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Magnum Engines

Note: This informational piece is provided by Magnum Engines to help you maintain your engine performance over time. We hope you find this information beneficial to your enjoyment of flying.

ABC & Ringed Engine Operation

Ringed Engines are quite different than ABC (Aluminum-Brass-Chrome) or ABN (Aluminum-Brass-Nickel) engines and must he operated differently.

A ringed engine utilizes a ring on the piston to control the exhaust gases during combustion, prohibiting the gases from going past piston to contaminate the incoming fuel and air. An ABC engine controls the exhaust by careful control of piston-cylinder sleeve clearances.

RE: ABC Engine: In the ABC engine, the cylinder sleeve is taper ground, being smaller at the inside diameter at area forming combustion chamber at top causing tightness at top dead center this tightness will he felt when engine crankshaft is rotated because when engine is cold, there is practically no clearance between piston and sleeve, causing this hind.

When the ABC engine reaches operating temperature, the combustion chamber area is hotter than lower part of sleeve. This heat causes expansion, which is controlled by the design of the Piston and Sleeve, and allows the cylinder to give relatively same clearance above and below. This is the result of being straight bore when heated.

All engines are affected by improper operating temperatures caused by improper fuel management. As you can understand, too high an operating temperature caused by too lean running will affect the expansion of the sleeve, and cause power loss and engine destruction.

To obtain best wearing surface between piston and cylinder walls, an ABC engines sleeve is made of bronze, and internally plated with chrome. The sleeve dissipates heat rapidly with proper lubricant to form less friction between piston and cylinder. (lack of lubricant and excess heat will quite easily damage engine).

Ringed Engine

A ringed engine does not have the taper, and does not have bronze sleeve coated with chrome. The sleeve is porous, which means that there are tiny holes in the metal that carbon can fill! Carbon is a natural lubricant, so tilling the tiny holes in the sleeve will "glaze" the sleeve, giving excellent lubrication for the piston.

The ring in the piston, when installed, is under considerable spring tension, which, within normal limits will always keep tension on cylinder wall to prevent "blow by" of the combustion gases that may contaminate the incoming fuel and air in the crankcase-resulting in large loss of power.

Because this ring localizes much friction (piston has skirt clearance), the matter of reducing metal to metal friction is important. Even though piston is "glazed," the ring is not, so a low friction molecule must separate ring from cylinder. This low friction molecule is part of the lubricant in the engine fuel. This means proper fuel is imperative

for a Ringed Engine. If improper fuel management occurs, rapid failure of the operating engine parts will result.

If proper fuel management occurs, a ringed engine may last longer than an ABC engine. Additionally, after long term good performance, a properly run ringed engine will in most cases be less expensive to repair, needing only a new ring, instead of a new piston and sleeve.

To allow the ring to work properly, we know that it must be lubricated and allow the heat to be carried away by lubricant remaining in the liquid state (fuel). If the lubricant reaches its flash point, it will burn and all the positive effects of the lubricant will be gone, as the carbon and varnish levels will be too great in the engine and mechanical wear of the ring and the built-in tension will be gone!

There is only I suggested lubricant used in model engine fuel that has a flash point nearly 100 degrees Fahrenheit higher than the usual synthetics used, and that lubricant is Castor Oil. A ring engine must have at least a partial part of this total lubricant-Castor Oil!

Lean operation even with a good fuel can destroy all types of engines, and possibly sooner with a ringed engine.

Fuel Management for all Engines: The habit employed by most pilots of adjusting for maximum RPM on the ground with a full tank of fuel will result in a lean run!! and possible flame out which is a regular occurrence at the flying field. Employing this method of maximum RPM for ground performance is not correct for the flight environment.

Proper Fuel Management for all Engines: RPM increases from lO%-30% in the air over that achievable on the ground. This is due to the forward motion of the airplane as well as the aerodynamics of the propeller. This increased RPM constitutes more air to engine and the carburetor settings on the ground are now improper to the flight performance of the engine.

Additionally, the burning of the fuel in flight will lower the level of fuel in the tank, as will high climb rates, aggravating low fuel flow and lean run!!!

If an engine is to perform over longer periods of time, the engine must be adjusted for flight environment!!! It is imperative to simulate the flight environment while on the ground. One method which we suggest is to fill the fuel tank to about 1/3 capacity, and then start engine. With engine running, hold the aircraft nose up in the air and adjust carburetor to maximum performance. Once top RPM is reached, richen the setting until an audible RPM drop is heard. This setting should give you excellent flights.

Remember, the needle valves do not require adjustments prior to every flight, which is a common habit that eventually causes engine returns to the service department. You should not have to reset the carburetor until climate temperatures really change or you change your type of fuel.