



BUGS,

A Growing Problem



Microbial growth, or bugs, is a very serious problem. It starts with water and there is always some amount of water in diesel fuel storage systems from various sources such as;

- Vapor recovery, as part of the Clean Air Act, introduces water vapor into the fuel
- Condensation occurs due to temperature changes in the fuel storage tank
- The process to create ULSD uses water and some residual moisture remains

Microorganisms naturally occur in water. Water is the perfect habitat for the microorganisms (bugs) to thrive. Once the fuel is placed into a storage tank and sits idle, the water separates from the fuel. Without proper treatment, the bugs begin to grow and deteriorate the fuel leading to several problems outlined below.

How do the bugs grow? Because there is water and a food source, the diesel fuel, fuel storage tanks are a perfect breeding ground for microorganisms (bugs). The bugs have an abundant food supply, they feed off the hydrocarbons in the fuel. The “rag layer” indicated below is the emulsion of water and fuel supporting the growth of the bugs. Once the bugs begin to grow they double in population every 20 minutes. As the bugs multiply they produce waste products. The waste products produce sludge, acids and other harmful by-products impacting the fuel and the storage tank. Eventually a black, brown or green slime will form clogging filters, corroding metal and causing hoses to swell and blister.

Fuel _____

Rag Layer _____

Water _____

Sediment _____



Does my fuel storage system have Bugs?



To determine if the fuel storage system has bugs a sample of the fuel needs to be pulled from the bottom of the tank. Typically this is performed using a device called a Bacon Bomb or fuel thief as shown. The sampling device should be properly cleaned prior to collecting the tank sample to avoid cross contamination of the sample. Some of the fuel will be used for the Microbial Cult test and the remaining fuel may be used to perform cold filter plug point, pour point and cloud point tests. Contact your Penray Fuel Doctor to explain the process and schedule a fuel sampling appointment.

Warning Signs: In addition to the fuel sample analysis, several symptoms may indicate a problem. Examples include slow flow rate from the dispenser, clogged dispenser filters, sulfurous odor (rotten-egg), leopard type spotting on a fuel filter and slime coating on metal parts or blistered hoses. If any of these symptoms are present the fuel storage system is no longer healthy and requires immediate attention.



How are the bugs killed? Biocides are regulated and registered by the EPA. Biocides are designed to kill and control bacteria, fungus and mold in fuel. They only address problems with living organisms in the fuel storage system, biocides do not address problems associated with oxidation that lead to sediment and gum. Penray carries ValvTect® Bioguard® Microbiocide, an EPA registered biocide which is used to kill and control bugs in the fuel storage system. ValvTect® Bioguard® Microbiocide works quickly in as little as 2-3 hours. The dead bugs will fall to the bottom of the storage tank and should be removed with the water to prevent additional fuel filter clogging. To prevent the growth of new bugs, regular treatment with ValvTect® Bioguard® Microbiocide several times a year and regular checking and removal of water is recommended.

Application: ValvTect® BioGuard® Microbiocide should be used in fuel storage tanks including marinas, auxiliary diesel generators and railroad diesel tanks. Used as directed, ValvTect® BioGuard® Microbiocide will reduce tank corrosion, foul odors, slime, clogged filters and premature hose/gasket wear. Effective in all diesel fuels including Ultra Low Sulfur Diesel (ULSD), biodiesel and biodiesel blends.

PRODUCTS

ValvTect® BioGuard® Microbiocide:

ValvTect® BioGuard® Microbiocide quickly stops microbial activity in the tank before the fuel works its way into a vehicle, ensuring that the engine runs smoothly and the entire system is protected from any side effects of microbial activity.



Features and Benefits:

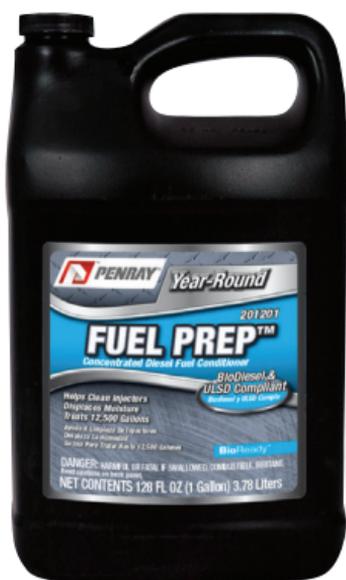
- Effectively kills bacteria, fungi and other microorganisms that live and grow in diesel fuel systems
- Prevents filter plugging, sludge, slime, acid and corrosion caused by bacteria
- Dual soluble (fuel & water) for maximum effectiveness. Treating storage tanks = treating saddle tanks
- Biocide works quickly: as little as 2-3 hrs vs. 24-36 hrs needed by competitive products
- Safer chemistry than competitive brands
- Effective in all diesel fuels, including ULSD and Biodiesel

Part#	Size	Qty/ Case	Container	Treat Rate
BGDULS2016OZ	1 Pint	12	Bottle	Kill: 1 ounce to 20 gallons Maintenance: 1 ounce to 60 gallons
BGDULS201GAL	1 Gallon	2	Bottle	Kill: 1 gallon to 2500 gallons Maintenance: 1 gallon to 7400 gallons

PRODUCTS

Penray Fuel Prep™ Year-Round Concentrated Diesel Fuel Conditioner:

Penray Fuel Prep™ Year-Round Concentrated Diesel Fuel Conditioner helps maintain healthy fuel after treatment with ValvTect® Bioguard Microbiocide.



Features and Benefits:

- Helps separate water from fuel reducing conditions for microbial growth
- Cleans dirty injectors helping improve fuel mileage
- Enhances fuel lubricity reducing premature failure of injectors and pumps
- Improves fuel stability reducing filter plugging
- Facilitates a cleaner engine extending diesel particulate regeneration cycles

Part#	Size	Qty/Case	Container	Treat Rate
201201	1 Gallon	4	Jug	12,500 Gallons
201205	5 Gallons	1	Pail	62,500 Gallons

Maintain Healthy Diesel Fuel Year-Round!



Penray Fuel Dr. Plan

For Bug Free Healthy Fuel!



For additional info on the Penray Fuel Doctor Program & Treatment products:

- Contact your regional Fuel Doctor or call Penray at 800.373.6729
- Schedule a fuel check-up
- Penray Fuel Dr. will visit your site to collect samples for analysis
- Results will be available within 10 days
- Your Penray Fuel Dr. will discuss the results, recommend treatment and ensure your fuel is healthy

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References: Marathon Petroleum Company, Beware of Bugs, BP, Long Term Storage of Diesel, 2005, Fuel Technologies International, Is My Stored Diesel Ready for an Emergency, 2010, American Petroleum Institute, Publically-Available Microbial Information

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