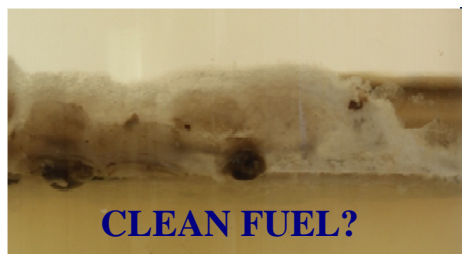


FUELSTAT MICROBIOLOGICAL CONTAMINATION TEST KIT



Rapid on-site test for the detection of H.res, bacteria and other fungi in Aviation Fuel



- ◆ **IATA APPROVED.**
- ◆ **RESULT IN 10 MINUTES, NO DELAY.**
- ◆ **EASY TO PERFORM. ON SITE TEST.**

- ◆ **NO LABORATORY REQUIRED.**
- ◆ **DETECTS ONLY ACTIVE MICROBES.**
- ◆ **EASY DISPOSAL, NON HAZARDOUS.**

Fungi and bacteria in Aviation Kerosene

It is widely recognised that micro-organisms can grow in hydrocarbon fuels by using the alkanes and fuel additives as a foodstuff, but the type of organisms and the resulting damage depends on the fuel and the additives. All contamination is important when considering fuel quality and particularly when monitoring stored fuel reserves. However, whilst a wide range of micro-organisms can be found in fuel systems and can cause damage, only a small number of specific microbes can seriously degrade fuel, and they tend to work together as a consortium.

The most damaging organism is the filamentous fungus, *Hormoconis resiniae* (*H.res*), previously known as *Cladosporium resiniae*, and it is present in approximately 95% of all contaminated fuel. Bacteria and other fungi, including some yeasts make up the other 5%.

But *H.res* is the most dangerous because:-

1. It produces far more biomass and so is more likely to cause blockage problems.
2. It is by far the most common cause of microbial corrosion in system components and aircraft tanks.
3. It usually starts on small water droplets, it then covers the droplet, holding it in place, and continues its growth, and actually generates more water due to its metabolism. In the process, it firmly attaches itself to surfaces (including tank walls). Bacteria and yeasts require free water and are found

mainly floating in the water phase. They are less likely to adhere to surfaces and will be significantly reduced during each water drain. But *H.res*, once established, continues to multiply in situ. High levels of bacteria and yeasts indicate that the fuel is of poor quality, and so are useful indicators, but this does not mean that they are causing any problem, and they will probably be significantly reduced at the next drain. High levels of *H.res*, however, indicate that there is a potentially serious and long term problem.



H.Res

Regular monitoring of fuel system contamination for *H.res* is important because it is the indicator species and the only organism that can stick to surfaces. It is also highly damaging to aircraft and fuel system components as explained earlier.

So Conidia Bioscience has developed the **FUELSTAT® resiniae PLUS test kit** in response to calls from operators and maintenance/repair companies for a real-time test for total microbial contamination in fuel tanks and systems.

What is so special about our FUELSTAT® *resinae* PLUS Test Kit?

Our test provides rapid screening of water/fuel samples, giving a quick and accurate assessment of *H.res*, bacteria and other fungi in the sample. This test is more accurate than the currently used 'rapid' growth-based and ATP tests.

The kit is an immunoassay test (like a pregnancy test), and this means that we detect contamination by "finding" material that is produced by the 3 different types of contamination that grow in fuel. We do not, therefore, need to capture a part of the living organism and grow it up. This is important because *H.res* does not just float around at the water/fuel interface, it is spread throughout the tank and it sticks to the bottom or sides of the tank. There is, therefore, a better chance of finding that compound in a small sample, so the results are more accurate and consistent.

Currently available fuel tests involving total microbial counts simply tell us that there are micro-organisms present in the fuel and that they are alive. Our test goes beyond this. It detects **active** *H.res*, bacteria and other fungi and tells us not only that contamination is present and alive but also that it is growing and there is real potential for damage. The kit will ignore any fungus that has been blown in from outside or has been growing on trees or other food sources, whereas other tests will grow whatever they find in the sample, whether it came from the fuel or not. They require sterile sampling conditions, and we just require that the sampling

equipment has no residue from the last test sample.

The **FUELSTAT® *resinae* PLUS test kit** measures the amount of active growth in the sample and provides action and alert levels which are defined by IATA.

Using the **FUELSTAT® *resinae* PLUS test kit** is quick and simple and it requires little training to carry out and interpret the results. It takes only 10 minutes to complete our test whereas other tests take a minimum of 2 to 3 days to give a full picture of bacteria and fungi contamination. Because fungal spores will not even show significant growth before 4 days, a complete answer using growth techniques takes 5 to 7 days. During that time the samples have to be incubated and may have to be monitored daily. ATP based tests, while rapid, show total contamination, and do not relate to actively growing organisms. The results from most of our competitors are deduced either by comparing colours or spot numbers with a chart or, if accuracy is required, counting under a microscope. In our test you look at the six lateral flow devices on the test kit paddle and read off whether you have negligible (never say nil), moderate or heavy contamination. The levels for moderate and heavy contamination appear in the IATA guidelines.

Most competitor's kits require special handling, certainly for safe disposal. Ours (apart from the fuel itself) can be disposed of by normal methods, or recycled if you have a plastics recycling policy.

The FUELSTAT® *resinae* PLUS Test Kit?

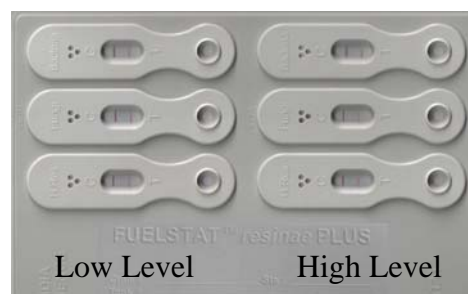
Our kit consists of the following:-

Step by step guide. Test paddle. Pipette. 175ml Bottle containing blue extraction fluid (which is water based). Dropper cap. Dessiccant sachet.



The fuel or water sample is added to the Bottle and mixed. When the blue fluid has separated from the sample, 4 drops of the mixture are placed into the 6 sample wells which are set into the paddle. Within 10 minutes the results will be displayed in the viewing windows. (See Detailed Test Procedure).

The Test Paddle.



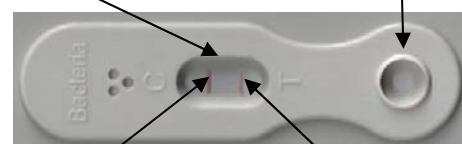
Bacteria

Fungi

H.Res

Viewing window

Sample well



Control Line

Test Line

Detailed Test Procedure.



• Open foil pack contents



• Take a sample from the lowest point in the tank



• Once settled, is there any free water?



Water Phase Test



• If enough water is free in the sample use the pipette to fill the bottle to lower line



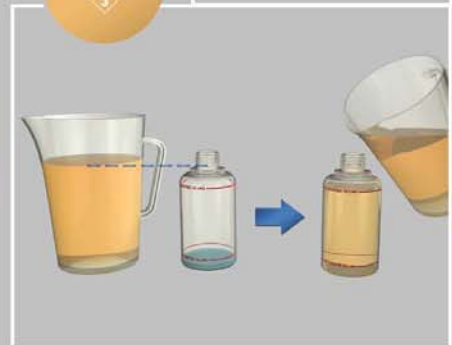
Mixed Water and Fuel Phase Test



• Use pipette to collect free water and put into bottle. If water does not reach lower line, fill to top line with fuel from the same sample



Fuel Phase Test

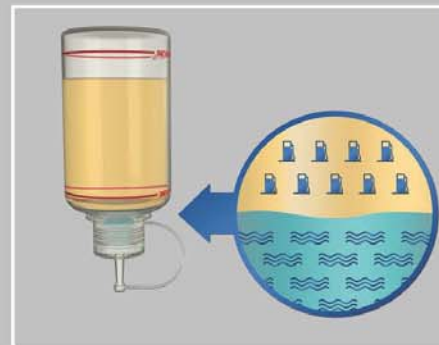


• If no water is visible in the sample, fill the bottle to the top line with fuel

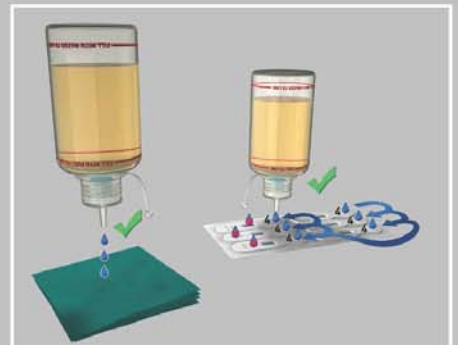


Shake for 5 seconds

• For all types of test, secure dropper cap and shake sample vigorously for 5 seconds



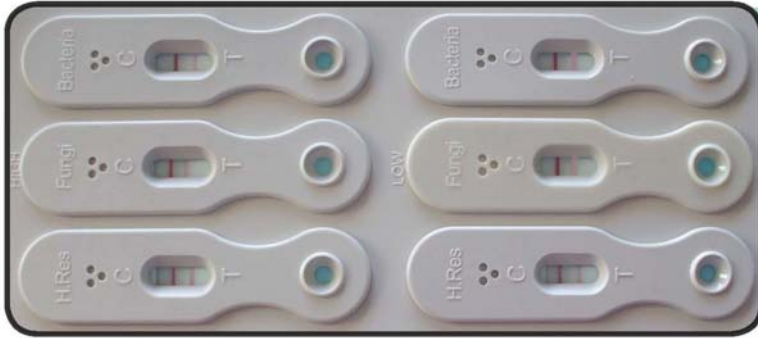
• Invert bottle and allow blue fluid to settle out of the fuel sample.
Note: For a water phase test the blue fluid will not separate from the sample



• Allow 3 drops to spill onto a tissue to clear the dropper then carefully allow 4 drops of blue fluid into each sample well ensuring no spillage into the viewing window

• Keep the paddle flat: the blue fluid will be seen to flow along the viewing window and, after a few minutes, a dark red Control line to the left of the viewing window will appear.

Test Results.



Negligible Result

If all 6 Control lines and all 6 Test lines are visible, this is a Negligible result, no action required.

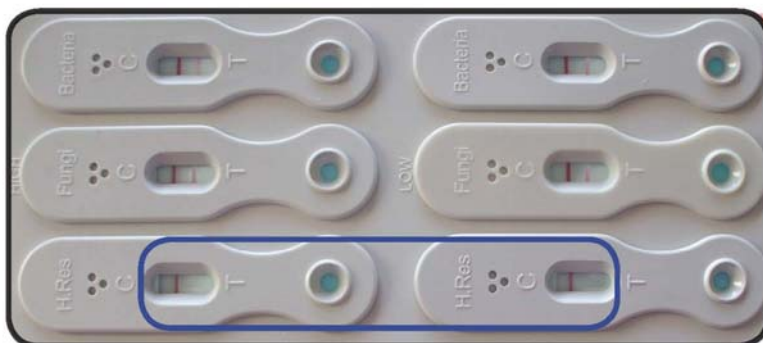
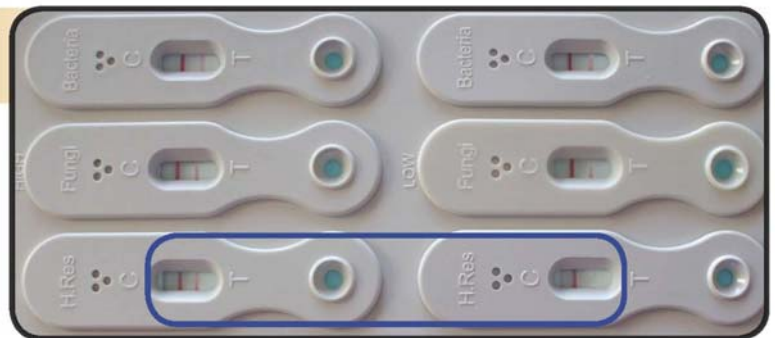
- This means that there is either no contamination or, if there is contamination, it is at such a low level that it requires no action.

Low Positive Result

MODERATE CONTAMINATION

If any of LOW test Lines are not visible on the low devices, this is a Low Positive result. Here the Test Line in the H.Res field is not visible.

- This means that there is contamination present and it is at a level that requires the application of biocide.



High Positive Result

HEAVY CONTAMINATION

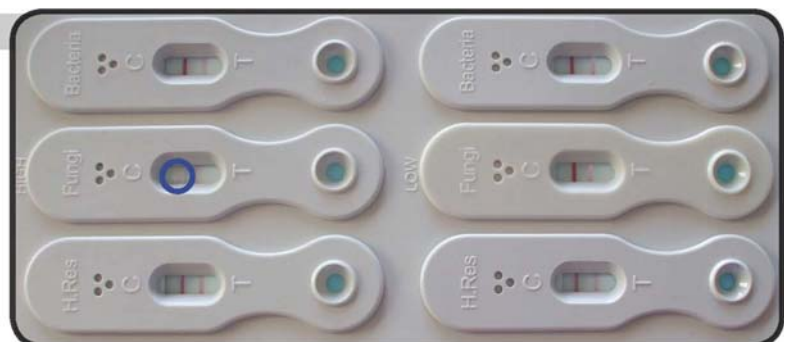
If the test result shows no Test Lines on any HIGH and their corresponding LOW devices then the test is a HIGH POSITIVE result.

- This means that there is contamination present and it is at a level that requires tank cleaning and the application of biocide.

Test Not Valid

If there is no Control Line visible on any of the 6 devices, then the test is invalid and must be run again using a new test kit.

- Retest even if there are lines opposite the 'T' (Test Line)



How To Order.

Part Number: 090100012. FuelStat Resinae Plus, FHR8-2.

Pack quantity: 8 tests.

Specification.

Kit contents: Test Paddle, Preparation Bottle, Plastic Pipette, Instruction Leaflet.

Packaging: Each test is sealed in a foil pouch. 8 tests per carton.

Test type: Immunoassay. Utilises lateral flow

technology and antibodies to H.Res, Bacteria and Fungi.

Test Duration: Approximately 10 minutes.

Maximum storage temperature: 30degC.

Shipping specification: 33x23x19cm, 1.35Kg.

Hazard Rating: Non hazardous.

Disposal: Normal domestic waste or recycling.

NATO Stock Number: 4940-99-615-6295.

For Diesel fuel test kits please contact our Sales Department.