Biocide Selection Guide for Fuel Applications

Safeguarding your equipment—and your productivity.

DOW Microbial Control
Putting you in control.
Take control of your microbial challenges.

Protect your investments with biocides.

Biocide usage is critical for maintaining the integrity of fuels at all points during storage, distribution and usage. Left untreated, fuels are susceptible to bacterial and fungal contamination that can cause machine malfunction, filter clogging, engine failure, aircraft gauge malfunction and microbially induced corrosion. Fuel performance properties can also be negatively impacted.

Dow Microbial Control offers a portfolio of trusted products, each with demonstrable efficacy against both bacteria and fungi. We offer biocides for a range of different needs, from rapid decontamination of spoiled fuel to shock treatment of heavily fouled systems to preventive maintenance treatments for clean fuel. As the permissible sulfur level in fuel decreases due to more stringent standards, Dow Microbial Control continues to provide effective biocide solutions that enable you to remain compliant. Specialists are available to advise you on which products and dosage levels will best fit your needs to protect your valuable investment.
Biocides for a variety of applications.

Our biocides provide rapid decontamination, shock treatment and maintenance treatment of:

- Biodiesel
- Ultra-low sulfur diesel
- Diesel
- Unleaded gasoline
- Marine fuels
- Refineries
- Terminals
- Service station storage tanks
- Heating oil
- Fuel additives
- Kerosene
- Multi-component products
- Aviation fluids*

*KATHON FP 1.5 is the only Dow Microbial Control product approved for use in aviation fluids. The Federal Aviation Administration must be consulted as to the acceptability of the additive for use in specific engines and/or aircraft.
A full range of products.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Active Ingredient(s)</th>
<th>Solvent</th>
<th>Description</th>
<th>Performance against bacteria and fungi</th>
<th>Meets 15 ppm sulfur ULSD standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>KATHON™ FP 1.5</td>
<td>1.5% 5-chloro-2-methyl-4-isothiazolin-3-one/2-methyl-4-isothiazolin-3-one (CMIT/MIT)</td>
<td>Dipropylene glycol (mixed isomers)</td>
<td>Liquid</td>
<td>★★★</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>400 ppm dosage delivers 1.4 ppm S</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 ppm dosage delivers 0.3 ppm S</td>
</tr>
<tr>
<td>FUELSAVER™</td>
<td>81% 4-(2-nitrobutyl) morpholine and 5% 4,4-(2-ethyl-2-nitrotrimethylene) dimorpholine</td>
<td>None</td>
<td>Liquid</td>
<td>★★★</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Active ingredient does not contain sulfur</td>
</tr>
<tr>
<td>FUELSAVER™ 40 LT</td>
<td>36.5% 4-(2-nitrobutyl) morpholine and 2.3% 4,4-(2-ethyl-2-nitrotrimethylene) dimorpholine</td>
<td>Ethylene glycol monomethyl ether</td>
<td>Liquid</td>
<td>★★★</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Freeze-resistant version of FUELSAVER</td>
<td></td>
<td></td>
<td></td>
<td>Active ingredient does not contain sulfur</td>
</tr>
<tr>
<td>BIOBAN™ GA 50</td>
<td>50% glutaraldehyde</td>
<td>Water</td>
<td>Liquid</td>
<td>★★★★★</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Active ingredient does not contain sulfur</td>
</tr>
</tbody>
</table>

Selecting the appropriate fuel biocide

Rapid Decontamination (1-4 hours) → BIOBAN GA 50

Shock Treatment of Heavily Contaminated Fuel (24-48 hours) → KATHON FP 1.5 or FUELSAVER

Maintenance Dosing of Clean, Non-Contaminated Fuel → KATHON FP 1.5 or FUELSAVER

Approved Distribution Channels (such as marinas) → FUELSAVER
From one region of the world to another, the experts of Dow Microbial Control stand ready to protect your fuel products from microbial contamination.

Let us help put you in control with:

**Unmatched expertise**
Rely on the industry’s most experienced team of experts in microbial control technologies. We offer expertise in regulatory issues, toxicology and environmental research. Our products are carefully formulated based on the latest science and exhaustive performance testing.

**Regional presence, knowledge and support**
The Dow Microbial Control Customer Application Centers are your source for the best microbial control products and services. Each center has a thorough knowledge of the unique challenges and opportunities of the region, providing you with local personalized support.

**Broatest portfolio**
You have complex microbial control challenges. Our BIOBAN, FUELSAVER and KATHON products are designed to meet those challenges. We understand your needs—and we have the products and expertise needed to address them.

---

Let us help put you in control with:

**Customer-specific formulation testing**
- Microbiological efficacy
- Biocide stability

**Problem solving**
- Biocide stability
- Contamination issues

**Microbiological audits of refineries, terminals and fuel storage facilities**
- Troubleshooting
- Rapid microorganism quantification by adenosine triphosphate (ATP) analysis in accordance with ASTM D7687* using the LuminUltra QGO-M test kit

**Analytical support**
- Active ingredient concentration
- Technical, safety, regulatory and environmental information

**In-person and online training**
- Products, safety handling, industrial hygiene and more

---

*Nanette Hermsen
Global Strategic Marketing Manager, Energy and Water
Dow Microbial Control

Help where you need it.

With customer application centers around the globe, expert assistance to help solve microbial challenges is always within reach—no matter where you are. We offer fully equipped state-of-the-art laboratory capabilities and knowledgeable technical and sales assistance to help find solutions for your fuel treatment challenges.

Contact Information

Central and Eastern Europe:
Turkey +90-216-571-16-00
Russia +7-495-663-78-20
Poland +48-22-833-22-22

Western Europe:
+800-3-694-6367 (toll-free)
+31-115-67-26-26 (phone)
+31-115-67-28-28 (fax)

North America:
+1-800-447-4369 (toll-free)
+1-989-832-1560 (phone)
+1-989-832-1465 (fax)

Middle East and Africa:
UAE +971-4-332-88-66
South Africa +800-99-5078 (toll-free)

Greater China:
Shanghai +86-21-3851-1000
Beijing +86-10-8527-9199
Guangzhou +86-20-3813-0600
Taiwan +886-227-78-000

Southeast Asia:
Philippines +63-2-867-3293
Indonesia +62-21-2995-6273
Singapore +65-6830-4575
+65-6796-6217
Thailand +66-2365-7371
Vietnam +84-8-3822-5808
Malaysia +603-7965-5200

Australia and New Zealand:
+61-3-9226-3500 (phone)
+61-3-9226-3562 (fax)

Japan and Korea:
Japan: +81-3-5460-2261
Korea: +82-2-3490-4348

Indian Subcontinent:
+91-22-6793-4953 (phone)
+91-22-6793-4924 (fax)

Latin America:
+55-11-5188-9555 (phone)
+55-11-5188-9400 (fax)

Other Global Areas:
+1-989-832-1560 (phone)
+1-989-832-1465 (fax)

This document is designed as a general overview of Dow Microbial Control products and chemistries. Not all products are available in all geographical locations. Please contact your Dow Microbial Control representative for detailed technical information applicable to individual requirements.

NOTICE: No freedom from any patent owned by Seller or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer’s use and for ensuring that Customer’s workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Seller assumes no obligation or liability for the information in this document. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. Please note that not all products are registered in all regions for all applications. Please contact your local Dow representative for detailed technical information applicable to your individual situation.

USE BIOCIDES SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE.

**Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow
Form Number: 253-02864 09/01/11-TCG

www.dowmicrobialcontrol.com