

On the spot testing for microbial contamination is good for business and profits.

TRIED. TESTED. TRUSTED.

FUELSTAT® provides rapid detection of microbial contamination in **AVIATION JET FUEL & DIESEL FUEL**



INDUSTRIES

FUELSTAT® offers a rapid fuel test solution to detect microbiological contamination in middle distillate fuels - jet fuel, diesels (including Kerosene 28 heating oil), MGO (Marine Gas Oil) - into the following sectors, and more:



BUSINESS & GENERAL AVIATION

FUELSTAT® offers rapid testing at wing with instant data management for Business & General Aviation, and their support MRO operations, anywhere on the globe.



MARINE & OFFSHORE

FUELSTAT® provides the ability to protect Marine Gas Oil (MGO) and vital equipment both in port or at sea, 24/7, 365.



TRANSPORTATION

Using or transporting, jet or diesel fuel? FUELSTAT® can help reduce the potential for transferring Microbial contamination from one asset to another.



MILITARY / DEFENCE

Air, Land or Sea, FUELSTAT® can rapidly help protect vital assets and fuel supplies during times of peace or conflict, anytime, anywhere.



BACKUP POWER GENERATION

Fail to plan is to plan to fail, FUELSTAT® can help minimise the risk of critical equipment failing when you need them most.



FUEL STORAGE & SUPPLY

From exploration to refinery, pipelines to end user, FUELSTAT® has every step of the supply chain covered.

MICROBIAL CONTAMINATION IN FUEL

If you're a user or supplier of jet or diesel fuels, microbial contamination can pose a serious threat to you and your customers.

Once this microbial contamination starts to develop, it can get out of control quickly. The micro-organisms produce a thick, slimy material called biomass, which clogs engines and stops them from working properly. Biomass can also influence metal corrosion, causing permanent damage to tanks and mechanical parts. If left for a prolonged period of time without treatment, it can cause:

- Rejected fuel deliveries
- Corrosion and tank leakage
- Blocked filters
- Customer increased fuel consumption, blocked injectors and Engine failures



HOW DO YOU MANAGE THE RISKS OF JET AND DIESEL FUEL MICROBIAL CONTAMINATION?

There is no way to completely prevent microbes from entering fuel. These microbes are all around us, in the air and on surfaces, and can enter the fuel in numerous ways once it leaves the refinery. Most importantly, even the well-maintained fuel delivery systems will experience condensation - and when water gets into fuel, microbes do too. If severe microbial contamination is discovered in your fuel, it can be treated with specialist fuel cleansers and biocides. However, this procedure can cost many thousands of dollars and usually requires taking your fuel and generators out of action. To minimise the risks, there are three key activities you need to do:

1. Remove water from tanks
2. Store fuel correctly
- 3. Test for fuel microbial contamination regularly...**



Is sending samples to a lab for microbial fuel tests worthwhile or economical?

Traditionally, fuel testing methods have depended on fuel samples being sent to a specialist laboratory for analysis. The next step is a waiting period of up to 4-7 days, or longer to get the results.

Sending the fuel samples to the lab isn't simple. ASTM D6469 highlights that if a sample is to be tested for microbial contamination and cannot be tested on-site, it should be transported on ice and tested within 24hrs or the sample may no longer be a true representation of the environment from which it came. Delays cause varying results which may cause an increased risk to you or your customer's asset.

- Why take the risk?...
- Why wait 4-7 days for a test report?

FUELSTAT® SOLUTION
TEST. RESULT. REPORT
within 15 minutes



FUELSTAT®

Conidia Bioscience

BUSINESS & GENERAL AVIATION



Avoiding unscheduled Aircraft on Ground (AOG) can be very good for business and reputation

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- Why take the risk?...
- Why wait 4-7 days for a test report?

Applying an additive like biocide on a regular basis is another solution commonly used in aviation to prevent microbial contamination. The risk is that a fresh contamination starts before the next scheduled application of biocide and grows rapidly and that the contamination micro-organisms develop resistance from regular exposure to biocide, much as a human does with antibiotics.

- Is the cost and effort of applying additives regularly justified?
- Would fast on-site testing be a more efficient option?

FUELSTAT® SOLUTION TEST. RESULT. REPORT

within 15 minutes



MARINE & OFFSHORE

Every year, many sea vessels experience technical and mechanical problems caused by fuel microbial contamination.

Microbial contamination can grow quickly in short time periods—so testing marine fuel yourself is very important. Similarly in offshore applications there are many users of stored fuel; day tanks, backup power generators, cranes and the transportation that relies on stored fuel (diesel-powered life craft and helicopters).

- Does your fuel contain dangerous levels of microbial contamination?
- **FUELSTAT®** can quickly help you find out!



IMO 2020 : WHY MARINE FUEL MANAGEMENT IS EVER MORE IMPORTANT

The IMO 2020 regulations are important for fuel users, as they require fuel manufacturers to reduce sulphur concentration.

Whilst the direct effects of sulphur reduction on long term fuel stability are, yet unknown, several published studies indicate that introduction of biodiesel, primarily Fatty Acid Methyl Esters (FAME), can increase microbial contamination overall due to the hygroscopic (water absorption/retention) nature of FAME.

- How are you addressing the risk of increased microbial contamination?
- Regular ***fuel tank testing*** is advised at sea or in port
- Manual cleaning of fuel oil tanks during dry-docking and while the ship is in service

ROAD & RAIL TRANSPORTATION

Microbial contamination can be very damaging to any operation if left unmonitored.

With modern engines becoming more finely tuned to meet strict controls on emissions and as such more friendly to the environment, many are suffering higher levels of fuel system issues. The reductions in sulphur and introduction of bio-content has had an impact on the ability of organisms (Diesel Bug) to thrive and as such is resulting in higher numbers of unplanned maintenance and unscheduled downtime of assets.

- Does your fuel contain dangerous levels of microbial contamination?
- **FUELSTAT®** can quickly help you find out!



CAN YOU GUARANTEE THAT MICROBIAL CONTAMINATION IS NOT PASSED ON BY A FUEL SUPPLIER?

How does a fuel supplier guarantee the cleanliness of supply from a tank or tanker, or pipeline?

The further down the supply chain you go post the sanitary environment of the refinery, the more susceptible an operation is and therefore testing is becoming increasingly important for all areas of the supply chain to ensure quality and aid efficient preventative maintenance programs to be undertaken.

- How are you addressing the risk of increased microbial contamination?
- Regular ***fuel tank testing*** is advised, both on the vehicle and at storage/transfer locations

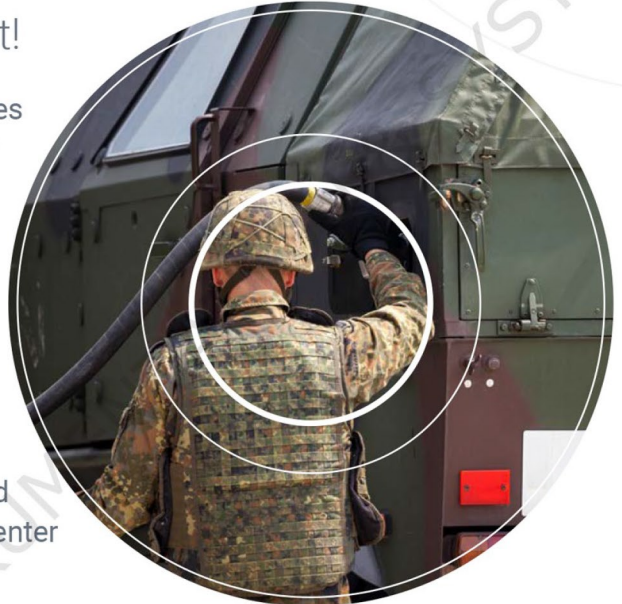
DEFENCE / MILITARY

Does your fuel contain dangerous levels of microbial contamination?

FUELSTAT® can quickly help you find out!

The very nature of military operations is such that activities are often carried out in times of conflict where time really is a matter of life or death. As such, can one really wait several days to identify whether their air, land or sea asset is at its optimum level, or potentially at risk of failure? The answer is, of course no.

Middle distillate fuels such as jet fuel and diesel are at risk of microbial contamination from very robust micro-organisms that feed off the hydrocarbons in fuel and are nourished by even the smallest amount of water produced by environmental factors such as condensation that can enter the fuel supply.



Field-based microbial fuel testing for all military operations

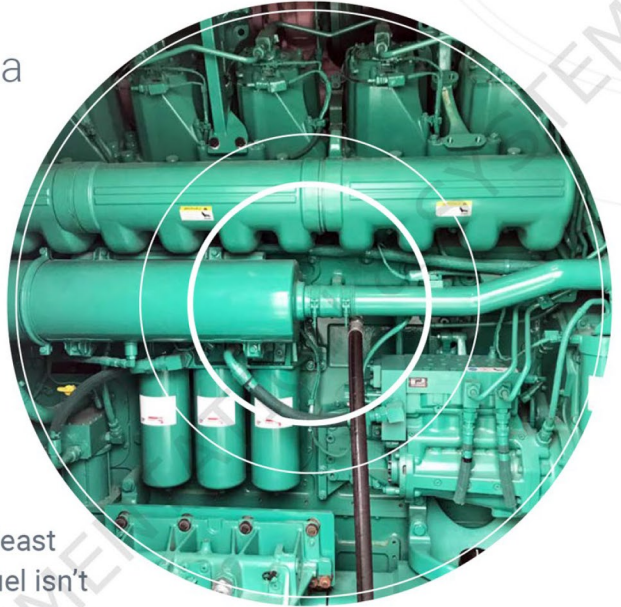
FUELSTAT® test kits have no special handling, transportation, storage or disposal requirements and are safe to be carried and administered in the real life conditions of most military operations, at a time when needed most. As a result these kits are widely approved by many Worldwide operations and include NATO stock numbers.



BACKUP POWER GENERATION

Is your backup generator 100% ready for a power emergency?

In a power emergency, your generator fuel is just as important as the generator itself. And at times when power emergencies seem more likely - or have greater consequences - you need to be 100% sure your fuel is usable. That means carefully monitoring and managing microbial contamination (a.k.a diesel bug) because:



- **Backup generators are at high risk of microbial contamination.** Modern diesel fuels always have at least some level of microbial contamination. And when fuel isn't changed often, this contamination has more time to grow to dangerous levels.
- **Severe microbial contamination could mean disaster.** If microbial contamination grows quickly between tests, it could potentially stop your generators working.
- **Traditional fuel tests are inconvenient.** Testing for microbial contamination usually involves hiring an external team, sending samples off-site, and waiting days for results.
- **Microbial contamination risks are often underestimated.** Many maintenance contractors do not realise how fast diesel bug grows, or the danger it presents.

The only way to have total confidence in your generators is with a fuel maintenance program that incorporates regular, accurate testing - so there's 0% room for error.

WHY IS EMERGENCY GENERATOR FUEL AT RISK?

Middle distillate fuels can be affected by contaminants like water, particulates (e.g. rust and dust), other fuels, and microbial contamination. Microbial contamination can enter through water droplets, which get into fuel systems largely through condensation and grow in the space between water and fuel.

Diesel fuel is particularly at risk of microbial contamination due to its properties. In the last 10+ years Fatty Acid Methyl Ester (FAME), also called biofuel, has been added to diesel. FAME is susceptible to microbial contamination because it attracts and holds water.

FUEL STORAGE & SUPPLY

- Does your fuel contain dangerous levels of microbial contamination?
- FUELSTAT® can quickly help you find out!

FUELSTAT® is used across many aspects of the Fuel Supply Chain from refinery to wing in the aviation sectors, or to point of use for marine, transportation and power generation sectors for applications such as:

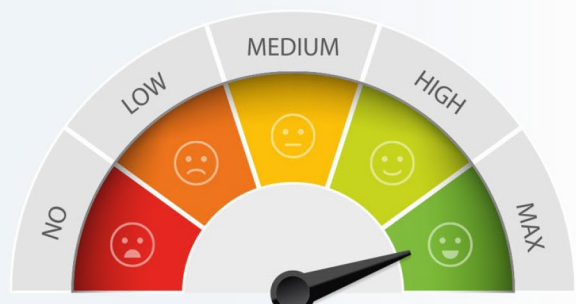
- Regular testing of fuel supply infrastructures such as pipelines, hydrants, holding tanks for jet fuel and diesel supply as per JIG/industry or internal operations guidelines
- Reactive testing of supply infrastructure when microbial contamination is suspected
- Proof of fuel being clear of microbial contamination prior to loading/unloading
- De-fuelling operations on behalf of clients



Tough markets demand efficient processes that are not always visible to clients

In an increasingly litigious environment providing chain of custody proof of fuel quality is becoming increasingly important throughout the fuel supply chain, but rapid, on-site microbiological testing using FUELSTAT® can also have several operational benefits:

- Taking only minutes, not days, provides ability for fast remedial action if necessary
- Treat only what needs treating, helping to reduce overall maintenance costs
- Minimise potential of cross contaminating other assets, thus reducing downtime
- Protection of reputation when used at time of fuel hand over



CUSTOMER SATISFACTION

THE SOLUTION IS AS SIMPLE AS 1-2-3 FUELSTAT® PLUS

- The ultra-simple test that just requires **4 drops** of sample
- **15 minutes** to result as opposed to 4-7 days!
- **'Test at the tank'** technology - no laboratory required
- No requirement for additional **equipment** or **sterility measures**

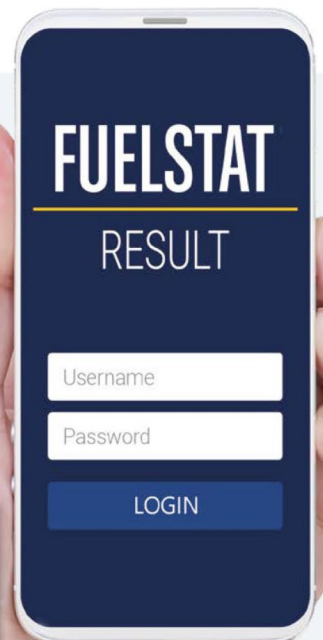


In critical times, you need a fast, convenient testing method - one that doesn't require multiple people to complete the process. Using FUELSTAT®, a single person can conduct tests at the tank after minimal training from our instructional videos. FUELSTAT® is based on immunoassay antibody tests. Just as a pregnancy test searches only for markers of human chorionic gonadotropin, FUELSTAT® only searches for the markers of bacteria and fungi that can grow in jet and diesel fuel and can potentially cause both operational downtime, corrosion and in worse case safety issues.

FUELSTAT® RESULT



- The easy to use app that gives **immediate visual verification** of result
- **Reduces risk** of misinterpretation
- No need for additional equipment other than a smartphone
- Fully **detailed report** can be instantly produced in PDF format



FUELSTAT®

ANALYSIS REPORT

Company name: Standard Address inputted From Portal

Registered User: Engineers Name

Address: Input from Portal Registered Address

Test date: 24-JAN-2019

Post code: From Portal

GPS location:

Country: United Kingdom

Fuelstat result number: 3.361

Customer reference: 124 - Portal Template

Printout date: 24-JAN-2019

Identity: Example Test

Bacteria: Negligible

Asset: Jet 1

Fungi: Heavy

Tank: Wing

Hormoconis resinae: Negligible

Fuel lot: 4

Overall result: Heavy

Fuelstat test lot: HR 2 411

Test method: ASTM D8070-16

Comments

Example test Report - Annual Maintenance Check

FUELSTAT® Result data interpretation and guidance

Alert level	Phase	Target antigen limits
Negligible	Fuel	Up to 150 µg/L
	Water	Up to 33 µg/L
Negligible — Repeat the test to confirm the result and increase the frequency of water drainage.		
Moderate	Fuel	Between 150-750 µg/L
	Water	Between 33-166 µg/L
Moderate — Repeat the test to confirm the result and increase the frequency of water drainage.		
Heavy	Fuel	Greater than 750 µg/L
	Water	Greater than 166 µg/L
Heavy — Repeat the test to confirm the result and increase the frequency of water drainage.		

Phone make: Apple

Portal version: 1.2.2

Phone model: iPhone 6s

Analysis approved by:

App version:

TRIED. TESTED. TRUSTED.

FUELSTAT®

Who we are:

FUELSTAT® fuel tests are developed, manufactured and marketed by Conidia Bioscience Ltd. Based in UK, Conidia Bioscience was founded in the early 2000's by experts in immunoassay techniques and holds the internationally patented intellectual property for FUELSTAT®.

Where to find us:

FUELSTAT® is distributed globally by a network of specialist distributors covering the major sectors. To arrange for a distributor to support you simply contact info@conidia.com.



Authorized Distributor in Singapore, Malaysia, Indonesia, Vietnam, China, Philippines & Myanmar:



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FUELSTAT® meets the ASTM
International D8070-16 Standard



FUELSTAT® is listed as an approved
product by Joint Inspection Group



FUELSTAT® is listed as an approved
product by IATA. Conidia Bioscience
is a Strategic Partner with IATA