



Biobor® JF

Diesel and Jet Fuel Microbicide

Benefits

Biobor® JF is a liquid fuel additive that combats fungus and other microbial life in hydrocarbon fuels, such as diesel and jet fuels, but is also effective in light oils and transmission fluid. **Biobor® JF** eliminates growth of harmful slime-producing fungi that clog filters and pipelines, attack rubber fuel system components and whose waste products aid in the corrosion of metal surfaces. **Biobor® JF** is simple to use and harmless to the wide variety of fuel system parts, top coatings, sealants and elastomeric materials tested. It does not adversely affect fuel performance in engines. **Biobor® JF** is an effective microbicide because of its equilibrium solubility in both fuel and water under conditions of fuel storage.

Applications

Biobor® JF is used by a large number of aircraft manufacturers, airlines, marines, trucking fleets, railroads, bulk storage terminals, fuel suppliers and by other users of hydrocarbon fuels and oils exposed to the possibility of contamination by fungus and bacteria.

Treatment Procedures

If a system is badly contaminated, drain water bottoms. Water bottoms in storage tanks should be kept to a minimum. Good housekeeping is important in treating slime problems, but it is not a cure. **Biobor® JF** is used at 270 ppm in fuel to effect sterilization, and subsequently at 135 ppm to maintain fungus-free fuel. Ideally, **Biobor® JF** should be metered. However, in the absence of metering equipment, **Biobor® JF** may be manually batch-blended. If batch-blended, as in tank trucks or small aircraft wing tanks, **Biobor® JF** should be introduced while the tank is being filled and after the tank is approximately 1/2 full. This will ensure faster and more complete dispersion.

Container Sizes and Dosage Rates

Biobor® JF is available in 8 oz. and 16 oz. Easy Squeeze containers, designed to dispense the exact measure every time, along with one quart cans, 5 gal. pails and 55 gal. drums. Use the following chart to calculate how much **Biobor® JF** you need for proper fuel treatment.

Fuel to be Treated (in gal.)	40	50	60	100	300	500	2,500	10,000	50,000
Biobor® JF (in oz.)	1/2	3/4	7/8	1 1/4	4	7	32	1 gal.	5 gal.
Maintenance Dosage									
Shock Treatment	1	1 1/2	1 3/4	2 3/4	8	13.5	64	2 gal.	10 gal.

Storage and Handling

All **Biobor® JF** containers must be kept closed from the atmosphere. Protect **Biobor® JF** from any water contamination. **Biobor® JF** is classified as a flammable and is shipped as a FLAMMABLE LIQUID N.O.S. (NAPHTHA) UN 1993, Class 3.3, PG III.

Other Hammonds Products

Ask your Distributor about other Hammonds products:

- ▶ **Select3®**
- ▶ **Select3® with LubriBor®**
- ▶ **ColdFlo®**
- ▶ **ColdFlo® with LubriBor®**
- ▶ **LubriBor®**
- ▶ **HumBug Detector® Kit**
- ▶ **Fizzy®**
- ▶ **Fuel-Dri**

Questions?

For answers to any questions on fuel additives, or to locate the Hammonds distributor near you, call us at (800) 548-9166.

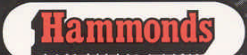


We Put Technology In Your Tank.™



Biobor® JF kills Hydrocarbon Utilizing Micro-organisms (or, HUM Bugs) which cause fuel tank contamination.

- ▶ Specially formulated for diesel and jet fuel
- ▶ Considered the industry standard in killing microbial growth
- ▶ Recommended by airframe and equipment manufacturers around the world
- ▶ MIL-S-53021A



Hammonds Fuel Additives, Inc.™
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HUM-Bug[®]

Detector Kit for Microbial Growth in Fuel and Oils

Microbial Growth in Fuel?

Microbial growth in fuel poses a serious hazard to both equipment and fuel storage tanks. This growth can clog filters, fuel lines, and cause damage to fuel quantity probes. It can cause corrosion in tank bottoms, erosion of fuel pumps and even foul injectors. Mats of growth can even prevent water and particulates from settling out of the fuel. Early detection of this microbial growth is absolutely critical for proper fuel quality control. Early detection can prevent costly downtime and equipment repair or replacement.

Early Warning

The **HUM-Bug Detector[®] Kit** is a low-cost, easy to use early warning detection procedure that will identify "Hydrocarbon Utilizing Micro-Organisms" (commonly called HUM-Bugs) in all hydrocarbon fuels and oils. These "Bugs" are the villains that cause the serious hazards associated with microbial and fungal growth in fuels. The **HUM-Bug Detector[®] Kit** will detect the microbial growth in its earliest stages if used in a planned quality control program.

How Do Microbes Grow?

When fuels are refined, the extreme temperatures ensure that the product is sterile and pure. But, once it has been delivered to a settling tank where it might encounter water there is a potential for Hydrocarbon Utilizing Microorganisms to grow. These HUM-Bugs, live in the interface between the fuel and the water. They utilize the hydrocarbons in the fuel or oil as their food source. As they feed and multiply, they chemically alter the fuel and produce acidic waste by-products which cause fuel tank corrosion. Under ideal conditions, they can double their size every 20 minutes. Detection of HUM-Bugs is imperative if costly problems are to be avoided. Although there are well over 250 types of organisms which might be found in hydrocarbon fuels, there are fewer than a dozen which may be considered harmful. Early detection will allow you to take positive measures with a biocidal additive to eliminate the problem. We recommend the use of **BIOBOR[®] JF**, the industry standard for the elimination and prevention of microbial growth in fuels and fuel oils.

Kit Description

The **HUM-Bug Detector[®] Kit** consists of a sterile hypodermic sampling syringe and a bottle containing a hydrocarbon fuel, a nutrient and a dye indicator. A fuel or water sample taken from the bottom of the tank is injected through the septum seal of the test bottle. The mixture should be shaken vigorously and placed in a dark location at room temperature. Depending on the type and degree of contamination, the nutrient dye will turn a pink or red color in as little as 12 hours. However, observations should continue for a period of one week. If the sample is free of harmful HUM-Bugs, the fluid in the test bottle will remain clear. Detailed instructions are enclosed in each **HUM-Bug Detector[®] Kit**.

Other Hammonds Products

Ask your Distributor about other Hammonds products:

- ▶ **Biobor[®] JF**
- ▶ **Select3[®] with LubriBor[®]**
- ▶ **ColdFlo[®]**
- ▶ **LubriBor[®]**
- ▶ **ColdFlo[®] with LubriBor[®]**
- ▶ **Select3[®]**

Questions?

For answers to any questions on fuel additives, or to locate the Hammonds distributor near you, call us at (800) 548-9166.

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We Put Technology In Your Tank.[™]



HUM-bug Detector[®] Kit detects microbial growth in fuels at an early stage and should be utilized as an "Ounce of Prevention".

- ▶ Low-cost, easy to use
- ▶ Early-warning detection of growth
- ▶ Detects microbial growth in all hydrocarbon fuels and oils
- ▶ Detects fungal growth in its earliest stages



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HAMMONDS FUEL ADDITIVES, INC.

“BUGS IN MY FUEL”

Answers to the Most Frequently Asked Questions on Microbial Growth in Fuel

What are microorganisms, or bugs?

The scientific names for the types of organisms that live in petroleum products are Cladosporium Resinae and Pseudomonas Aeruginosa. The organisms are either air or water borne and contaminate fuel systems by entering through vents, standing water in sump bottoms, dissolved “free water” or trash incurred during transport or delivery. They grow at incredible rates with some varieties having the ability to double in size every 20 minutes.

What do these bugs do?

These slimy bugs live and multiply in the fuel / water interface. They actually exist in the water and feed off the hydrocarbons in the fuel. They are referred to as Hydrocarbon Utilizing Microorganisms, commonly known as HUM-Bugs. As they grow, they form mats that are dark in color and appear gel-like. Their waste produces water, sludge, acids and other harmful by-products. Microorganisms will also consume rubber gaskets, o-rings, hoses or tank linings and coatings for their mineral contents.

How do I know I have bugs?

The signs of microbial growth can vary. Some of the obvious signs are clogged filters, loss of engine power due to fuel starvation because of plugged lines, contamination on tank bottoms, fuel with a sulfur smell and tank access lids with green or brown slimy formations.

A more definite appraisal may be made with the use of a microbe detector kit. An easy-to-use test kit is the HUM-Bug Detector[®] Kit available through Hammonds Fuel Additives, Inc.

Why do I need to control microbes in fuel systems?

A sterile fuel system is one with lower maintenance costs. That translates to reduce equipment disruptions, or downtime due to fuel system complications. The elimination of bugs in both storage and equipment tanks will also produce the chances of leaking tanks due to corrosion from microorganisms’ acid waste products.

Isn’t good fuel management and proper “housekeeping” enough to avoid problems?

Keeping petroleum products dry and clean is essential to any well-maintained storage operation. The monitoring of water bottoms and removal of trash and particulate matter is very important. However, the highest standards of housekeeping will not ensure the absence of microbial infestations and associated problems. Microbial spores can exist in a dormant stage for extended periods of time, waiting for trace amounts of water or improved growing conditions.



HAMMONDS FUEL ADDITIVES, INC.

What should I do if I find I have a bug problem?

Blend BIOBOR[®] JF into your fuel tank at the recommended 270 PPM by weight. Allow the tanks to be uninterrupted for at least 24 hours. 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. Place tank back in operation and monitor filters for residual build up. Once BIOBOR[®] JF has done its job of exterminating the infestation, the remains might appear as coffee grains in the bottom of the tank.

Once I have a sterile tank and fuel system, how can I prevent these problems from happening again?

The use of BIOBOR[®] JF at a rate of 135 PPM is a preventative measure and will deter any future infestations. BIOBOR[®] JF Fuel Additive will correct and prevent microorganism contamination in petroleum products. Periodic fuel testing with the Hum-bug Detector[®] Kit will also verify the effectiveness of the BIOBOR[®] JF additive.

Aren't there other products on the market that can cure the problem and do other things in addition?

Yes, there are other products on the market, some that have a list of problems that they propose to cure. However, when a product is formulated, it can have many different ingredients designed to do many different things. When this is done, it is difficult to get enough of any one ingredient to perform any job well. BIOBOR[®] JF is specifically designed to do one job, and do it very effectively without being harmful to the user, the fuel or the environment.

Why is Biobor[®] JF so effective?

As you may have noted from the can label, BIOBOR[®] JF is registered with the EPA as a pesticide. Any additive which has the proper amount of the effective ingredients with dosages strong enough to truly "kill" or eliminate a growing organism, must have its contents and label approved and registered by the EPA.

How can I find out more about Biobor[®] JF?

Call or write **Hammonds Fuel Additives, Inc.** at:

HAMMONDS FUEL ADDITIVES, INC.
15760 WEST HARDY ROAD, SUITE 400
HOUSTON TEXAS 77060-3147
PHONE: 281 820 5674 OR TOLL FREE 800 548 9166
FAX: 281-847 5129

We will be glad to send you additional technical data, or have our Marketing Technical Services Department visit with you to discuss your particular problem and solution.



HAMMONDS FUEL ADDITIVES, INC.

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 is 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 sip indicates a continuing potential for problems.*

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