Fuel Quality Management Field Guide
The Fuel Quality Management (FQM) Field Guide is a quick reference tool to use in the field to determine fuel quality issues. This guide, along with Hammonds Test...Treat...PROTECT program, represents years of research and development. The easy to follow steps are a path to Fuel Quality Management.

**Step One:** Test... to determine fuel quality and set a baseline for further actions.

*Sample the Fuel for Testing*

Take a cross-section of samples. Use a bacon bomb style fuel sampler. Open style dippers are inadequate for pulling acceptable samples from different fuel levels. In order to have a more complete picture of fuel quality, take several samples from different access points and different levels within the fuel. The diagram below displays several potential locations. Ideally, six to nine fuel samples are adequate to properly assess the fuel in most systems. If access is limited, as might be in a generator belly tank, take as many samples from available access points as possible.

Use clean, clear jars and fuel samplers that are presterilized. Isopropyl alcohol is a good solution to use in the field for quick clean-up and sterilization between samplings. Simply wipe the jars and sampler down with the solution prior to use and dry with a clean towel.
Complete a visual test using the *Fuel Clarity Bar Chart* like the one shown and determine the level of visual contamination using the *Visual Fuel Assessment Guide*. Follow the guide instructions for treatment options. Bottom samples are generally most revealing. If the sample contains biomass, water, particulates or dark aged fuel then treat and remediate the fuel. If the mid and upper layers are visually bright and clean looking, pump off the bottom contamination and treat with Biobor® JF. Clear samples may require additional testing to gain insight into problem systems.

**Test the fuel for microbial contamination** using the Biobor® Hum-Bug Detection® Kit or the Conidia FUELSTAT® test. Even if fuel looks bright and clear, microbial contamination is very possible. Always test the fuel.

**Inspect the Fuel System for Microbial Influenced Corrosion (MIC).** Once the fuel assessment and microbial testing are complete, do a quick visual inspection of the fuel system looking specifically for corrosion. Corrosion is associated with microbial contamination. Use the *Corrosion Assessment Guide* to determine next steps. This is especially important if the fuel samples are clear. MIC often indicates microbial activity in difficult to sample locations within the fuel system. Follow the treatment instructions on the guide if MIC is identified.

**Step Two:** Treat... the fuel. Follow each assessment guide to determine how to treat contaminated and degraded fuel. FQM includes the proper use of biocides and fuel additives to remediate fuel issues. Use Biobor® JF to kill microbial growth and protect the system from MIC. Use Biobor® Fuel Additives to remediate fuel caused by oxidation and aging. When diesel fuel ages, it loses cetane, lubricity, essential detergents and stabilizers that need to be replaced. Use the *Additive Treatment Chart* to determine which Biobor® product is appropriate or contact Hammonds Fuel Additives, Inc. and talk to one of the technical specialists.

**Step Three:** Protect... the fuel. FQM is not a one-time event. It is an ongoing program aimed at reducing maintenance costs, liabilities and downtime. Once you Test... and Treat... monitor your system and fuel using the *TTP Assessment Chart*. This is the Protect part of the program. Visual inspections and fuel sampling are all part of protecting your system from unwanted costs and problems. Set up a monthly schedule to Test... Treat... Protect... the fuel and system.
Fuel Clarity Bar Chart

Fuel clarity is rated by placing fuel sample in front of bar chart. Test based on a pass or fail method for determining contamination in fuel.
*Complete regular microbiological testing using FUELSTAT® and regular visual inspections to establish a fuel quality trendline. Knowing how your fuel quality is trending is an essential element to cost savings. Verify fuel is free of microbiological growth (MBG). If fuel is visually clear, but tests for MBG then treat with Biobor® JF.

**Treat with Biobor® JF, let soak for 24-48 hours then polish fuel until bright and clear.

***Treat with Biobor® JF, let soak for 48-72 hours then polish fuel and clean tank of all contamination. Remediate fuel quality issues with Biobor® additives
**Negligible Visible Corrosion**

TEST FOR MBG AND CONTINUE TO MONITOR*

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**If fuel shows signs of contamination, treat with Biobor®JF, let soak for 24-48 hours and polish if needed.

***If fuel shows signs of contamination, treat with Biobor®JF, let soak for 48-72 hours and polish fuel and/or clean tank of all contamination. Remediate fuel quality issues with Biobor® additives if needed.

**Moderate Visible Corrosion**

TEST FOR MBG**

**Heavy Visible Corrosion**

TEST FOR MBG AND TREAT FUEL***
## Additive Treatment Chart

<table>
<thead>
<tr>
<th>BENEFIT</th>
<th>DIESEL</th>
<th>BIBOR MD</th>
<th>BIBORAG Fast</th>
<th>BIBORAG Winter Blend</th>
<th>GAS</th>
<th>BIBOR SD</th>
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<tbody>
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<td>Biocide</td>
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<td>Cleans Injectors, Valves and Deposits</td>
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<td>Controls Water</td>
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<td>Disperses Solids and Particulates</td>
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<td>Improves Performance and Efficiency</td>
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<td>Prevents Ethanol-Related Issues in Gas</td>
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<tr>
<td><strong>TREAT RATE</strong></td>
<td>1:10,000</td>
<td>1:1,000</td>
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<td>1:1,500</td>
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<td>Cost / Gallon Treated</td>
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## TTP Assessment Chart

### LEVEL OF PROBLEM

- **NEGLIGIBLE**
- **MODERATE**
- **SEVERE**

### FUEL - TEST RESULTS
- NEGLIGIBLE MBG
- MODERATE MBG
- HEAVY MBG

### FUEL - VISUAL RESULTS
- NEGLIGIBLE VISUAL CONTAMINATION
- MODERATE VISUAL CONTAMINATION
- HEAVY VISUAL CONTAMINATION

### FUEL SYSTEM CORROSION
- NEGLIGIBLE CORROSION
- MODERATE CORROSION
- HEAVY CORROSION

### OPERATIONAL SIGNS
- NONE OBSERVED
- INCREASED OPERATIONAL ISSUES
- CONTINUOUS - MAJOR OPERATIONAL ISSUES

### ACTION REQUIRED
- CONTINUE TESTING AND MONITORING
- TREAT AND CLEAN
- TREAT, CLEAN AND REMEDIATE
FAMILY OF FUEL ADDITIVES

Recommended for use with...

Hammonds®
Additive Injection Systems
Precisely Blended, On-Spec Fuel EVERY TIME.

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