5. **Walk-around inspection - OBSERVE condition**

POSTFLIGHT

1. Control Lock - INSTALL
2. Wheel Chocks - INSTALL (or move into hangar)
3. Tie downs - INSTALL if necessary
4. Cowl Plugs _INSTALL
5. Pitot Cover - INSTALL
6. Forms Binder -
    a. Tach & Hobbs time entered
    b. Fuel and Oil - enter amount
    c. Discrepancy sheet - annotated
7. Windshield - CLEAN (no bugs)
8. Keys - in flight bag
9. Credit Card - in flight bag
10. **Master Switch - OFF**
11. Hangar Lights – OFF
12. CLOSE YOUR FLIGHT PLAN