ZEPHYR AIRCRAFT ENGINES INC.

OPERATING RECOMMENDATIONS

THE FIRST FLIGHT:

Your Zephyr engine has been test run including full power operation at our facility. A brief run to check for leaks and control operation is all the running required prior to the first flight. After this run, the engine should be fully cooled. Then taxi time should be minimized if possible. A normal but brief preflight runup is adequate. One mag check and one cycle of the prop no more than 200 RPM will minimize temperature buildup. Allow for a slightly rough mag check due to oil fouling. Power application for the first takeoff roll should be very gradual. Runway length and obstructions permitting full power should be reached as liftoff speed is attained. Airspeed and full throttle fuel afford the engine maximum cooling airflow. Full power should be maintained to cruise altitude for fixed pitch prop type installations. Four cylinder engines with constant speed propellers may climb at full throttle with RPM reduction optional. Higher power and turbo-charged engines may be pulled back to 75-80% for climb once obstructions are cleared and cruise climb speed attained. All engines should also be climbed at a relatively high airspeed once a safe altitude is reached. One hour is a good initial flight time. Cruise at 75% power. Check fuel flows, oil and cylinder head temperatures, alternator operation, carburetor heat, and leaning capability as is appropriate to your particular machine. If possible avoid power reduction to idle prior to touchdown. After the flight uncowl, or open cowlings as required for a visual inspection of the engine installation as well as check for leaks. If you have any questions, PLEASE CALL

BREAK IN OPERATION

TAKEOFFS: FULL POWER should be used for all takeoffs and maintained to a "safe" altitude. Most engines are certified for continuous 100% operation. A few have time limit maximum RPM restrictions which are noted on the tach as well as in the POH.

CLIMB: As stated in the preceding paragraph, fixed pitch installations require full throttle in all climbs; and the lower powered constant speed installations are better off at full throttle. Cooling airflow and fuel for cooling are the keynote in climb, so it is best to cruise climb at the high power settings appropriate for your type of aircraft. No leaning in climb is acceptable beyond that which might be required to maintain smooth operation climbing out of higher altitudes.

CRUISE: For the first 25 hours or so of break in it is best to operate at 75% power as much of the time as practical. On normally aspirated engines avoid high altitude operation where you cannot obtain 75% or you are running high RPM and low

manifold pressure to do it. Normal precise leaning is acceptable provided all indications of a correct lean mixture are in agreement; EGT, TIT, CHT. Fuel flow and the engine is operating smoothly. If fuel burn is not critical to the particular operation, we recommend for the first 10-12 hours a fuel flow that yields an EGT 75-100 on the rich side of peak. If practical for the first 10-12, or better yet 25 hours, avoid abusive operation - touch & go's, slow flight, etc.

OIL:

We use and recommend Phillips 20/50 XC, Phillips Type M or Shell Mineral for break-in, except in Lycoming 76-series engines, which require AD type oil and LW-16702 additive. Change the oil and filter at 10, 35, and 60 hours. If you are not satisfied with the consumption level at the 60 hour change, advise us! If you have chosen mineral oil for break-in, you may change to AD at the 60 hour change, provided the consumption is acceptable.

OIL LEVEL: It is common practice to run most engines as low as 75% of capacity. It is certainly never necessary to run a 12 quart system at more than 10. Filling the system generally increases consumption due to oil blowing out of the crankcase breather. Oil temperature is thermostatically controlled so 12 quarts will not run any cooler than 10. Heat is dissipated in the cooler, not the sump so quantity will not increase cooling.

OIL CHANGE INTERVALS: WE RECOMMEND OIL & FILTER CHANGES EVERY 35 HOURS OR 25 ON NON FILTER INSTALLATIONS.

AUTO FUEL:

DO NOT USE AUTO FUEL IN YOUR ENGINE PRIOR TO 50 HOURS. IT WILL RUIN THE TOP END. We do not recommend the use of auto fuel at any time. If you do use it we recommend an occasional tank of 100LL in order to run some lead. We will not warranty any condition which may have been caused by or contributed to by auto fuel.

ENGINE LIFE:

The worst enemies of your engine are dirt, disuse and excessive heat. Lack of use can be detrimental as it can lead to corrosion from moisture and acid buildup in the engine. The aircraft should be flown long enough to have the operating temperatures in the green for at least 20 minutes every 10 days to 2 weeks. Ground running is not satisfactory. Pulling the prop through by hand is not only unsatisfactory but detrimental as it removes oil from parts without any possibility of replacing it. Dirt is kept out of your engine by maintaining a good properly installed air filter and a leak free induction system. Dirt is everywhere so basing on pavement does not excuse you. Changing the oil and filter is also eliminating dirt from your

engine. High operating temperatures due to lack of cooling airflow and excessive leaning will shorten engine life. Excessive or rapid heating and cooling will also shorten engine life. Warm the engine up slowly. Apply power gently and slowly, particularly on the first takeoff of the day. If you must have full power immediately, bring it up gradually with the brakes on if conditions permit.

If you don't understand or agree with any part of this or you would like to discuss it further - CALL ME!! I have 41 years in the engine business and more than 10,000 hours flying most types of aircraft.

Charlie Melot, Pres. 800-204-0735