

*IASH 2019, the 16<sup>TH</sup> INTERNATIONAL CONFERENCE  
ON STABILITY, HANDLING AND USE OF LIQUID  
FUELS  
Long Beach, CA  
08-12 September 2019*

**Investigation into Microbiological Fuel Contamination of the Airbus A380 During Refurbishment, Including Testing & Application of Kathon™ FP 1.5 Fuel Biocide**

Oliver James Rumford-Warr<sup>1</sup> and Rizwan Isap<sup>2</sup>.

<sup>1</sup>Fuelcare Limited, Mercury House, Shrewsbury Business Park, Shrewsbury, SY2 6LG, UK, [sales@fuelcare.com](mailto:sales@fuelcare.com)

<sup>1</sup>Fuelcare Corporation, 700 Lavaca #1400-92019 Austin, TX 78701, USA, [sales@fuelcare.com](mailto:sales@fuelcare.com)

<sup>2</sup>Dow Europe GmbH, Bachtobelstrasse 3, 8810 Horgen, CH

**ABSTRACT**

During the initial refurbishment of the new A380 aircraft, an internal procedure was developed by Airbus to remove redundant fuel from aircraft wing tanks. A small volume of fuel/water mix continued to reside in the tank bottoms leading to early stages of Microbiological Fuel Contamination (M.I.C.). Without safe, physical access to the tank bottoms for draining contaminated fuel, a preventative regimen of biocide dosing with Kathon™ FP 1.5 was planned to combat the issue.

Fuelcare consulted with Airbus & Dow Microbial Control to develop a biocide regimen using Kathon™ FP 1.5 fuel biocide. In order to evaluate the regimen, both field & laboratory trials were conducted. The field trial was carried out at the Airbus FAL (Final Assembly Line) in Hamburg and a laboratory study at Dow Microbial in Zurich. In the field study, Fuelcare systems dosed Kathon™ FP 1.5 at 100ppm into JET A1 for A380 aircraft MSN 0198 with test samples taken before & after the procedure. The samples were then tested by Airbus, Dow & Hamburg Institut für Hygiene und Umwelt, with the laboratory study by Dow Microbial. The successful testing resulted in a planned ongoing treatment regimen.

**INTRODUCTION**

During 2014, the first Airbus A380 aircraft began to arrive at Airbus' Finkenwerder facility in Hamburg for refurbishment. In order to clean the fuel tanks located in the wings of the A380, Airbus engineers had to remove unused JET A1 fuel using fuel drain points. This process did not fully empty the wing tanks, where fuel resides below the drain points and was unable to be accessed via normal methods without safety risks to Airbus engineers. Low points within fuel storage

systems are prone to water collection and subsequent microbial growth, which, if left untreated, may result in operational risk for the aircraft. Without the ability to remove this fuel, Airbus enquired with Fuelcare & Dow Microbial Control if another means of preventing microbial growth may be possible with a suitable biocide. Airbus required this solution to maintain a microbe-free environment in the residual JET A1 for a 16-week period; the length of time the Airbus A380 would remain at Hamburg during refurbishment.

Fuelcare and Dow Microbial Control proposed the use of Kathon™ FP 1.5 fuel biocide dosed into JET A1 prior to refurbishment. Kathon™ FP 1.5 is the only fuel biocide permitted for use in aviation and is dosed at 100ppm aviation applications or to the OEM permitted dose rate. Excess treated fuel would be drained, leaving a JET A1/biocide mix and subsequent protection against M.I.C. A testing plan was arranged and carried out with Airbus in both the field and laboratory. The field trial required the dosing of an A380 with Kathon™ FP 1.5 before refurbishment, with fuel samples tested before & after the trial only. Field trial results would be verified by an independent third party, Hamburg Institut für Hygiene und Umwelt. Concurrent to the A380 dosing, a long-term laboratory evaluation of Kathon™ FP 1.5 was initiated. Airbus Operations GmbH sent two, 1 litre samples of JET A1 fuel for analysis. The samples were inoculated with three different microbes ubiquitous in fuel environments (*Pseudomonas Aeruginosa*, *Yarrowia Tropicalis* and *Hormoconis Resinae*). The samples were then treated with Kathon™ FP 1.5 with weekly measurements over 16 weeks.

## **RESULTS**

The aim of both field & laboratory test work was to investigate if Kathon™ FP 1.5 was able to maintain to an acceptable level, the presence of nuisance microorganisms in JET A1 fuel for a full 16-week period. Individual microcosms were used to replicate worst-case scenarios (high water content, very high infection level) for the JET A1. In these tests, Kathon™ FP 1.5 was able to maintain the presence of microbes in the fuel to an acceptable level (below 10 CFU/ml) in both laboratory and field trials. Whilst Kathon™ FP 1.5 was not able to affect a positive result within 24 hours, the biocide thereafter was able to eradicate the microbial growth and continue its effect for the full refurbishment period of 16 weeks, with no requirement to add an additional dose. In both cases, as no additional fuel was added to the microcosms in this test work; it is possible that addition of contaminated fuel to treated fuel (such as would occur during refuelling of an aircraft) would have a detrimental effect on the function of the Kathon™ FP 1.5. It is likely that, in such a scenario, the Kathon™ FP 1.5 would be consumed completely and no longer confers any preservation. However, with no additional fuel, this test work shows that Kathon™ FP 1.5 is able to protect the fuel against microbial degradation and contamination for a period of up to 16 weeks.

## **CONCLUSIONS**

The Airbus project highlighted the efficacy of Kathon™ FP 1.5 in protecting aircraft fuel tanks from microbial attack. Both tests in the field & laboratory provided a positive use case for the method for Airbus in their refurbishment of the A380 aircraft. During the 16-week refurbishment of the A380, the fuel retained in the aircraft remained free of microbial growth, providing Airbus with a suitable solution. Furthermore, the dosing systems supplied by Fuelcare provided a

simple, accurate and effective method of dosing the JET A1 with Kathon™ FP 1.5 Fuel Biocide at the required dose rate. The additional laboratory trial confirmed that of the field trial – a full 16-week microbial growth protection for Airbus JET A1 fuels.

## **REFERENCES**

1. Wilker R., James M., Isap, R., 'Evaluation of Kathon™ FP 1.5 for Long Term Preservation of A1 Jet Fuel'. Dow Microbial Control.
2. c/o Aljac Fuelling Components Ltd, U.K.