Boletim Especial de Aeronavegabilidade (*Special Airworthiness Bulletin*)

ATA: 28 - Fuel

BEA Nº 2020-01

Subject: Biocide additive in jet fuel.

Date: March 31th, 2020

Introduction:

This Special Airworthiness Bulletin (BEA) is intended to alert the entire civil aviation community of recent problems regarding the use of aviation fuel biocides and the adverse engine operating conditions from their use.

This bulletin is informative, and the recommendations are not mandatory. Until this time, there is no airworthiness concern that would warrant an Airworthiness Directive (AD) according to Regulamento Brasileiro de Aviação Civil (RBAC) nº 39.

Manufacturer: See the paragraph "Background"**.**

Affected Aeronautic Product: See the paragraph "Background"**.**

Background:

The ANAC approved aviation fuel operating limitations may be listed in the product's aircraft flight manual, aeronautical product specification, installation manual, service instructions or manuals, or as limitations associated with a supplemental type certificate. Many of the fuel specifications allow for the use of a biocide to control microbiological growth in the fuel system of the aircraft. The two most common biocides in use today are Kathon™ FP1.5 and Biobor JF.

Microbiological contamination is caused by micro-organisms (bacteria, molds, yeasts) that grow in water and feed off the hydrocarbons in the fuel. Good housekeeping to prevent water accumulation in the fuel tanks is the most effective means to prevent this contamination. In case microbiological contamination is detected and needs to be treated with biocides, the up-to-date instructions presented in the engine and aircraft maintenance manuals should be followed to ensure that the correct method and dosage is applied.

In engines and aircraft where biocides are approved for use, the manufacturers provide procedures in their AMMs for the application of these biocides into the aircraft fuel tanks. Several recent events have been documented showing adverse engine effects on the ground and in-flight after the application of these products. Two of these events were the result of overdosing the fuel system beyond the recommended dosage, however, one event has shown no evidence of misapplication. While lack of clarity of the AMM procedures, or lack of adherence to those procedures may have contributed to the overdosing events, evidence suggests that some engine models are more sensitive to Kathon FP1.5 concentration than others.

The DuPont, the manufacturer and distributor of Kathon™ FP1.5, has recommended discontinuing its utilization for aeronautical products. The General Electric is also taking measures to remove Kathon™ FP1.5 from the approved fuels additives for their engines, while additional testing is being conducted.

Recommendations:

1. Operators should consult their Aircraft Flight Manuals (AFMs), AMMs, the latest service documents, and communications from the manufacturers of their engines and aircraft to determine which biocide additives are approved for use on their aircraft and engines and adjust their procedures to reflect the latest approvals.

2. Type Certificate and Supplemental Type Certificate holders of turbine engine powered aircraft are expected to ensure that applicable engine limitations regarding the use of biocide are properly implemented into the aircraft's Instructions for Continued Airworthiness (ICA). In case biocide usage is approved for airframe application only, the engine(s) should not be operated with fuel containing biocide and the aircraft TC or STC holder is to provide appropriate maintenance procedures to prevent ingestion by the engine of fuel containing biocide.

3. Gas turbine powered engine and aircraft manufacturers and operators should review current biocide application procedures and practices and consider the following recommendations:

    a. Aircraft fuel tanks should have the following minimum volume of fuel upon completion of biocide treatment:

        i. 1/3 of tank volume for the initial treatment of a tank with confirmed biological contamination. This may be increased if the aircraft is not limited by fuel weight for its intended mission.

        ii. 100% of tank volume for a second treatment of a tank with confirmed biological contamination (if necessary).

        iii. 10% of tank capacity for preparing aircraft for storage.

    b. The additive should be applied to an aircraft fuel tank as follows:

        i. For aircraft equipped with underwing pressure refueling capability, the additive should be injected with a metered injection cart at the concentration levels shown in Table 1. The injection cart should be equipped with a graduated additive vessel to allow the determination of the volume of additive injected during a biocide servicing.

        ii. For all other aircraft, a means should be provided to blend the biocide additive into the jet fuel upstream of a pump and/or filtering system prior to loading into the aircraft fuel tank. This can be accomplished by blending the biocide additive into a refueling vehicle or separate fuel tank and then pumping the fuel into the aircraft.

    c. The resulting concentration of biocide additive in the aircraft fuel tank should not exceed the levels shown in Table 1. Prior to treatment, care should be taken to account for residual biocide levels that exist in the tank, either from previous treatments or from the fuel supplier.

    d. For each application of an approved biocide additive, record the following information:

i. Type of biocide used.

ii. Quantity of fuel in the aircraft tank before additive injection.

iii. Quantity of fuel uplifted into the tank when injecting the biocide additive.

iv. Quantity of fuel in the tank after injection of the biocide additive.

v. Quantity of biocide additive injected for each application.

Produto and Concentration	Kathon™ FP1.5	Biobor JF
Maximum Concentration of Biocide Additive in Uplifted Fuel	0,135 ml/l = 135 parts per million (ppm) by volume	0,269 ml/l = 269 ppm by volume (also equivalent to 364 ppm by weight based on a minimum density jet fuel)
Maximum Concentration of Biocide Additive in Aircraft Fuel Tank after Biocide Injection	0,100 ml/l = 100 ppm by volume	0,199 ml/l = 199 ppm by volume (also equivalent to 270 ppm by weight based on a minimum density jet fuel)

Table 1 – Maximum Recommended Concentrations in Jet Fuel.

4. Operators, aeronautical product maintenance organizations and auxiliary service organizations should review their procedures, training requirements, and training records of persons charged with adding biocide to affected aircraft. They should also verify that their biocide application procedures are consistent with those provided in the manufacturer's AMM, and that maintenance personnel are adhering to those procedures.

5. Operators and auxiliary service organizations should keep detailed records of any biocides applied to fuel farms and uploaded to aircraft such that the proper end dosage can be determined based on the fuel supplied.

6. Operators should review their records for potential unreported cases of fuel control damage or contamination that may be the result of biocide contamination. If any cases are found, they should be reported to the engine and aircraft manufacturer.

7. Procedures for decontaminating fuel systems on aircraft should also consider:

a. Maximum biocide concentration permitted in uplifted fuel and in the fuel in the aircraft tank are clearly specified.

b. Proper quality controls are included in the process such that real-time calculation are not required by the crew trying to perform the decontamination tasks.

c. Necessary caution statements and warnings for administering any fuel additive that can overdose the fuel system and cause hazardous engine effects are included.

8. Engine and aircraft manufacturers should survey their operators who may have experienced biocide contamination of engine fuel system components and report the results to their appropriate airworthiness authority.

9. The continued surveillance activities from ANAC should focus audit activities on the proper application of all biocides. Pay particular attention to those steps that ensure the proper concentration of additive is blended into the fuel.

Reference documents:

1. Safety Information Bulletin (SIB) No.: 2020-06 issued by European Aviation Safety Agency (EASA) on March 20, 2020.

2. Special Airworthiness Information Bulletin (SAIB) 2020-02 issued by Federal Aviation Administration (FAA) on March 25, 2020.

For further information contact

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