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WORLD LEADERS IN RUSSIAN SPORTING AIRCRAFT & ENGINES

Use of motor fuels in Russian engines

We are finding that many people are contacting us about the advisability of using automotive fuel (Mogas) with the different Russian radial engines. These engines were originally designed to use Russian B91 fuel, which is, as its designation indicates, 91 octane and with considerable lead content – about three times that of 100 LL. Also, the engines are low compression and, fundamentally tough. Nevertheless the use of Mogas is a complex issue, but I hope the following will help people considering a change. The principal aspects to consider are:

Octane rating
You will appreciate that automotive octane is different to aviation octane since they are measured in a different way. But in crude terms, if you subtract about 10 from automotive octane rating you will get aviation octane rating. So whatever your highest automotive octane rating is in your country – usually at least 95; sometimes 98 and infrequently 100, you should subtract 10 from those figures to get the aviation octane. However these engines have a low compression ratio – unless you have high compression pistons, and so high octane motor fuel is absolutely fine from this consideration

Lead
Of course modern motor fuels have no lead, but firstly these Russian engines are designed to have lead, and I should say that there are different theories, and although tetra-ethyl lead (the actual additive) does leave lead deposits, many people consider that lead is beneficial because it lubricates the valves. Indeed when we have customers who ask me the same basic question and who want to use Mogas, I say that on occasions they should be also adding 100 LL or a lead substitute which we can buy in the UK since people use it for old cars, and one simply adds it to the fuel. There are different alternatives, but the one we recommend is called Tetraboost. It also has the advantage of increasing the octane rating if that is an issue.

Volatility
A problem with modern automotive fuels is that they are much more volatile – that is they boil at lower temperatures than avgas. This is particularly true where they are now adding 5% or 10% alcohol. This can be an issue if the aeroplane is left outside on a very hot day; the fuel is in wing tanks and gets very hot; you start the engine and it starts sucking and the lower pressure can then make the fuel vaporise. I must say I've only heard a couple of cases of this but it is something worth bearing in mind, particularly with a low-wing aircraft. But if you are starting the engine after a long period in the sun, you should run it for a good time before attempting to take off to make sure that the fuel is flowing correctly into the carburettor.

Alcohol
Again we come back to the same problem of added alcohol which can have a problem with fuel hoses; carburettor membranes et cetera. Fortunately the Russian engines are designed to work on generally very low quality fuel, and this isn't a problem. But it does affect various older cars not designed to cope with alcohol. And of course the alcohol further increases the volatility of the fuel. However a very important concern should be noted in that the ethanol is quite strongly hygroscopic – that is it will attract and blend with water. So firstly this is not good in terms of engine running,

but also potentially will corrode metallic parts in which the water comes into contact. So firstly always leave your fuel tank as full as possible, so leaving less opportunity for atmospheric water to condense into the fuel, and secondly it is worth checking for water – this can be done by passing the fuel through "blotting paper" and the excess water will be obvious.

But the bottom line is that these Russian radial engines are tough; designed for poor fuel and typically fine with Mogas, but do note the reservations I mention above.