

Instructions

This FUELSTAT® Plus test kit is designed to detect microbiological contamination in aviation, diesel and other middle distillate fuels.

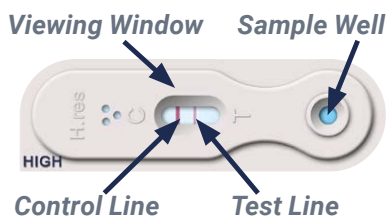
The test is based on antibody immunoassay technology that detects specific fuel degrading micro-organisms in a simple, rapid test that gives results in 15 minutes on-site.

Each heat sealed foil pouch contains:

- Test Plate: Plastic base with 6 lateral flow devices affixed
- Test Bottle: 175ml plastic bottle with flat cap and "dropper cap" containing 3.0ml of Sample Extraction Liquid
- Disposable, single use, plastic syringe and extraction tube and an alcohol wipe
- Instruction leaflet
- Note: a FREE FUELSTAT® Result app is also available for digital verification and sharing of the test result (page 3)

The test incorporates 6 devices, measuring high and low level contamination of *Hormoconis resinae* (H.res), bacteria and fungi which grow in aviation, diesel and other middle distillate fuel types and have potential to block and damage fuel systems.

Each device contains a sample well and viewing window. Results are shown by a Test Line (T), with a Control Line (C) to confirm the validity of the test for each device.



SAMPLE PREPARATION ADVICE

A microbiological test is only as good as the sample which has been taken. It is recommended that industry standards and guidance material such as ASTM D7464, ASTM D6469 are followed.

Take a sample from the lowest point of any tank or fuel delivery system. This is most likely to give the most representative result of microbiological contamination.

It is important that a clean sampling container* is used to minimise the risk of cross contamination. If using the same sampling equipment for multiple samples each item used should be cleaned prior to re-use with no less than 70% alcohol wipes (or other sterilisation method) and left to dry before reuse.

*HDPE Sampling Containers are industry standard

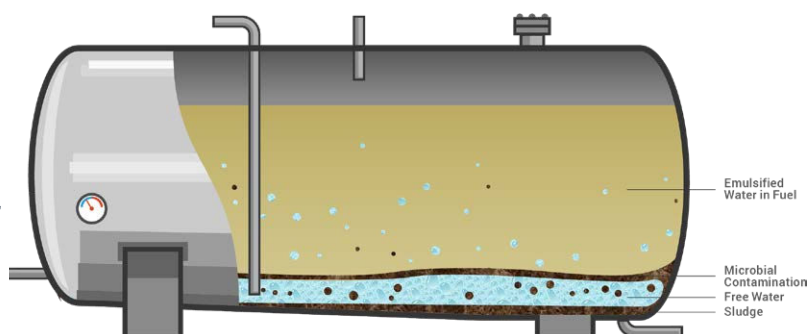
To perform the FUELSTAT® test you will require a minimum 200ml sample but 1 Litre may be more representative of fuel system conditions and is recommended.

IMPORTANT:

- **When possible, test the free water phase of the sample taken from the fuel tank. Testing the free water phase will provide more representative results than testing the fuel phase**
- **ASTM D6469 highlights that ideally all testing should be accomplished at the testing site within a few minutes of the sample being drawn, if not possible samples for microbiological testing should be kept on ice for transportation with testing performed within 4hrs and no later than 24hrs after sampling**

All microbes (bugs) require the presence of water to grow and proliferate in fuel systems. Consequently, microbes generally live in the bottom water ("water phase") within a fuel tank and in the fuel / water interface, feeding on the fuel and using nutrients within the water to grow. For the most representative determination of microbial contamination within a fuel system, it is recommended to test at least some of the water phase from a fuel tank. If you are conducting regular water draining it is strongly advised to test the water sample drained from the tank before disposal.

Within a fuel phase there may be a limited amount of suspended water available to sustain the growth of microbial communities, especially so for aviation fuels. Fuel only samples (where no free water phase is collected from the tank) are heterogeneous by nature, meaning there are variable levels of suspended water and microbial presence throughout the sample. This can lead to variable results where multiple fuel only samples are taken from the same fuel tank. As a result, a fuel only sample is less likely to be representative of the actual tank conditions, as in most of these cases there will be either a free water phase, pockets of water, or condensation present somewhere within the tank.





Doing the Test



1 Clean sample equipment using 70% alcohol wipes and let dry. Have the FUELSTAT® test kit contents at hand. Wear correct PPE, including Nitrile gloves and safety eyewear when handling fuel.



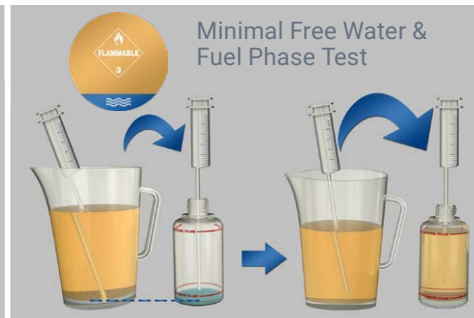
2 Take a **1 Litre sample** from the lowest point in the tank following OEM and industry guidelines (see sampling advice on page 1)



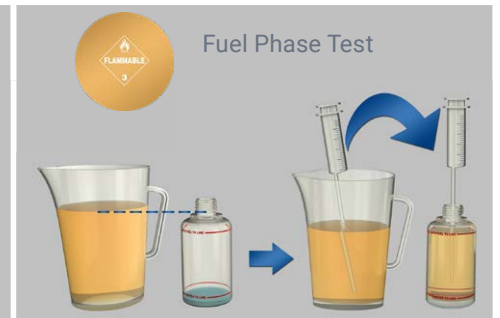
3 Agitate sample using a swirling motion and leave to **settle for 12-15 mins**. Once settled, is there any free water?



4 Free Water Phase Test
If enough free water in the sample, syringe free water into the FUELSTAT® test bottle to the lower line, marked '**Water line**'



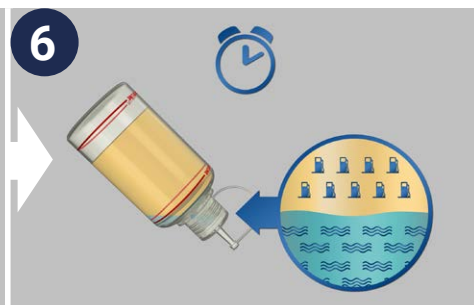
5 Minimal Free Water & Fuel Phase Test
If there is visible free water but not enough to reach the '**Water line**' when syringed into the FUELSTAT® test bottle, continue syringing fuel from near the bottom of the sample up to the top line marked '**Fuel line**'



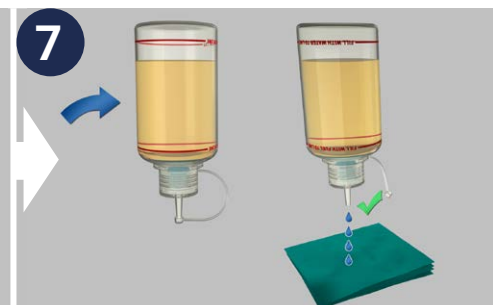
6 Fuel Phase Test
If there is no visible free water in the sample, syringe fuel from near the bottom of the sample into the FUELSTAT® test bottle up to the top line marked '**Fuel line**'



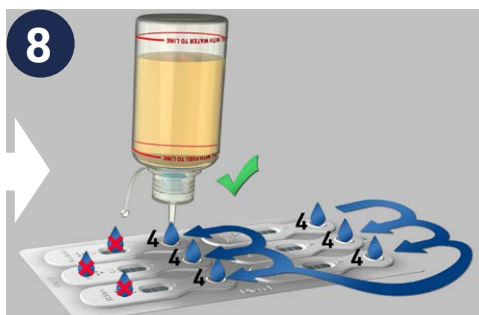
7 For all types of test, secure dropper cap and **shake sample vigorously for 5 seconds**



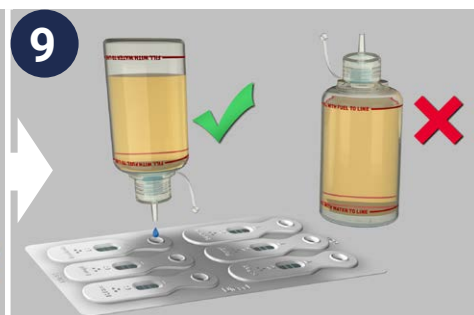
8 Invert test bottle 45° and allow the blue fluid to settle out in the shoulder of the bottle. NOTE: for a free water phase only test the blue fluid will not separate out



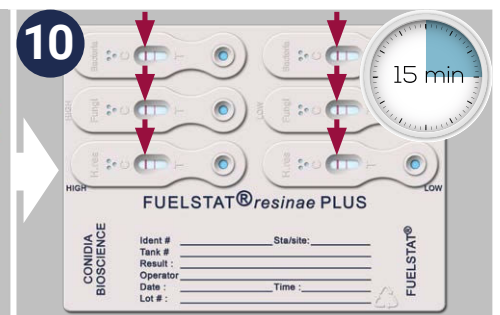
9 Fully invert the bottle and allow 4 drops to spill onto a tissue to clear the dropper nozzle of any trapped fuel deposits, **DO NOT TURN THE BOTTLE UPRIGHT**



10 Carefully allow **4 drops of blue fluid to fall into each of the 6 circular wells** on the test plate ensuring that no sample is spilled into the viewing window



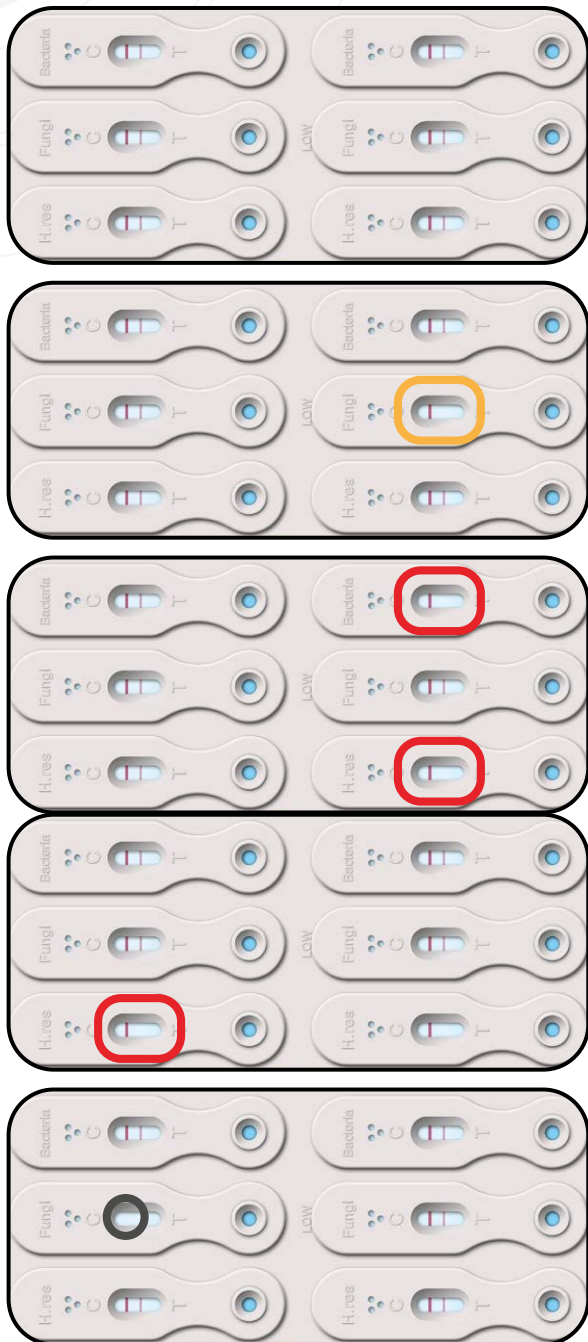
11 Keep the bottle inverted in case any additional drops may be required. If the bottle has been turned upright at any stage of this process it is important to return to step 5



12 Leave the FUELSTAT® test plate on a flat surface for **10-15 minutes**. A dark red line 'Control line' should appear on the left-hand side of each of the 6 viewing windows. This indicates that the test has worked correctly

Reading the Results

11 If all 6 'Control lines' are visible the test result is now ready to be interpreted. **Read results within 15-30 minutes** after placing sample fluid into sample wells. How to manually interpret the test is shown below, a visual score card included in the kit can be used to help determine the presence/intensity of lines:



Negligible Result

NEGLECTIBLE CONTAMINATION

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 1 Low Test line is missing, here the Low Test line in the Fungi field is not visible, this is a Low Positive result.

This means that there is contamination present and action should be taken - refer to OEM manuals and industry guidance

High Positive Result

HEAVY CONTAMINATION

If 2 or more Low Test lines (on the right side of the test plate)* or any High Test lines (on the left side of the test plate) are not visible, this is a High Positive result.

*note: the combined amount of contamination present when 2 or more Low Positive results are obtained equates to a heavy total level of contamination.

This means that there is higher levels of contamination present and urgent action should be taken - refer to OEM manuals and industry guidance

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).

FUELSTAT® RESULT APP FOR DIGITAL RESULT VERIFICATION

FUELSTAT® Plus comes with a **FREE** App that verifies the result instantly after the test has been completed. It is available on iOS and Android.

The app contains video step-by-step instructions to guide you through all steps 1-11 and verifies the result with a PDF report that you can print and share.

To download and verify your test now, scan the QR code or visit the Google Play or Apple App Store:



STORAGE, STABILITY AND RECYCLING

Storage conditions:

Store at 10°C to 30°C. To avoid deterioration at higher ambient temperatures kits may be stored in a refrigerator short term but should be brought up to room temp before use. Do not use after the stated expiry date. Long term freezing is not recommended

Suitable packaging:

Must only be kept in original packaging

Transport class:

This product does not require a classification for transport

Recycling:

The user's attention is drawn to the possible existence of regional or national regulations regarding disposal of fuel sample and recycling ability of kit components, most kit components can be re-cycled

WARNINGS AND PRECAUTIONS

Caution should be exercised in the handling of fuel or other hazardous materials in accordance with Health and Safety procedures

- Each test plate is disposable. Use only once
- The test plate in the foil pack should be kept sealed until ready for use. Once the foil pack is opened the shelf life of the device is not guaranteed. It should be used as soon as possible
- The viewing window of the test device should not be touched
- The test plate should be kept dry at all times. **DO NOT USE if any of the devices become wet**
- If the test plate appears damaged, scratched or marked in any way please contact Conidia Bioscience

NOTE: It is best to read results within 15-30 minutes after placing sample fluid into sample wells. Lateral flow devices, as used by FUELSTAT®, are sensitive to light as well as interactions with other liquids. In order to preserve the read-state of a test, the test plate should be protected from any light and other contaminants, preferably in its original foil packaging. As time passes, the higher the risk grows in regard to a strip changing appearance

MATERIAL DATA

For complete MSDS documents please visit: www.conidia.com

FUELSTAT® Test Plates:

Each strip is composed of nitrocellulose membrane, backing card, sample pad, conjugate pad and absorbent pad. The membrane, conjugate pad and sample pad contain dried chemicals and biological material preserved by sodium azide

Extraction Buffer Fluid:

Chemical composition: A mixture of non-harmful salts in water coloured by a harmless food dye. Preserved using ProClin 950 used at 0.06% which is classified as non-harmful at these concentrations. The active ingredient of ProClin 950 is 2-Methyl-4-isothiazolin-3-one (MIT) (CAS-No: 2682-20-4) at 9.5-9.9% solution

Hazardous components: No component is present at sufficient concentration to require a hazardous classification

Product Import Codes:

- Commodity Code: 38220000
- HTS CODE: 9031.80.8085

TROUBLESHOOTING

Problem	Cause/Remedy
No drops from bottle	Particulate material in sample may be blocking the dropper nozzle. Shake bottle again, allow to settle and then gently squeeze the bottle until drops appear
No blue dye flow	Add an additional drop, one at a time, until flow is achieved
No control line visible	Too much sample added or fuel flooded device and test flooded. Repeat with new test plate. Flow components exposed to wet or damp. Repeat test using new test plate
Faint red test lines	Low level of contaminant present or uneven flow of sample. This may be due to insufficient sample added or sample not mixed vigorously enough. If Test Line is very faint, appears to be a shadow and is only visible at close range, then it should be considered to be a Positive result
Control and test lines are blue in colour	Extraction liquid not mixed with Fuel/Water sample properly or Fuel/Water added to sample well. Repeat test using a new test plate
Damaged devices or bottles	Contact Conidia Bioscience. Please quote batch number for reference
Lines appear before sample added	Test device made wet. Repeat test with new test plate

PRODUCT SUPPORT

Comprehensive support information and video instructions are available on the website: www.conidia.com

If you have any additional technical queries regarding your FUELSTAT® test please contact: info@conidia.com

RESULT LIMIT INDUSTRY GUIDELINES

Phase	Target antigen limits	Alert level
Fuel	Up to 150 µg/L	NEGLIGIBLE
Water	Up to 33 µg/ml	
Fuel	Between 150-750 µg/L	MODERATE
Water	Between 33-166 µg/ml	
Fuel	Greater than 750 µg/L	HEAVY
Water	Greater than 166 µg/ml	

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