

FLIGHT EXPRESS



*Initial and Recurrent
Flight Training Handbook*

Beechcraft 58 Baron

2003 revision 2

Part I. – Introduction to the Baron Fleet

Part II. – Weight & Balance and Load Limits

Part III. – Managing the Baron's Engines in Operations

Part IV – Flight Express Company Flows, Procedures and Checklists

To prepare for Baron training:

- ❑ READ THE POH!
- ❑ Read this handbook.
- ❑ Complete the Baron take-home self-test (*available online*).
- ❑ Review general information on instrument, commercial and in particular multi-engine flying.
- ❑ Sit in a Baron, if one is available, to familiarize yourself with the cockpit layout.

Part I. – Introduction to the Baron Fleet

Flight Express operates model E55 and 58 Beechcraft Barons. This is a list of all the Barons we have on line as of February 2003. **(The information contained in this list is subject to constant change and is presented here for training purposes only.)**

Registration number	Model	De-ice or Anti-ice Equipment	Known-Ice Approved?
N103GA	58	boots	NO
N112BS	58	boots	NO
N112KB	58	boots	NO
N159TH	58	TKS	YES
N18447	58	boots	NO
N1888W	58	boots	NO
N225TA	58	TKS	YES
N258TJ	58	TKS	YES
N31T	58	TKS	YES
N329H	58	none	NO
N4099S	E55	TKS	YES
N4174S	58	boots	NO
N4492F	E55	TKS	YES
N4626A	58	boots	NO
N4675S	58	TKS	YES
N46US	58	boots	NO
N6BW	58	TKS	YES
N703MC	E55	none	NO
N752P	58	none	NO
N796Q	58	boots	NO
N80AC	58	TKS	YES
N8195R	58	boots	NO
N9098Q	58	TKS	YES
N93DF	58	TKS	YES
N950JP	58	boots	NO
N955HE	58	none	NO

Refer to the fleet table on the previous page to answer the following study questions.

1. How many Barons do we have?
2. How many *known-ice approved* Barons do we have?
3. How many TKS-equipped Barons do we have?
4. How many booted Barons do we have?
5. How many booted, *known-ice approved* Barons do we have?
6. How many model E55 Barons do we have?
7. How many model 58 Barons do we have?

Part II. – Weight & Balance and Load Limits

Multi-engine airplanes are inherently more sensitive to lateral and longitudinal movement of the center of gravity. Federal Aviation Regulations reflect this:

§135.185 Empty weight and center of gravity: Currency requirement.

(a) No person may operate a multiengine aircraft unless the current empty weight and center of gravity are calculated from values established by actual weighing of the aircraft within the preceding 36 calendar months.

§135.63 Recordkeeping requirements.

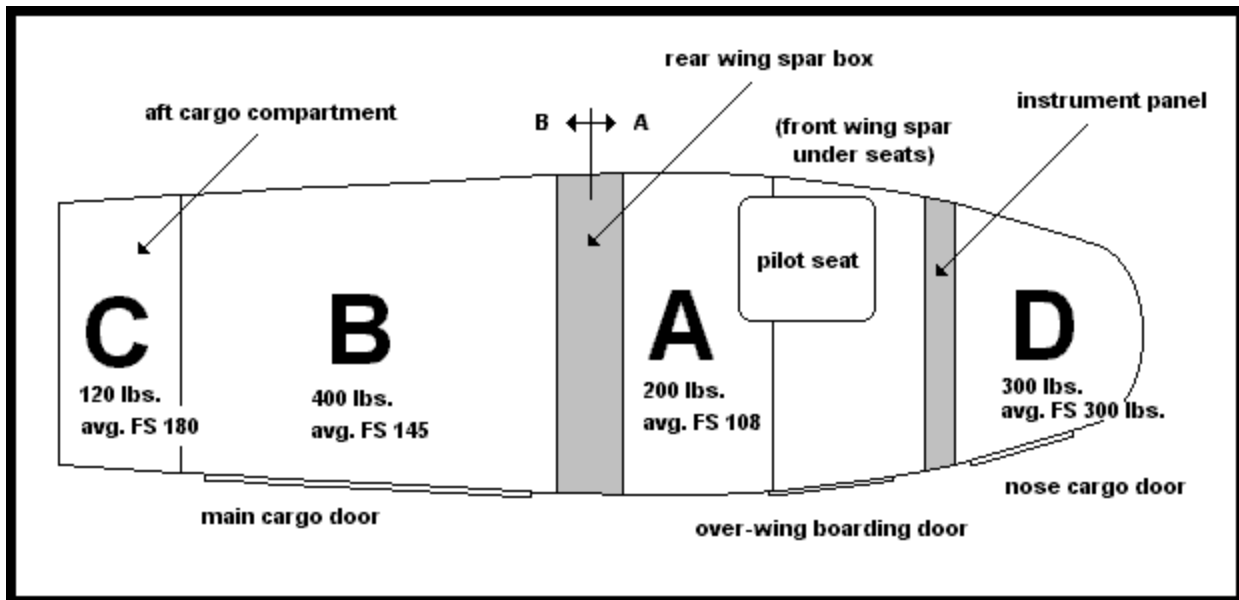
(c) For multiengine aircraft, each certificate holder is responsible for the preparation and accuracy of a load manifest in duplicate containing information concerning the loading of the aircraft. The manifest must be prepared before each takeoff and must include:

- (1) The total number of passengers;
- (2) The total weight of the loaded aircraft;
- (3) The maximum allowable takeoff weight for that flight;
- (4) The center of gravity limits;
- (5) The center of gravity of the loaded aircraft, except that the actual center of gravity need not be computed if the aircraft is loaded according to a loading schedule or other approved method that ensures that the center of gravity of the loaded aircraft is within approved limits. In those cases, an entry shall be made on the manifest indicating that the center of gravity is within limits according to a loading schedule or other approved method;
- (6) The registration number of the aircraft or flight number;
- (7) The origin and destination; and
- (8) Identification of crew members and their crew position assignments.

(d) The pilot in command of an aircraft for which a load manifest must be prepared shall carry a copy of the completed load manifest in the aircraft to its destination. The certificate holder shall keep copies of completed load manifests for at least 30 days at its principal operations base, or at another location used by it and approved by the Administrator.

Refer to the two regulations on the previous page to answer the following study questions.

1. How often does each Baron in the fleet have to be re-weighed?
2. How many copies of the multi-engine load manifest must be prepared?
3. What eight things must each copy of the multi-engine load manifest contain?
 - (1)
 - (2)
 - (3)
 - (4)
 - (5)
 - (6)
 - (7)
 - (8)
4. Does the pilot in command of an aircraft for which a load manifest must be prepared actually have to carry a copy of the completed load manifest in the aircraft to its destination?
5. For how at least how long does a copy of the load manifest have to be kept on file?
6. Where does it have to be kept?
7. **§135.63** requires that the load manifest be filled out in duplicate, but does it actually specify what must be done with the *second* copy?



1. The diagram above is not exactly to scale.
2. “Average FS” means *average fuselage station*, as measured in inches from the datum plane. For example, the average fuselage station for cargo area C (the aft cargo compartment) is 180. Cargo area C extends from FS 170 (170 inches aft of the datum plane) to FS 190 (190 inches aft of the datum plane).
3. All cargo in areas A and B must be fully secured using the cargo net so that it cannot shift under all normally anticipated flight conditions. (§135.87)
4. All cargo in area C must be secured behind the webbing retainer to prevent it from falling into area B.
5. Area D (in the nose) is an approved baggage compartment and so cargo placed there does not have to be tied down.
6. The weight limits for each area are *maximum structural capacities only*, meaning that they pertain to the strength of the deck and *not* to the center of gravity. It is possible to load the airplane within the limits for each area but still be outside the CG limits. It is also possible to load the airplane within the CG limits but exceed the maximum structural capacity for one or more of the cargo areas.
7. The maximum structural capacity for the deck is 100 pounds per square foot, *except* for the area between the front and rear spars, where the maximum structural capacity is only 50 pounds per square foot.
8. The dividing line between areas A and B crosses the rear wing spar box.
9. It is usually impossible to carry a full cargo load *and* a full fuel load; achieving the maximum possible useful load may require going with reduced fuel. Conversely, going with full fuel usually greatly reduces useful load.
10. Exceeding CG limits or maximum gross takeoff weight limits can be extremely dangerous, particularly in terms of the pilot’s ability to deal with an engine failure, ice encounter, stall, unusual attitude or other emergency.

MAXIMUM RAMP WEIGHT:	5,424 lbs.
MAXIMUM TAKEOFF WEIGHT:	5,400 lbs.

Refer to the table and facts on the previous page to answer the following study questions.

1. How much weight can be placed in cargo area A?
2. How much weight can be placed in cargo area B?
3. How much weight can be placed in cargo area C?
4. How much weight can be placed in cargo area D?
5. Where is cargo area A?
6. Where is cargo area B?
7. Where is cargo area C?
8. Where is cargo area D?
9. What is the only area in which cargo does *not* have to be secured using straps or netting?
10. The weight limits for each area:
 - (A) are maximum structural capacities; they pertain to the strength of the deck.
 - (B) are center-of-gravity limits; they ensure that the airplane is within its moment envelope.
11. The maximum structural capacity for the deck is _____ pounds per square foot, *except* for the area between the front and rear spars, where the maximum structural capacity is only _____ pounds per square foot.
12. True or false: It is almost always possible to carry a full load of fuel and a full load of cargo in a 58 Baron.

13. Exceeding CG limits or maximum gross takeoff weight limits:
 - (A) will make takeoff impossible.
 - (B) will not necessarily make takeoff impossible, but will put the airplane in an extremely dangerous position in the event of an engine failure, ice encounter, stall, unusual attitude or other emergency.
14. What is the maximum *ramp* weight?
14. What is the maximum *takeoff* weight?

Part III. – Managing the Baron’s Engines in Operations

In 1966 Beechcraft introduced the C55 model, which was the first to use the **Continental IO-520-C** powerplant. This engine was rated to produce what **285** horsepower. The E55 and 58 model Barons – which are the ones we use – first appeared in the year **1970**.

Induction air for the engine was available from either **filtered ram air** or **unfiltered alternate air**. (In our airplanes, the pilot cannot select unfiltered alternate air.) Alternate air will still be supplied to the engine **automatically through a spring-loaded door if the normal air intake becomes obstructed** by a blockage (such as ice).

When operating in conditions conducive to the development of an air filter blockage, **a drop in manifold pressure** is a sign or symptom that the pilot might observe to indicate that one has occurred.

STUDY QUESTIONS

1. In 1966 Beechcraft introduced the C55 model, which was the first to use what make and model of engine?
2. This engine was rated to produce what horsepower?
3. The E55 and 58 model Barons – which are the ones we use – first appeared in what year?
4. Induction air for the engine was available from what two sources?
5. Alternate air will be supplied to the engine when and how?
6. When operating in conditions conducive to the development of an air filter blockage, what sign or symptom might the pilot observe to indicate that one has occurred?

MIXTURE CONTROL AND LEANING PROCEDURES

From a pilot’s point of view, probably the most important contributing factor to achieving long engine life and avoiding costly repairs is **control of the fuel-air ratio**. The “ideal” fuel-air ratio in terms of producing the maximum amount of heat during the combustion process – also known as peak cylinder head temperature -- is **15 pounds of air to 1 pound of fuel or 6 $\frac{2}{3}$ %**.

As the pilot *leans* the mixture beyond the peak cylinder head temperature, excess *air* will have an immediate **cooling** effect on the engine. Likewise, as the pilot *enriches* the mixture beyond the peak cylinder head temperature, excess *fuel* will also have an immediate **cooling** effect on the engine.

Best *power* is achieved at a mixture setting slightly **richer** than peak CHT. At best power, **airspeed** is maximized per pound of fuel burned.

According to research, most engines actually do not *require* leaning below about **5,000 feet MSL!** Leaning too much or too fast can cause the engine to starve and stop running. What not enough pilots seem to realize, however, is that leaning too much or too fast can lead to three other very bad things well prior to reaching that point: **high temperatures, pre-ignition and detonation.**

Operating the engine with an excessively *rich* mixture setting, on the other hand, can lead to **high fuel consumption, ignition fouling, loss of power and engine roughness.** So the pilot's job is to find a balance between these two extremes. Two of the simple keys to finding this balance are *always to adjust the mixture slowly* and also *pay attention to the engine's behavior!*

Detonation occurs when the fuel-air mixture explodes suddenly instead of burning evenly and progressively in the cylinder. It is analogous to hitting the piston with a sledgehammer instead of pushing it down with your hand.

Three signs or symptoms may suggest that detonation is occurring (aside from the noise, which may be masked by normal engine, prop and wind sounds): **a slight loss of power, high cylinder heat temperature and high exhaust gas temperature.** If detonation is occurring, you may be only moments away from **complete engine failure!**

The uncontrolled firing of the mixture before the normal spark ignition point is called **pre-ignition.** It can lead to **excessive pressures within the engine.** Three of the principal causes of this problem are **glowing spark plug electrodes, valve faces or edges heated to incandescence and carbon or lead particles glowing within the cylinder.**

After climbing up to your cruising altitude and leveling off, you should always wait at least two minutes before you even begin to lean the mixture. This is because **it allows the engines to adjust to the higher airspeed and gives their temperatures a chance to stabilize.**

Moreover, while leaning, movement of the mixture control levers should be *extremely slow!* How slow? **If you stop moving the levers at any time, the needles of the exhaust gas temperature gauges should instantly freeze in position. If the needles continue to move, you were moving the levers too fast.**

The PRIMARY INSTRUMENT to which you should refer for proper mixture control is **the EGT gauge.** A SECONDARY INSTRUMENT you can use to back it up is **the fuel flow gauge.** (In Barons, the probe for the EGT gauge is installed **in the exhaust stack.**)

In general, the leaning process should be accomplished **in the cruise configuration at power settings of 75% or less.**

STUDY QUESTIONS

1. From a pilot's point of view, what is probably the most important contributing factor to achieving long engine life and avoiding costly repairs?
2. What is the "ideal" fuel-air ratio in terms of producing the maximum amount of heat during the combustion process, also known as peak cylinder head temperature?

3. As the pilot *leans* the mixture beyond the peak cylinder head temperature, excess *air* will have what immediate effect on the engine?
4. As the pilot *enriches* the mixture beyond the peak cylinder head temperature, excess *fuel* will have what immediate effect on the engine?
5. Best *power* is achieved at a mixture setting slightly richer or slightly leaner than peak CHT?
6. At best power, what is maximized per pound of fuel burned?
7. Most engines do not require leaning below about what altitude?
8. Excessive leaning can lead to what three very bad things, prior to reaching the point where the engine actually starves and stops running?
9. What four very bad things can happen if the engine is operated at an excessively rich mixture setting?
10. What three signs or symptoms (aside from the noise, which may be masked by normal engine, prop and wind sounds) may suggest that detonation is occurring?
11. If detonation is occurring, you may be only moments away from what?
12. The uncontrolled firing of the mixture before the normal spark ignition point is called what?
13. The problem described in question #12 above can lead to what?
14. What are three of the principal causes of this problem?
15. After climbing up to your cruising altitude and leveling off, you should wait how long before even beginning to lean the mixture?
16. Why should you do this?
17. When leaning, movement of the mixture control levers should be *extremely slow!* How does the video suggest you confirm that you are moving them slowly enough?
18. What is the PRIMARY INSTRUMENT to which you should refer for proper mixture control?
19. What SECONDARY INSTRUMENT can you use to back it up?

20. Where is the probe for the EGT gauge installed?

21. In general, the leaning process should be accomplished when?

Now that we have outlined some of the broad guidelines regarding mixture management, let's briefly discuss the official Flight Express company policy on this subject.

- The official Flight Express company policy on mixture management is a conservative compromise between **performance**, **engine longevity** and **fuel economy**.
- Cracked, melted or otherwise damaged valves, pistons, cylinders, pushrods etc. are very expensive and time-consuming to repair or replace. Good mixture management practices can help to dramatically reduce these costs.
- Poor mixture management practices can lead to engine damage and engine damage can lead to power failures. Power failures are something that we all want to avoid!
- First, do not lean the mixture *AT ALL* at or below 3,000 feet MSL. Just leave the mixture fully rich all the time below this altitude.
- At cruising altitudes above 3,000 feet MSL, *WAIT* at least two to five minutes before you even *start* to lean the mixture. Give the engine temperature a chance to stabilize first.
- When you do begin to lean, *LEAN SLOWLY*. If you stop moving the lever, the needle of the EGT gauge for that engine should instantly freeze. If it continues to climb after you have stopped moving the lever, you were moving the lever too fast.
- Lean until you identify the peak exhaust gas temperature. Then pause to allow the temperature (and temperature indications) to settle.
- Now enrich slowly and smoothly until you are operating at 100 degrees F cooler (richer) than peak EGT.
- When descending, maintain a normal cruise power setting (24" MP / 2,400 RPM) and a moderately higher airspeed if possible. Avoid steep, fast, diving descents at low power settings.
- During your cruise descent, slowly and smoothly enrich the mixture to compensate for increasing atmospheric density while slowly and smoothly retarding the throttle to maintain 24" MP.
- Plan your rate of enrichment so that you are operating at nearly fully rich by the time you reach about 3,000 feet MSL.
- **DO NOT** bring the mixture all the way forward all at once as you descend.
- **DO NOT** forget to enrich the mixture as you descend.
- **DO NOT** forget to reduce throttle as you descend.

Most of our Barons, unfortunately, do not have EGT gauges. In an airplane without an EGT, use the following procedure.

1. Consult the cruise performance chart in section V of the POH to determine the expected fuel flow based on the altitude and conditions.
2. Lean until you are operating somewhere *between* best economy and maximum power for that power setting.
3. As always, be sure to lean **SLOWLY** and **SMOOTHLY** to avoid placing excessive thermal stress on the engine. Remember that repetitive thermal stress is *cumulative*. Eventually it can lead to a major failure.

For example, if you were cruising at an altitude of 4,000 feet on a STANDARD DAY, the POH gives the following values for the following power settings:

RPM	MP	fuel flow	
2500	24.5" Hg	96 PPH / 16.1 GPH per engine	(maximum power)
2300	24" Hg	84 PPH / 14.1 GPH per engine	
2300	21" Hg	72 PPH / 12 GPH per engine	
2100	20.5" Hg	64 PPH / 10.6 GPH per engine	(economy cruise power)

We operate with a cruise power setting of 24" Hg and 2,400 RPM. Therefore . . .

AFTER WAITING AT LEAST TWO MINUTES AFTER LEVELING OFF IN CRUISE you would begin to **SLOWLY** and **SMOOTHLY** lean the mixture until your fuel flow gauge indicated a flow rate well above 10.6 GPH but below 16.1 GPH. *When in doubt, try to err on the rich side.*

Running with an excessively rich mixture does not hurt the engine. In fact, it helps to keep it cool and extend its life. Running with an excessively lean mixture dramatically increases wear, however, and should be avoided. Rapid changes to the fuel-air ratio – *in either direction* – should likewise be avoided.

WARNING

Think about this: Did Beechcraft create the guidelines above for a private pilot who flies occasionally or for a large, full-time freight operator who flies all day and all night, week after week, month after month?

The POH figures for leaning are quite aggressive. *Again, when in doubt, always try to err on the rich side.* Being too rich won't hurt anything. Being too lean will.

STUDY QUESTIONS

1. Our official company policy is a compromise between what three things?
2. Cracked, melted or otherwise damaged valves, pistons, cylinders, pushrods etc. are very expensive and time-consuming to repair or replace. What can help to dramatically reduce these costs?
3. Do not lean the mixture *AT ALL* at or below what MSL altitude?
4. At altitudes above that, at least how long should you wait before you even *start* the process of leaning the mixture?
5. How can you tell if you are leaning the mixture too fast?
6. After identifying the peak EGT, slowly and smoothly adjust the mixture to what setting?
7. When descending, what power setting should you maintain if possible?
8. What two things must you do during the descent to prevent temperatures and pressures in the engine from changing too much or too fast?
9. You should plan your rate of enrichment so that you are operating at nearly fully rich by the time you reach about what altitude?
10. What three things should you *avoid* doing in the descent?

Part IV – Flight Express Company Flows, Procedures and Checklists

(Lists of numbered items are **flows**. A flow is a memorized series of immediate action items.)

CLEARED ONTO THE RUNWAY (“Lights, camera, action.”)

1. Strobe lights – ON
2. Taxi and landing lights – ON
3. Transponder – MODE C
4. Wing flaps – UP
5. Cowl flaps – OPEN
6. Fuel – BOTH SIDES ON

CLIMB

1. Mixtures – RICH
2. Props – 2500 RPM
3. Throttles – 25” MP (or full, whichever is less)
4. Wing flaps – UP
5. Gear – UP
6. Lights – as needed (usually ON)
7. Cowl flaps – OPEN

(No checklist.)

CRUISE

1. Mixtures – TO DO *(See below.)*
 2. Props – 2400 RPM
 3. Throttles – 24” MP (or full, whichever is less)
 4. Wing flaps – UP
 5. Gear – UP
 6. Lights – as needed (usually OFF)
 7. Cowl flaps – CLOSED
- (Now refer to the CRUISE checklist. Read through it carefully **out loud**.)*

After completing the CRUISE checklist, lean . . .

☞ **SLOWLY** ☞

and

☞ **CONSERVATIVELY** ☞

and

ONLY AFTER AT LEAST 2 MINUTES FROM THE TIME YOU LEVELED OFF.

IN-RANGE

1. Mixtures – ENRICH SMOOTHLY AND GRADUALLY THROUGHOUT DESCENT.
 2. Props – 2400 RPM
 3. Throttles – 17” MP (until slowed to desired instrument or initial visual approach speed.)
 4. Wing flaps – APPROACH
 5. Gear – TO DO
 6. Lights – as needed
 7. Cowl flaps – CLOSED
- (Now refer to the IN-RANGE checklist. Read through it carefully **out loud**.)*

TBGUMPSS HR

1. Time – START at FAF
 2. Brakes – CHECK
 3. Gas – BOTH SIDES ON
 4. Undercarriage – DOWN
 5. Mixtures – RICH
 6. Props – FORWARD
 7. Switches – lights on or off as needed, including pilot-controlled airport lights, if applicable
 8. Seatbelts – ADJUSTED AND SECURE
9. Heater – OFF
 10. Radar – OFF
- (This is the same as the printed checklist **if done properly!**)*

AFTER LANDING (“Lights, camera, action-action.”)

- ❑ **DO NOT CLEAN UP THE AIRPLANE UNTIL YOU COME TO A COMPLETE STOP CLEAR OF THE RUNWAY!**
- ❑ **KEEP THE YOKE PULLED TO THE FULL-AFT POSITION UNTIL YOU COME TO A COMPLETE STOP CLEAR OF THE RUNWAY!**

1. Strobe lights – OFF
 2. Taxi, landing and nav lights – as needed
 3. Transponder – STANDBY
 4. Wing flaps – UP
 5. Cowl flaps – OPEN
- (Now refer to the AFTER LANDING checklist. Read through it carefully **out loud**.)*

PRE-MANEUVER

Clearing turns – ASK INSTRUCTOR

Mixtures – RICH

Props – FORWARD

Throttles – 17” MP

Wing flaps – UP or APPROACH depending upon maneuver

Gear – UP or DOWN depending upon maneuver

Landing lights – ON Cowl flaps – OPEN

(No checklist.)

ENGINE FAILURE IN FLIGHT

Fly the airplane! Maintain control!

1. Mixtures – FORWARD
2. Props – FORWARD
3. Throttles – FORWARD
4. Wing flaps – UP
5. Gear – UP
6. Identify – DEAD FOOT, DEAD ENGINE
(Say “LEFT” or “RIGHT” each time.)
7. Verify – CAUTIOUSLY RETARD THROTTLE ON SUSPECT SIDE
(Say “LEFT” or “RIGHT” each time.)
8. Feather – CAUTIOUSLY RETARD PROP ON SUSPECT SIDE
(Say “LEFT” or “RIGHT” each time.)
9. Stabilize – Maintain airspeed, altitude and heading.
10. *Save – Retard power on good engine side.
Pull prop back to 2400 RPM on good engine side.
Open cowl flaps on good engine side.
11. *Secure – *(If applicable. Use your checklist.)*
12. *Crossfeed – *(If applicable. Use checklist.)*

*Only do this if performance allows. In the terminal area, you may elect to skip 9, 10 and 11.

UN-CROSSFEED AND AIR START

(Checklist only, and not in the terminal area.)

ENGINE FIRE ON THE GROUND

1. Starter – Continue to operate on the affected side.
2. Mixtures – IDLE CUTOFF
3. Fuel Selectors – OFF
4. Battery and alternator switches – OFF

ENGINE FIRE IN FLIGHT / EMERGENCY DESCENT (“Right to left to right”)

1. AFFECTED mixture – CLOSED
2. Throttles – CLOSED
3. Propellers – FORWARD
4. Airspeed – Dive hard to achieve 152 KIAS
5. Flaps – APPROACH
6. Gear – DOWN
7. Maintain 152 knots. This will require a steep nose-down attitude.

Note: This is a dramatic high-speed maneuver.
Practice and be ready.

*(Now refer to the ENGINE FIRE IN FLIGHT checklist. Read through it carefully **out loud.**)*

LANDING WITH ONE ENGINE INOPERATIVE

When landing is assured:

1. Gear – DOWN
2. Flaps – APPROACH
3. Airspeed – 90 KIAS
4. Throttles – Adjust for a stabilized 800 FPM descent.

When there is no more chance of a go-around:

5. Flaps – DOWN

GO-AROUND WITH ONE ENGINE INOPERATIVE

1. Throttles – FULL
2. Gear – UP
3. Flaps – UP
4. Airspeed – 100 KIAS or greater

WARNING! Single-engine go-arounds are extremely dangerous! Avoid if at all possible!

**All other procedures are to be carried out
using the appropriate checklists only.**

BEECH 58 BARON NORMAL AND EMERGENCY PROCEDURES CHECKLISTS

PREFLIGHT ACTION

Prop lock – OFF and STOWED
Fuel – Visually checked
Preflight inspection – Complete
Paperwork – Complete
ATIS and clearance – Obtained

BEFORE STARTING

Alternate static source valve – OFF
Emergency gear handle – STOWED and ACCESSIBLE
Beacon – ON
Seat belts – ADJUSTED and SECURE
Cargo straps – None hanging outside
Utility and cabin doors – CLOSED and LATCHED
Fuel selectors – BOTH ON
Circuit breakers – CHECK
Avionics master switch – OFF
Fuel boost pumps – OFF
Heater – OFF
Cowl flaps – OPEN
De-ice / anti-ice equipment – OFF
Nav lights – as needed
Taxi, landing and strobe lights – OFF
Gear lever – DOWN
Prop levers – FORWARD
Brakes – Check
“Clear left prop!”
Battery switch – ON
Landing gear and annunciator lights – TEST
Fuel gauge indications – CHECK

STARTING

Prop chain – Re-verify removed
Brakes – HOLD
Engine start – EXECUTE

AFTER EACH ENGINE START (“Light, load, nipple, pressure.”)

RPM – No more than 1000
Alternator switch – ON
Alternator light – OUT
Loadmeter – showing draw
Instrument pressure – OK / other side red before 2nd engine start
Oil pressure – CHECK

AFTER BOTH ENGINES ARE RUNNING

Avionics – On
#2 comm radio – Company frequency

BEFORE TAKEOFF

Taxi instrument check – COMPLETE
Prop blast area – CLEAR
Brakes – HOLD
Flight controls – FREE and CORRECT
Heading indicator – set to compass
Attitude indicator – adjust horizon
Altimeter – set and cross-checked
Elevator, aileron and rudder trim – SET
Transponder – CODE and STANDBY

ENGINE RUNUP

RPM – 2200
Prop – Cycle (Observe drop in RPM, rise in MP and slight momentary fluctuation in oil pressure.)
RPM – 1700
Mags – Check
Alternator – Check
Voltage regulators – Check
Engine instruments – Check
Instrument pressure – Check
RPM – 1500
Feather – Check, then restore smoothly and promptly
Throttle – Idle
RPM – OK
Mags – Ground check

Parking brake – OFF
Windows – CLOSED and LATCHED
Emergency plan – REVIEW **(See the last page of this handbook.)**

CRUISE

Engine instruments – CHECK
Instrument pressure – CHECK
Alternators – CHECK
Fuel boost pumps – OFF

IN-RANGE

Seat belts – ADJUSTED and SECURE
Shoulder harness (if installed) – ADJUSTED and SECURE
Altimeter – SET
HI or HSI – CHECK and SET
Alternators – CHECK
Engine instruments – CHECK
Instrument pressure – CHECK
Fuel selectors – ON

ENGINE SHUTDOWN

Avionics master switch – OFF
RPM – Idle
Mags – Ground check
Mixtures – Cutoff
Mags – OFF
Beacon – ON
Other lights – OFF
Alternator switch – OFF
Battery switch – OFF

SECURING FAILED ENGINE

Mixture – CUTOFF
Fuel Selector – OFF
Fuel boost pump – OFF
Magneto switch – OFF
Alternator – OFF
Cowl flap – CLOSED
Electrical load – MONITOR

CROSSFEED

LEFT engine inop:

Right fuel boost pump – LOW
Left fuel selector – OFF
Right fuel selector – CROSSFEED
Right fuel boost pump -- OFF

RIGHT engine inop:

Left fuel boost pump – LOW
Right fuel selector – OFF
Left fuel selector – CROSSFEED
Left fuel boost pump – OFF

MANUAL LANDING GEAR EXTENSION

Landing gear circuit breaker – PULL
Landing gear lever – DOWN
Airspeed – 152 KIAS or below
Handcrank cover – Remove
Handcrank – Engage and turn counterclockwise until it will no longer move.
Gear down light – ON
Handcrank – Stow

ENGINE AIR START

Fuel selector – ON
Throttle – ½ travel
Mixture – RICH
Fuel boost pump – LOW
Mags – BOTH

With unfeathering accumulators:

Prop – FORWARD
Prop – Retard smoothly as windmilling begins; this prevents overspeeding.

Without unfeathering accumulators:

Prop – MIDRANGE
Starter – ENGAGE

Throttle – Adjust as engine starts; keep power moderate at first because engine is cold.
Fuel boost pump – OFF
Alternator – ON
Oil pressure – CHECK
Engine – Warm up at 2000 RPM and 15” MP until readings are normal.

ELECTRICAL SYSTEM FAILURE – ONE ALTERNATOR INOP

Alternator switch – CHECK
If that does not work, turn the alternator switch OFF and reduce the electrical load as practical.

ELECTRICAL SYSTEM FAILURE – BOTH ALTERNATORS INOP

Voltage regulator switch – SELECT OTHER
If that does not work, turn both alternator switches OFF and reduce the electrical load as practical.

BE-55 / BE-58 Preflight Procedures Checklist

- A. Remove Prop Lock – stow in compartment C
- B. Check fuel level and oil level – call for the fuel truck **now** if needed
 - Check all lights
 - In cold weather, check function of pitot heat, stall warning vane heat and fuel vent heat
- C. Cockpit
 - Remove and stow control lock
 - Turn OFF all switches except the rotating beacon
 - Set the elevator trim tab to within the green (takeoff) arc
- Cargo / cabin area
 - Emergency gear hand crank – STOWED but FREE and ACCESSIBLE (Ensure crank handle is not trapped under spar cover)
 - Side window emergency exits – closed and securely latched
 - Shake out the cargo net; check for stray cargo and then fold neatly to permit loading
 - Check the aircraft registration and airworthiness certificates in compartment C
 - Fully extend cargo tiedown straps and thread through rear cargo net to get them out of the way
- Exterior
 - Right static port – clear
 - Inventory antennas under belly
 - Inventory antennas on top of fuselage
 - Check right horizontal stabilizer – condition of aluminum, rivets and fasteners
 - Check right elevator – condition of aluminum, rivets and fasteners, freedom of movement, static wicks
 - Check right elevator trim tab – hinge bolts, cotter pins, excessive play
 - Untie tail
 - Check rudder – condition of aluminum, rivets and fasteners, freedom of movement, static wicks
 - Tailcone – condition of aluminum, rivets and fasteners
 - Nav light – secure
 - Rudder trim tab – hinge bolts, cotter pins, excessive play
 - Check for differential play between elevators
 - Check left horizontal stabilizer – condition of aluminum, rivets and fasteners
 - Check left elevator – condition of aluminum, rivets and fasteners, freedom of movement, static wicks
 - Check left elevator trim tab – hinge bolts, cotter pins, excessive play
 - Overhead cabin air vent inlet – unobstructed
 - Left static port – clear
 - Left flap – condition of aluminum
 - Left aft inboard fuel drain – sump (1st sump)
 - Left aileron trim tab – hinge bolts, cotter pins, excessive play
 - Aileron trim tab bellcrank – check for three **cotter** pins
 - Left aileron – condition of aluminum, rivets and fasteners, freedom of movement, static wicks
 - Left aileron actuator rod ends – check condition
 - Left aileron hinges and brackets – check condition and security
 - Outboard trailing edge – static wicks
 - Left nav and strobe lights and plastic cover – condition and security
 - Examine left wing leading edge for damage
 - Inspect underside of left wing for wrinkling, blue stains or other evidence of a fuel leak
 - Left landing light and plastic cover – condition and security
 - Check stall warning vane
 - Untie left wing
 - Check fuel vent for blockage
 - Confirm no obstructions in left engine air intakes
 - Check left propeller and spinner
 - Check left alternator wires and left alternator mounting
 - Check left exhaust stack and cowl flap for cracks or excessive play
 - Check **BOTH** left induction manifold fuel drains – *ensure that they protrude outside cowling*
 - Check left forward inboard fuel drain – sump (2nd sump)
 - Sump left fuel strainer (3rd sump)

Check left main landing gear – axle nut, cotter pin
tire tread and inflation
both brake pads at least nickel thickness
squat switch
cotter pins on all visible castellated nuts
uplock roller – free and lubricated
main strut inflated*
* If main strut is flat, DO NOT MOVE the airplane! Strut damage could result.

Check pitot tube for blockages

Check nose wheel – axle nut, cotter pin
tire tread and inflation
taxi light

Battery box drain clear

Check nose compartment for stray cargo

Check brake fluid reservoir – verify that fluid is above the “add” mark

Check TKS or alcohol reservoir for fluid level in cold weather

Check quantity indicator wires for security

CAUTION: nose compartment door spring tends to allow the door to slam shut suddenly

When closing the door, ensure that *both* latches are properly aligned

Examine right wing leading edge for damage

Inspect underside of right wing for wrinkling, blue stains or other evidence of a fuel leak

Untie right wing

Check fuel vent for blockage

Confirm no obstructions in right engine air intakes

Check right propeller and spinner

Check right alternator wires and right alternator mounting

Check right exhaust stack and cowl flap for cracks or excessive play

Check **BOTH** right induction manifold fuel drains – *ensure that they protrude outside cowling*

Check right forward inboard fuel drain – sump (4)

Sump right fuel strainer (5th sump)

Right landing light and plastic cover – condition and security

Outboard trailing edge – static wicks

Right aileron – condition of aluminum, rivets and fasteners, freedom of movement, static wicks

Right aileron actuator rod ends – check condition

Right aileron hinges and brackets – check condition and security

Right flap – condition of aluminum

Right aft inboard fuel drain – sump (6th sump)

Note: Some Barons have 8 sump drains, not 6. The fourth sump drains on each wing will be located between the two front sump drains.

D. Start your paperwork, get ATIS and obtain your outbound IFR clearance

BE-55 / BE-58 Postflight Procedures

Conduct a walkaround inspection of the aircraft similar to your preflight

Check for stray cargo and remove all trash and personal items

Install control lock and prop lock

Record your ending Hobbs time

Write up any observed or known discrepancies; notify both Maintenance *and* Dispatch

Tie down the aircraft at all three points (if possible)

Flight Lesson # 1

Preflight Walkaround Inspection

Normal Engine Start

Normal Taxi

Taxi Instrument Checks

Normal Takeoff

Climb

Transition to Cruise

Steep Turns

Slow Flight – Dirty

Imminent Power-Off Stall

Manual Gear Extension

Engine Failure in Cruise (*complete shutdown*)

Airborne Restart and Warm-Up

Emergency Descent

Normal Landings (*until proficient*)

Engine Failure on Takeoff (*with abort*)

Engine Failure After Takeoff (*zero thrust*)

Single-Engine Landing

No-Flap Landing

Rejected Landing (*with go-around*)

Flight Lesson #2

Normal Engine Start

Normal Taxi

Taxi Instrument Checks

Instrument Takeoff

Instrument Climb

Transition to Instrument Cruise

Steep Turns

Slow Flight – Dirty

Imminent Power-Off Stall

Engine Failure in Cruise (*zero thrust*)

Emergency Descent

Unusual Attitude Recovery

Partial Panel Maneuvering

Flight Lesson #3

Non-Precision Approach 1

Non-Precision Approach 2

Single-Engine Precision Approach

Checkride

BEFORE TAKEOFF MULTI-ENGINE BRIEFING (*example*)

Temperature _____ ° C

MSA in this area is _____ feet within
_____ nautical miles of _____.

Altimeter
Setting _____ " Hg

Major obstacles in this area include: _____

Available
Runway
Length _____ feet

Computed accelerate-and-stop distance is: _____ feet

Computed accelerate-and-go distance is: _____ feet (*to clear a 50' obstacle*)

Computed single-engine service ceiling is: _____ feet

Engine failure prior to V_R – ABORT

Engine failure after V_R with sufficient runway remaining – LAND

Engine failure after V_R with insufficient runway remaining – Pitch for V_{YSE} ("blue line") 100 KIAS, maintain aircraft control and execute engine failure procedures. Advise ATC (if applicable) and return for a landing.