



## Comparison of Biocidal Efficacy of KATHON™ FP 1.5 and Biobor<sup>1</sup> JF in Jet A Fuel

Laboratory efficacy test demonstrates the superior performance of KATHON™ FP 1.5 Biocide over Biobor<sup>1</sup> JF in a jet fuel.

### Overview:

The protection of aviation fuels from microbial spoilage is critical for human safety and the reputation of the aeronautical industry. The data summarized herein illustrate the importance of selecting a biocide product which demonstrates microbial efficacy in aviation fuel.

KATHON FP 1.5 has a long-standing reputation for providing effective and rapid microbial protection of aviation fuels. Additionally, KATHON FP 1.5 is an effective, well-recognized, and trusted product that is used to protect fuel products including diesel, low sulfur diesel (LSD), ultra low sulfur diesel (ULSD), unleaded gasoline, marine, and biodiesel fuels from microbial spoilage.

### Laboratory study:

A recent study demonstrates the relative performance of KATHON FP 1.5 in comparison to Biobor JF in contaminated Jet A fuel. During this study, Jet A fuel was contaminated with high levels of industrially relevant microbes ( $5 \times 10^6$  colony forming units per milliliter (CFU/mL) of bacteria and  $5 \times 10^5$  CFU/mL of fungi). Organisms used included the bacterium *Pseudomonas aeruginosa* (ATCC# 33988) and the fungal organisms *Hormoconis resinae* (ATCC# 20495) and *Yarrowia tropicalis* (formerly *Candida tropicalis*) (ATCC# 18138) which are used in the ASTM E1259 method entitled, *Standard Practice for Evaluation of Antimicrobials in Liquid Fuels boiling below 390°C*.

Jet A fuel samples were contaminated with microorganisms on day 0 and then appropriate dosage levels (as specified by the EPA label) of the biocides KATHON FP 1.5 and Biobor JF were applied to the 50 mL fuel samples (45 mL fuel and 5 mL sterile water). The level of contamination was determined at various time points during the study and scored on a numerical scale of 1 to 4. A score of 2 (which indicated contamination of at least  $1 \times 10^2$  CFU/mL) and above was considered to be a failing score. Failing scores are shown in red, and passing scores are shown in green. No additional biocides were dosed into the fuel samples after day 0; therefore, biocidal efficacy observed throughout the study is the result of the original biocide dosage on day 0.

### Results:

Table 1 shows the results of dosing the Jet A fuel with either KATHON FP 1.5 (100 ppm of product as supplied) or Biobor JF (270 ppm of product as supplied) in comparison to a no biocide control. As shown in Table 1, KATHON FP 1.5 is rapidly effective (within 4 to 24 hours) for decontamination of the Jet A fuel. Biobor JF failed to decontaminate the fuel at every time point for the bacterial and yeast organisms tested over 28 days. Efficacy against the mold contaminant required 7 days. No significant difference in efficacy was observed between the Biobor JF product and the no biocide control against bacterial and yeast contaminants.

<sup>1</sup>Biobor is a registered trademark of Hammonds Fuel Additives, Inc. Biobor JF is not registered for use in on-road vehicles.



Table 1. Treatment of heavily contaminated Jet A fuel with KATHON™ FP 1.5 (100 ppm) or Biobor JF (270 ppm) in comparison to a no biocide control.

Biocide	ppm product	Organism	Challenge (10 <sup>6</sup> Bacteria/10 <sup>5</sup> Fungi)	Growth Score at Time Point (After Challenge)								
				1 Hour	4 Hours	24 Hours	2 Day	7 Day	14 Day	21 Day	28 Day	
KATHON™ FP 1.5	100	Bacteria	Challenge (10 <sup>6</sup> Bacteria/10 <sup>5</sup> Fungi)	4	4	0	0	0	0	0	0	0
		Yeast		2	0	0	0	0	0	0	0	0
		Mold		4	1	0	0	0	0	1	0	
Biobor JF	270	Bacteria		4	4	4	4	4	4	4	4	4
		Yeast		4	4	4	4	4	4	4	4	4
		Mold		4	4	4	4	0	0	0	0	0
No Biocide Control	0	Bacteria		4	4	4	4	4	4	4	4	4
		Yeast		4	4	4	4	4	4	4	4	4
		Mold		4	4	4	4	4	4	4	4	4

Table 2. Growth scoring scale for efficacy testing results.

Score	# of colonies	Approximate CFU/mL
0	0	<1 x 10 <sup>1</sup>
1	1 to 9	1 x 10 <sup>1</sup> - 9 x 10 <sup>1</sup>
2	10 to 99	1 x 10 <sup>2</sup> - 9.9 x 10 <sup>2</sup>
3	100 to 300	1 x 10 <sup>3</sup> - 3 x 10 <sup>3</sup>
4	> 300	> 3 x 10 <sup>3</sup>

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†except Indonesia and Vietnam

Summary:

KATHON FP 1.5 is rapidly effective for the decontamination of heavily fouled Jet A fuel (Table 1). The use of KATHON FP 1.5 maintains the integrity of aviation fuels at all points during storage, distribution, and usage. The KATHON FP 1.5 product preserves valuable aviation fuel as part of a rigorous program to prevent engine failures and gauge malfunction due to microbial spoilage of aviation fuel.

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