

Vapor Suppression – The vapor suppression switch must be turned on in the following situations:

- Operations above 18,000 ft.
- If TIT is rising above 1460°F at full power with the mixture full rich (at any altitude).

Once engine temperatures have stabilized and if the aircraft is below 18,000 ft, the vapor suppression switch may be turned off.

The vapor suppression switch should also be turned on any time the engine is not running smooth or it is suspected there is vapor in the lines. Vapor in the lines is most likely to happen in hot weather or at high altitudes.

NORMAL OPERATIONS ABOVE 18,000 FT

During normal climb, cruise and descent operations above 18,000 ft., a minimum engine condition of 2200 RPM and 15 in.Hg of manifold air pressure are required to insure proper turbocharger operation is maintained. If engine operation below 15 in.Hg of manifold air pressure is necessary, the fuel mixture must be properly leaned or engine stoppage will result.

CRUISE

Flight Planning – Several considerations are necessary in selecting a cruise airspeed, power setting, and altitude. The primary issues are time, range, and fuel consumption. High cruise speeds shorten the time en route, but at the expense of decreased range and increased fuel consumption.

Cruising at higher altitudes increases true airspeed and improves fuel consumption, but the time and fuel used to reach the higher cruise altitude must be considered. Clearly, numerous factors are weighed to determine what altitude, airspeed, and power settings are optimal for a particular flight. Section 5 in this manual contains detailed information to assist the pilot in the flight planning process.

In general, the airplane cruises at 50% to 85% of available power. The maximum recommended cruise power setting is 85%. The minimum cruise power setting is 40%, but higher power settings may be required in colder weather to maintain minimum engine temperatures.

Mixture Settings – In cruise flight and cruise climb, care is needed to ensure that engine instrument indications are maintained within normal operating ranges. After reaching the desired altitude and engine temperatures stabilize (usually within five minutes), the mixture must be adjusted. The engine driven fuel pump references deck pressure and adjusts mixture automatically for deck pressure and altitude effects. The pilot is responsible to lean the mixture in cruise for lower fuel flow.

Control by Turbine Inlet Temperature (TIT) – When leaning the mixture using TIT, the pilot should use the TIT gauge on the MFD. At power settings below 85% power, starting at full rich mixture, lean slowly while observing the TIT. When changing the mixture to lean of peak, it is acceptable to have TIT indications temporarily in the yellow range, but indications must return to the normal range upon leaning completion. Best power is obtained at 1625°F. Below 85% power the engine can be leaned past peak and be operated 50°F lean of peak TIT. Lean of peak operation improves the efficiency of the airplane and provides about 30°F lower CHT at the same RPM/MAP combination. Fuel flow can be used as a reference to judge the resulting power setting, but should not be used for leaning.

CAUTION

Do not lean the engine when operating above 85% power. At power settings above 85%, the mixture must be full rich. Do not lean the engine during full power climb.

at 2500 RPM, the engine has warmed sufficiently to accept full rated power. During takeoff and climb, the fuel flow may be high; however, this is normal and desirable since the engine will develop more horsepower in the substandard ambient temperatures.

NOTE

In cold weather below freezing, ensure engine oil viscosity is SAE 30, 10W30, 15W50, or 20W50. In case of temporary cold weather, consideration should be given to hangaring the airplane between flights.

HOT WEATHER OPERATIONS

Flight operations during hot weather usually present few difficulties. It is unlikely that ambient temperatures at the selected cruising altitude will be high enough to cause difficulties. The airplane design provides good air circulation under normal flight cruise conditions. However, there are some instances where abnormally high ambient temperatures need special attention. These are:

1. Starting a hot engine
2. Ground operations under high ambient temperature conditions
3. Takeoff and initial climb out.

After a hot engine is stopped, the temperature of its various components begins to stabilize. Engine parts with good airflow will cool faster. In some areas, where conduction is high and circulation is low, certain engine parts will increase in temperature. In particular, the fuel injection components (especially the fuel injection pump) will become heat-soaked and may cause the fuel in the system to become vaporized.

During subsequent starting attempts the fuel pump will be pumping a combination of fuel and fuel vapor. Until the entire system is filled with liquid fuel, difficult starting and unstable engine operations can normally be expected. To correct this condition, set the fuel selector to either tank, close the throttle, set the mixture to idle cutoff, and operate the primer for approximately 3 seconds; proceed with normal starting procedures. It may be necessary to leave the vapor suppression on during starting and turn it off approximately one minute after engine start.

Ground operations during high ambient temperature conditions should be kept to a minimum. In situations which involve takeoff delays, or when performing the Before Takeoff Checklist, it is imperative that the airplane is pointed into the wind. During climb out, it may be necessary to climb at a slightly higher than normal airspeed and turn the vapor suppression on. Be sure the mixture is set properly to full rich, and do not operate at maximum power for any longer than necessary. Temperatures should be closely monitored and sufficient airspeed maintained to provide cooling of the engine.

NOTE

Heat soaking is usually the highest between 30 minutes and one hour after shutdown. At some point after the first hour the unit will stabilize, though it may take as long as two or three hours (total time from shutdown) depending on wind, temperature, and the airplane's orientation (upwind or downwind) when it was parked. Restarting attempts will be most difficult in the period 30 minutes to one hour after shutdown.

ENGINE OPERATION FOR MAXIMIZING EXHAUST LIFE

The exhaust is a thermally stressed component that endures frequent and rapid temperature changes. Every temperature change can be counted as a fatigue cycle and with each cycle having a cumulative effect may eventually result in the component cracking. When mechanical stress is added to thermal stress, cracking may occur even earlier. At normal operating temperature, 1625°F TIT for example, stainless steel loses >50% of its room temperature strength. The turbocharger and its attachment flange are thicker and the adjoining exhaust components. Therefore, the hot turbocharger flange will cool much slower than the adjoining components resulting in internal stresses. If an exhaust has