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Liquid Intelligence Microbial Field Fuel Test Kit

Detection of Bacteria, Yeast and Mould Contamination in Diesel

THE PRINCIPLE

Liquid Intelligence Diesel Fuel Dip-slide Test Kits are a combination double sided slide for the detection of bacteria, yeasts and moulds in diesel fuel. This slide provides a simple means of detecting micro-organisms in diesel fuel tanks. Liquid Intelligence Diesel Fuel Dip-slide Test Kit comprise of a simple agar double sided slide contained in a plastic sterile test tube. The lighter colour side of the dip-slide comprises a nutrient agar for growing bacteria cultures. The darker coloured side is comprised of a formulated agar that will grow yeast and mould cultures. Yeast appears as low round white or grey discs, mould appear as furry colonies.

MICROBIAL FIELD TEST INSTRUCTIONS

1.	Obtain diesel sample from the bottom of the fuel tank or from the fuel filter or water separator.
2.	Remove the double sided slide from black storage container. Be careful not to touch the slide surfaces.
3.	Immerse the test slide into the fuel sample for ten seconds, ensuring that both sides of slide are fully coated.
4.	Drain excess fuel from test slide by touching the slide tip on a clean paper towel.
5.	Replace the slide into black storage container and tighten cap. (Bacteria, yeast and mould grow best in the dark.)
6.	Place the black storage container in a warm place (30°C to 35°C) for at least 24 hours. One side of the slide is white. This will detect BACTERIA between 24 and 36 hours after exposure. The other side of the slide is off white. This will detect MOULD and YEAST between 36 and 48 hours after exposure. Note that higher temperatures may inhibit bacterial growth. In the case of negative results, incubation for a further five days can be carried out to detect any slow growing strains. After incubation, the slide surfaces are simply compared against the chart to obtain the contamination level of the bacteria, yeast or mould in your diesel fuel.



INTERPRETATION OF RESULTS

Compare the slide surface against the comparison charts printed on the side of the black storage container.

Any reaction requires immediate action. Bacteria and fungi will form insoluble particulate matter that can clog fuel filters, resulting in fuel starving and engine stoppage. They can also corrode metal surfaces, including storage tanks and pumps, and will form organic acids that contribute to fuel instability.

Liquid Intelligence has a range of broad spectrum biocide treatments for killing bacteria in diesel fuels.

LIQUID INTELLIGENCE 202/201 DIESEL FUEL

Bacteria & Fungi Biocide Treatment for killing bacteria in Automotive & Marine Fuel Tanks.

Microbes in the form of bacteria and fungus are present in all diesel fuels. Long periods of fuel storage can create ideal opportunities for microbes to grow in fuel tanks. The first indication of microbial contamination is mucous-like accumulations on fuel-filters and increased requirements for fuel-filter replacement. Microbes can only be removed from the fuel system by use of a diesel fuel biocide.

CHARACTERISTICS

- **Liquid Intelligence** 202 Dual-Phase biocide is effective in both diesel fuel and water as recommended by major diesel engine manufacturers
- **Effective** as a "quick-kill" biocide and for long-term diesel fuel maintenance
- **Kills microbes**, bacteria and fungi, that grow in dispersed and free water associated with diesel fuels
- **Prevents** fuel filter plugging – helps prevent fuel system failures
- **Protects** fuel system components against organic acids created by microbial growth – prevents fuel tank corrosion
- **Improves** fuel performance
- **Reduces** engine maintenance costs.

Liquid Intelligence 202/201 Dual-Phase Biocide is one of the most advanced Biocide on the market today. It works not only in water but in diesel fuel and is formulated for a Quick-Kill of bacteria.

To remove bacteria, fungi, sludge and water from the fuel system, use the following procedure to achieve a complete microbial clean-up.

- Pump or drain fuel contaminants (microbes, water and sludge) from the bottom of the fuel tank until diesel fuel appears. Dispose of fuel system waste in an environmentally responsible manner.
- When calculating the amount of additives required for your specific application, always use the total fuel capacity of the tank (if the total capacity of the tank is 2000 litres, but the tank only contains 1000 litres of diesel fuel, you would use enough additive to treat 2000 litres of diesel fuel).
- **KILL DOSE**-Add 1 litre of biocide per 1000 litres of diesel for fungi or bacteria contaminated fuel. Add diesel fuel until fuel tank is filled to maximum capacity. The addition of diesel will mix the additives with the fuel.

BIOCIDAL PROPERTIES

Liquid Intelligence 202/201 has a broad activity spectrum against the bacteria and moulds that may cause infection and deterioration of diesel fuel products, including the following organisms:

BACTERIA	FUNGI
Achromobacter sp.	Asperigillus sp.
Aeromonas sp.	Cephalosporium
Alcaligenes sp.	Cladosporium sp.
Bacillus sp.	Fusarium sp.
Escherichia coli	Paecilomyces varioti
Flavobacterium sp.	Penicillium funiculosum
Klebsiella sp.	
Proteus sp.	
Pseudomonas sp.	
Streptomyces sp.	

To keep storage tanks free of microbial growth, treat with Liquid Intelligence 202 biocide at the recommended maintenance treatment (see chart below) ratio every three months.

Liquid Intelligence 201	SHOCK TREATMENT	MAINTENANCE TREATMENT
1 Litre	1000 Litres	2000 Litres

Q & A- LIQUID INTELLIGENCE 202 DUAL-PHASE BIOCIDES

Q: WHY IS A DUAL PHASE IMPORTANT IN A MICROBE OR FUNGUS CLEAN-UP?

A: Some biocides are diesel fuel soluble but do not kill in diesel fuel. These types of biocides only are effective in the water layer in the tank. To get a complete kill you need to be able to kill growth on the top and sides of the tank as well. If the fuel tank is filled with fuel and **Liquid Intelligence 202 Dual-Phase Biocide** is present in the fuel as recommended you will get a complete kill-off.

Q: ARE THERE ANY OTHER PROBLEMS ASSOCIATED WITH MICROBIAL AND FUNGAL INFESTATION BESIDE CLOGGED FUEL FILTERS?

A: Yes. Microbial growth produces organic acids which will corrode fuel tanks ultimately making them fail.

Q: SHOULD BIOCIDES BE USED REGULARLY IN MY FUEL TANKS OR ONLY WHEN GROWTH IS FOUND?

A: **Liquid Intelligence 202 Dual-Phase Biocide** should be used in a maintenance treatment schedule to prevent infestation. This will reduce long term maintenance cost associated with microbial and fungal growth such as corrosion and fuel filter plugging.

Q: HOW DO YOU KILL SERIOUS INFESTATIONS OF MICROBIAL AND FUNGAL INFESTATION?

A: Many times the only way to kill infestation and growth is to use **Liquid Intelligence 202 Dual-Phase Biocide** in shock treatment amounts. Normally that is three (3) times the maintenance levels. It is just like a swimming pool. If growth is on the sides of the pool the only way to clean and kill is to shock the pool with high amounts of chlorine. It is the same process with a fuel tank only with different chemicals.

FUNGAL CONTAMINATION OF DIESEL FUEL ON BOATS

Of all the users of diesel fuel the operators of boats are the most likely to encounter problems with fungus and bacteria for the following reasons:

- Boats operate in a wet environment and it is not always possible stop water seeping into fuel tanks.
- The fuel tanks on boats are designed to fit into restricted or unusually shaped areas to make the best possible use of available space. This can mean that they can be difficult to drain and often have areas where pools of water can collect and sit undisturbed.
- The fuel tanks contain baffles to stop the fuel sloshing about. The baffles can trap free water in small pockets.
- In warmer climates boats operate in areas with high humidity. Water in the air enters the boat tanks through the breather and condenses inside the tanks. Where water is present in pockets in the fuel tanks it will provide a site for fungus and bacteria to grow. Often the fungus or bacteria will develop for a long time without causing any problems until one day they become disturbed and stirred up into the fuel. This will be noticed when filters start blocking with a black slime which is the dead matter from the fungus and bacteria.

The fungus can be stirred up by:

- Vigorous movement due to a storm, etc.
- The fungus population reaches a size at which it grows out of its sheltered corner and spreads into the rest of the fuel.
- The natural life cycle of the fungus reaches a point at which dieback occurs and the dead matter starts floating in the fuel.
- The fungal activity reaches a point at which natural surfactants produced by the fungus cause water and dirt to be suspended in the fuel and the fuel becomes hazy.

PREVENTION

On land the normal prevention of fungal problems is to regularly drain any water in which the fungus can grow. This may not be possible in some boats because the fuel tank shape does not provide a common draining point for all water pockets.

An alternative is to consider a regular dosage of **Liquid Intelligence 202 Diesel Fuel Bacteria & Fungi Biocide Treatment**. **Liquid Intelligence 202** is suitable for treating volumes up to 10,000 litres. The treat rate for a maintenance dose is 1 litre to 2000 litres and to kill a contamination the treat rate is 1 litre to 1000 litres. Tanks treated with a dose of the biocide at every load will stop the fungus growing; regular maintenance should be carried out to remove the water. The water when removed must be treated as a waste because it will contain active biocide. It must not be allowed to run off into the storm water system. Biocides are poisons and should be handled according to the safety instructions on the pack, gloves must be worn when handling biocides.

TREATMENT

Should a tank become over infested with fungus then filters will start blocking with a black slimy deposit and the fuel may be hazy with water and dirt suspended in it. In such cases the biocide should be added to the fuel tank and then the fuel in the tank should be circulated to ensure that the biocide spreads throughout the fuel.

Following treatment, the water and dead fungus will drop to the bottom of the tank. It should then be drained off or sucked out with a hose; otherwise it will sit on the bottom until becoming stirred up in rough water and again block filters. Treatment should continue for a few loads until filter operation has returned to normal. In an extreme case it may be necessary to empty and enter the tanks to carry out manual cleaning.

DIESEL INJECTOR CLEANER WITH BIOCIDES

Liquid Intelligence 200 Fuel Additive is designed to enhanced diesel engine performance and reduces emissions. Efficient operation of diesel engines depends on proper operation of the fuel injectors. Control of deposits in this critical area is necessary to ensure optimum performance, minimize fuel consumption and engine smoke.

Liquid Intelligence 200 Fuel Additive Provides overhead lubrication for cylinders, pistons and valves, removes carbon from injectors and combustion area. Deactivators and anti-corrosion additives safeguard fuel systems; broad spectrum biocide prevents and dissipates all biological growths.

APPLICATION RATIOS

Diesel Hot Shot	500ml per 100L
Diesel Normal	250ml per 100L

CHARACTERISTICS

Liquid Intelligence 200 Fuel Additive is an ash-less Detergent. When added to fuels, **Liquid Intelligence 200** ash-less detergents, additives and inhibitors resist gumming and residue formation, this prevents clogging of injectors, build-up on, exhaust valves and filters.

Liquid Intelligence 200 provides upper Cylinder Lubrication by lubricating the upper cylinder, valves, valve guides, oil rings etc. 200's Special lubricant enables it to combine with the fuel before combustion and lubricate the upper engine parts. This reduces the accumulation of deposits on intake valves and maintains emission control system efficiency.

METAL DEACTIVATORS AND CORROSION INHIBITORS

Liquid Intelligence 200's metal deactivators protect copper in the fuel system and deactivate traces of copper from the refining process, if unchecked copper traces act as a catalyst for formation of gums and deposits. 200's Corrosion inhibitors impregnate the metal surfaces protecting the fuel system against corrosion extending filter, pump and injector life.

BIOCIDE ENHANCED

When temperatures are warm and moisture in the form of free water or humidity exists in fuel, normal dust can introduce spores to the fuel system. These spores can live in the water and feed on the fuel at the water fuel interface, or in high humidity can live in the fuel itself. The residue from these "fuel bug" colonies can block filters, damage injectors and pumps stopping the machinery causing downtime.

Liquid Intelligence 200 uses a dual range biocide, 1 part for disinfection of the water trap areas in fuel tanks and another part that stays suspended in the fuel preventing any fuel based infections.

Whether fuel tanks are bulk storage or vehicle, the addition of Liquid Intelligence 200 to your fuel system will prevent and dissipate all biological growths (fuel bug).