

# The Seabee's Franklin Engine

by Jim Poel

## Description

The Franklin "500" by Aircooled Motors of Syracuse, N.Y. is a Six cylinder, 500 cubic inch, 215 horsepower engine, with a 26 inch prop shaft extension on one end, a cooling fan on the other and was built only for the Republic Seabee. The engine comes in two models, the 6A8-215-B8F and B9F, both of which sit backwards on the aircraft. The first five hundred were B8F models and the rest (over 500), of course, were B9F models. There are a number of differences between the two; most visibly, the B8F has two magnetos and no oil filler cap on the prop shaft housing. While the B9F has the prop shaft, oil filler and one magneto and one distributor. The other unseen difference is the use of a thrust bearing on the B9F as opposed to thrust washers on the B8F. The larger bearing allows for more reverse thrust to be used.

Both models have two mechanical fuel pumps connected by a myriad of fuel lines, check valves and other hardware, which gives it the appearance not unlike the fuel system on the Spirit of St. Louis. Many owners remove one (usually the left) pump and replace it with an electric pump mounted down near the tank. This cleans up that area and eliminates some fire hazards.

The ignition system on the B8F is pretty standard with two Eiseman LA-6 magnetos. Both have impulse starters are timed at 32° BTDC. The B9 has one Scintilla S6LN-31 magneto with no impulse starter, and on Auto-Lite distributor. The magneto is timed at the usual 32° BTDC, but the distributor is timed at 2° BTDC. As RPM is increased, the centrifugal advance brings the distributor up to 32° BTDC like everyone else. This system makes hot starts a piece of cake.

The induction system is an updraft and the cooling is a downdraft. The induction air intake is at the base of the cooling fan. The air travels backward through a rectangular tube beneath the oil pan, through the air filter box, upward through the carburetor, and forward through the intake manifold to the cylinders.

The lubrication system has had a few changes over the years. First of all, the early oil pumps were made larger, increasing the volume. The smaller pumps didn't supply enough pressure, at low RPM, to reverse the propeller once the oil was hot. Next came the pick up screen, which started life as a fully floating device. It seems that under certain conditions it would float up and tangle with the crankshaft. The fix was to limit the amount of float travel to about ¾ of an inch. With this modification the maximum capacity was changed from 11 quarts to 12. Despite the increased capacity, most owners know not to fill beyond 10 quarts, as it tends to froth and spill out through the breather. Most owners have changed the oil cooler to the BT-13 type from the original rectangular ones. There is, however, a newer rectangular one available now.

## Operation

The first thing about operating your Seabee engine is on starting. Pumping the throttle does help the start, but should be done in long steady pumps (2) while the engine is cranking. Being an updraft, without the rushing air going up to the cylinders, gas from the accelerator pump only falls down into the air filter box. There it will either drain out making a nasty smear on the side of your Bee, or worse, puddle in the air box creating a fire hazard.

Run-ups in both models, but especially in the B9F, should be done at 2000 RPM. At a lower RPM on a B9F, the centrifugal advance hasn't completely advanced which causes a larger drop on the distributor side.

Your engine should turn at least 2300RPM on a static full power run up. As the take off roll and lift off, the rpm may exceed 2500. This is not uncommon and is the sign of a healthy engine. A few turns out on the prop control brings the RPM back to limits. Climb power is 27 inches of MP and 2400 RPM. For cruise power settings refer to the power setting chart below. For added power, some operators lean their mixtures for take off. This can add up to 150 RPM, which does help the take off. I must stress here that once off the ground or water, the mixture should be pushed back in to full rich for climb or SERIOUS overheating can occur. The Seabee engine has a wide range of fuel burn. Only your experience will help you figure out your fuel flow on your Seabee; the chart is only a guide.

Oil consumption can vary. Some engines burn very little, and some burn 1 quart per hour. High oil burns don't necessarily mean impending disaster, unless there are accompanying signs. It, of course, should be monitored. One final note; very often a Seabee will operate differently than your garden-variety general

aviation airplane. I am speaking of high power settings just before shutting down. After beaching, crosswind taxiing, going up a ramp, or any time high power settings are used just before shutting down, it's good procedure to run at low rpm for a couple of minutes to cool the cylinders before actually pulling that mixture knob.

All in all, the Franklin 500 engine is pretty much bulletproof, and with proper care and maintenance should push the old Bee around for while.

**CRUISE POWER CHART**  
(Franklin Engine)

| See Note (3)                | MAX CONT POWER |      | HI SPEED CRUISE |      | LOW SPEED CRUISE                |      | MAX RANGE  |      |
|-----------------------------|----------------|------|-----------------|------|---------------------------------|------|------------|------|
| FUEL FLOW and POWER SETTING | 5.8 MI/GAL     |      | 6.5 MI/GAL      |      | 7.5 MI/GAL<br>Approx. 75% Power |      | 8.5 MI/GAL |      |
| ALTITUDE                    | MP             | RPM  | MP              | RPM  | MP                              | RPM  | MP         | RPM  |
| Sea Level                   | 28             | 2500 | 27              | 2350 | 25.5                            | 2200 | 23.5       | 2000 |
| 2000                        | -              | -    | 27              | 2350 | 25.5                            | 2200 | 23.5       | 2000 |
| 4000                        | -              | -    | -               | -    | 23.5                            | 2400 | 21.5       | 2200 |
| 6000                        | -              | -    | -               | -    | 22.5                            | 2500 | 21         | 2300 |
| 8000                        | -              | -    | -               | -    | 21                              | 2500 | 20         | 2350 |

Note (1) Fuel consumption shown is for airplane of 3150-lbs. Gross weight; better consumption will be experienced for lower gross weight.

Note (2) Estimate fuel used in full throttle climb at average consumption of 20 gallons per hour.

Note (3) Each column gives progressively increased range at increasing penalty to cruising speed.

MP Manifold Pressure in inches of mercury.

See Republic Service News No. 23A for more information on Cruise power settings.