



BIOBOR[®]JF

GENERAL INSTRUCTIONS

For the use of Biobor[®]JF

Biobor[®]JF is best used with a fuel management plan. Included in this regular maintenance schedule should be daily inspection routines. The plan for Biobor[®]JF use includes correct dosage, frequency and method of applications.

Maintenance includes the care of the fuel and the fuel system. Of prime importance is the frequent and regular removal of water from both the storage tank and vehicles. Check tanks for uneven bottoms which cannot be drained.

Inspect fuel for quality. Check storage tanks, fuel systems and vehicle's operational tanks for microbes. Early detection prevents damage, and allows for easier treatment with Biobor[®]JF.

Proper fuel management is necessary to control microbial growth, but as with the use of preservatives to prevent food spoilage, some other insurance is needed. Biobor[®]JF is that insurance.

Biobor[®]JF is a powerful, safe and effective biocide for fuel. When used correctly, it will bring a fuel system to sterility and keep it that way. The necessary information and steps are outlined below.

1. Correct dosage
2. Careful addition injection to the system
3. Suitable contact time
4. Frequency of use

There are two (2) levels of addition; a shock dose for contaminated or at risk systems, and the maintenance dose for clean, less risky systems.

The meaning of a contaminated system is obvious. Microorganisms have been identified or contamination highly suspected because one or more of the following exist:

1. Slime has been found on the filters
2. Slime has been found on the surfaces
3. A problem has developed with fuel lines plugging

Once one of these preliminary symptoms is noticed, a fuel sample should be taken and tested. One of the industry wide, recognized tests for the existence of harmful Hydrocarbon Utilizing Microorganisms is the HUM-Bug Detector[®] Kit, also available through Hammonds Fuel Additives, Inc., Houston, Texas.

A system is at risk if one or more of the following conditions exist:

1. The fuel will be stored or the vehicle is not in constant use.
2. Fuel quality is suspect. (Some fuels are heavily contaminated due to improper handling).
3. The vehicle operates in warm, humid areas.
4. Past history of the vehicle or ship indicates a continuing potential for problems.
5. Condensation with wide variations in day/night temperature, spring and fall may be higher risk times.





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Systems can be a lower risk under the following conditions:

1. Fuel is bought with good quality assurance and is maintained carefully with frequent inspections.
2. Vehicles are used frequently (this only lowers the risk slightly).
3. Tanks are sumped frequently and regularly and/or have water removal systems.
4. Past history indicates problems of contamination are rare.
5. Winter will slow the growth rate (most microorganisms slow their growth rate in the cold).

Note: Microorganisms are not killed by cold, only put into a dormant state.

Assessing risk is a judgement matter. Manufacturers have to be taken into account, and are necessarily different for each case. The highest dosage level of Biobor®JF ever recommended is 270 parts per million (PPM). This level is approximately equal to one gallon of Biobor®JF for 5,000 gallons of fuel. The 135 PPM dose may not be strong enough to clean a contaminated system.

There are two (2) factors of consideration when using Biobor®JF.

1. Biobor®JF must reach all areas of a system to be effective.
2. The fuel/water Biobor®JF system is a complex one, and Biobor®JF needs to be distributed evenly throughout.

The most reliable way to get Biobor®JF into the fuel is by metered injection. With proper metered injection, Biobor®JF is blended instantly to the correct dose so there are no areas in the tank that get high or low levels, and the problem of solids formation is avoided. (The subject of solids formation is discussed at length in the Hammonds Service Bulletin 682). There are several manufacturers of metering systems who can be consulted on the details of the equipment available. Hammonds Technical Services, Inc. in Houston, Texas, manufactures fluid injector systems which are compatible with this product and are operated independently of any other equipment.

If the use of an injection system is not possible, there are other options. A batch may be made to predilute the Biobor®JF. The batch should not exceed 1,000 PPM, so something as large as a tank truck may be needed to perform batch blending. Some operators have been making a much more concentrated blend, several ounces of Biobor®JF in two or five gallons of fuel. This method is definitely not recommended! Fuel will ordinarily contain enough water to react with the highly concentrated Biobor®JF. This may appear as haze, precipitate, or through the formation of separate liquid layers. Limiting the blend to 1,000 PPM avoids the problem of precipitate and loss of Biobor®JF activity.

A second method is direct addition to the top of the tank. If this method is used, check to see if there is fuel under the access hold. Biobor®JF should never be poured into an empty tank or into a thin layer of fuel. If possible, dribble it in the tank which is being filled. If pouring in from the top, make sure there is at least half a tank full and add while fuel is flowing in. This will blend and dilute it to get the desired results. Treating the storage tank instead of the vehicle is the most efficient way to batch-blend Biobor®JF.

Everything in the system (pipes, trucks, filters and meters) will be kept free of contamination. Also, if a mistake in under-dosage is made, it can be corrected before the fuel reaches the vehicle or ship.

Biobor®JF is a metabolic poison for microorganisms. That is, it has its effect on the metabolism and/or multiplication of the individual cell. Before it can kill them, it has to cross the exterior walls and membranes of each cell. This takes a few hours. A few more hours are needed for the metabolic activity. Therefore, a certain contact time is needed for a complete kill.

Depending on the severity of the infestation, results may be seen in as little as 16 hours but can require as much as 72 hours in order to provide a complete kill. This is of no matter for storage tanks that are idle, but it becomes a problem for vehicles in active use. In order to reach the desired contact time, many possibilities have to be considered, and a careful plan worked out. Factors in the plan include:

1. Treating after the last use of the day, so that evening hours are available for contact.
2. Treating during scheduled maintenance, when the vehicle is idle for a day or two.
3. Treating at two or more successive stops on the schedule to ensure the necessary time.

Frequency of treatment is perhaps the most difficult aspect of Biobor®JF treatment. Many operators use Biobor®JF more or less continually, but this option is not open to all users. The system has to be treated often enough to keep microorganisms in check. The goal is to never allow microorganisms to grow long enough to cause any damage.



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Determining how often this is, is based on many factors:

1. The limit of risk for the system
2. Historical incidence of contamination
3. Level of maintenance
4. Source of fuel
5. Weather in the operating area
6. Use pattern of the vehicle or ship

Again, this is a judgment situation. Frequency may become individualized to a system, location, or even to a single tank on any individual piece of equipment.

A new schedule may at first be arbitrary. Experience will show whether or not the treatments are frequent enough. Should inspection show signs of growth contamination, then the system must be treated more often. A tank going into storage should be treated. No second treatment will be needed until the fuel is burned off or drained.

Service Bulletin No. 682, for aircraft use should be consulted before using Biobor®JF. Material Safety Data Sheets are also available.