



Filtration, Purification & Separation Solutions

ENGLISH EDITION

CHECKLIST

10 Warning Signs of Fuel Contamination

A Practical Inspection Guide for Detecting Water, Sludge, Microbial Growth and Fuel Degradation Before They Cause Equipment Failure

This checklist is designed for operators, maintenance teams, and fuel managers across industries including mining, data centers, marine, and standby power. Perform regular visual, sensory, and basic tests. Early detection prevents costly failures.

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1. How to Use This Checklist

- **Frequency:** Daily/weekly visual checks; monthly detailed inspections.
 - **Tools Needed:** Clear sample jar/bottle, Bacon Bomb or bottom sampler, flashlight, pH paper, ATP microbial test kit (optional), particle/water test kits.
 - **Action:** For any sign, isolate affected fuel, test further, polish/treat, and investigate root cause.
 - **Record:** Date, location, findings, and actions in a log.
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2. 10 Warning Signs

- **Cloudy or Hazy Appearance**
 - **Description:** Fuel looks milky or translucent instead of bright and clear. Indicates dissolved or emulsified water.
 - **Detection:** Fill a clear jar and let it settle; haze persists.
 - **Risk:** Promotes microbial growth and corrosion.
 - **Action:** Drain water, test content, and run polishing system.
 - **Free Water at Tank Bottom**
 - **Description:** Visible water layer or droplets when sampling from the lowest point.
 - **Detection:** Use bottom sampler; water separates clearly.
 - **Risk:** Primary enabler of microbial colonies and rust.
 - **Action:** Remove water immediately; check seals and breathers.
 - **Dark Color or Unusual Hue**
 - **Description:** Fuel darkens from straw/golden to brown, black, or reddish.
 - **Detection:** Compare to fresh fuel sample.
 - **Risk:** Oxidation and degradation byproducts.
 - **Action:** Test for acid number and oxidation stability; consider replacement or heavy treatment.
 - **Unpleasant Odor (Sour, Rotten Egg, or Musty)**
 - **Description:** Strong sulfurous, acidic, or moldy smell instead of mild diesel odor.
 - **Detection:** Open sample carefully and sniff (use PPE).
 - **Risk:** Microbial activity producing hydrogen sulfide and acids.
 - **Action:** Confirm with microbial test; apply biocide.
 - **Sludge or Sediment in Samples**
 - **Description:** Particles, black tar-like material, or "coffee grounds" at bottom of sample.
 - **Detection:** Let sample settle 30+ minutes or filter through coffee filter.
 - **Risk:** Clogs filters, lines, and injectors.
 - **Action:** Polish fuel aggressively; clean tank if heavy buildup.
 - **Floating Debris or Biofilm Strings**
 - **Description:** Slimy strands, mats, or rag-like material in fuel.
 - **Detection:** Visual in tank or sample; often at fuel-water interface.
 - **Risk:** Advanced microbial contamination.
 - **Action:** Shock dose biocide, filter thoroughly, and sanitize system.
 - **Filter Plugging or Rapid Filter Changes**
 - **Description:** Frequent clogging of primary or secondary filters.
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- **Detection:** Monitor differential pressure gauges; inspect used filters.
- **Risk:** Indicates high particulates, sludge, or water.
- **Action:** Analyze plugged filter contents; upgrade filtration.
- **Increased Fuel Consumption or Poor Engine Performance**
- **Description:** Higher fuel use, rough running, black smoke, or hard starting.
- **Detection:** Track logs and compare to baseline.
- **Risk:** Degraded combustion from contaminated fuel.
- **Action:** Test fuel quality comprehensively; clean injectors if needed.
- **Corrosion or Rust in Tank/Fittings**
- **Description:** Visible rust on dipsticks, tank walls, or components.
- **Detection:** Internal camera or during maintenance.
- **Risk:** Water + acids accelerating metal degradation.
- **Action:** Neutralize acids, remove water, apply corrosion inhibitors.
- **Abnormal pH or High Acid Number**
- **Description:** Fuel becomes more acidic (lower pH).
- **Detection:** Use pH paper or send for lab acid number test.
- **Risk:** Microbial acids and oxidation causing long-term damage.
- **Action:** Treat with stabilizers; replace fuel if severely degraded.

3. Additional Tips

- **Biodiesel Blends:** Watch more closely for signs 1, 2, 4, and 6 due to higher hygroscopicity.
- **Critical Systems:** Combine with ISO 4406 particle counting and real-time sensors.
- **Prevention:** Maintain tight seals, regular polishing, additives, and turnover.
- **When to Escalate:** Multiple signs present → Immediate lab testing and system isolation.

Consistent use of this checklist can dramatically reduce equipment failures and downtime.