

Microbicide Fuel Additives

There has been a lot of confusion about fuel additives such as Prist preventing and treating fuel contaminant growth. Just as ice can clog filters, pumps and other vital engine parts, microorganisms can do the same. In addition, the acidic byproducts of these organisms can also corrode fuel tanks. So what can you do to prevent these problems? Are additives such as Prist enough?

Microorganisms can be found in all carbon-based environments and the hydrocarbon based fuel like JetA is among the best. Sure, the extreme temperatures used to refine fuels ensure that they are originally sterile and pure. But exposure to water and air, in a settled fuel tank for instance, can and will cause these microorganisms to grow. These organisms, called Hydrocarbon Utilizing Microorganisms (or HUM-bugs), live in the interface between the fuel and the water and metabolize the hydrocarbons in the fuel. Under ideal conditions, they can double their size every 20 minutes. If left unabated, they can quickly become a serious and costly problem.

All turbine fuels have some non-particulate water and when the fuel cools at flight altitudes, its ability to retain dissolved water decreases. This water then forms ice crystals or remains as a supercooled liquid, quickly freezing upon hitting fuel lines or filters. The fuel-additive Prist is primarily designed to lower the freezing temperature of the water found in the fuel systems of aircraft. But does it also act as a microbicide?

Before 1994, when the chemical was changed from ethylene glycol monomethyl ether (EGMME) to diethylene glycol monomethyl ether (DEGMME), Prist was certified as a pesticide with the EPA and was thus advertised as a microbistat—where “-stat” means retarding or controlling growth while “-cide” means killing the organisms off. It is unclear exactly how this chemical change affects Prist’s ability to act as a microbistat. But according to a study done by the Naval Research Lab, DEGMME can indeed be used as a microbicide. The catch is that you will have to use a concentration of at least 10% to kill most bacteria and at least 25% to kill everything. Nevertheless, it was concluded that DEGMME had the best antimicrobial properties of all anti-icing agents tested.

The manufacturer simply claims the economic constraints on “officially” recertifying Prist as a pesticide once it was chemically changed prohibited them from doing so. Prist’s website offers the following: “It is widely believed that DEGMME does have a retarding effect on microbial growth, however, we no longer officially claim this property for the Prist additive.”

Thus, we may surmise that while Prist has some ability to control or retard microbial growth, it alone should not be considered sufficient to combat microbial growth. Regardless of how confident you may be about Prist’s microbicide abilities, it would surely be unwise to take unnecessary risks with something as important as your fuel system. Additionally, the shortcomings of Prist as a microbicide become clearer by pointing out that the manufacturers of Prist and the microbicide, Biobor JF, are in the process of trying to develop a joint product.

But for now, the more assured solution to microbial growth is to supplement your fuel with products specifically designed to act as microbicides. Biobor JF or Micronol B.C. 220 are both good additives. Micronol, for instance, partitions into both the water and the fuel phase, entirely killing all bacteria within 72 hours.

To summarize, the DEGMME in Prist can be considered a microbiostat when mixed in its usual anti-icing concentration with jet fuel but alone should not be considered sufficient in the long-term prevention or treatment of microbial growth. Your best bet is to use an antimicrobial additive, at least occasionally, in addition to an anti-icing additive.

For more information on some particular products, as well as a link to the study done by the Naval Research Laboratory, check out the links below.

Link to Biobor JF website-

http://www.hammondscos.com/print.asp?p_id=biobor&p_header=Biobor+JF

Link to Prist's website-

www.pristaerospace.com

For a list of Aranol products-

<http://www.aranol.com/products.html>

For a copy of the Naval Research Labs study-

<http://aem.asm.org/cgi/reprint/35/4/698.pdf>

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