Kathon™ FP 1.5 Fuel Biocide – Jet Fuel Data

Kathon FP 1.5 microbiocide from Rohm and Haas is a patented, high performance antimicrobial agent, developed specifically to combat problems of microbial contamination and spoilage in hydrocarbon fuels. The effectiveness of Kathon FP 1.5 has been proven over a number of years and it has extensive approvals endorsing its use in a range of fuel types - including civil and military aviation fuels.

DEVELOPMENT OF MICROBIAL GROWTH

Microbial contamination is likely to occur wherever fuel and water come into contact, either in fuel tanks or distribution systems. Modern fuelling technology ensures that fuel, on entering the aircraft, is almost totally free of undissolved water. However, temperature variations on the ground and in flight result in the condensation of atmospheric humidity or dissolved water within the fuel tank. This condensation builds up to form a water bottom.

Micro-organisms can be air and waterborne. Therefore, as the water bottom develops a microbial population becomes established in it. For many of the species present in the water bottom, the fuel represents an ideal nutrient source. These organisms flourish, living in the water phase, whilst feeding on the fuel or tank coatings. In the early cases of contamination, the fungus Cladosporium resinae (now known as Hormoconis resinae) was the predominant organism. Subsequently, many other organisms (bacteria, fungi and yeasts) have been identified as contaminants including pathogens in aviation fuels. This is a consequence of both the adaptation of microbial species and greater international travel, which has aided the global proliferation of fuel contaminants.

PREVENTION

Fuel tanks and sumps should be drained of water regularly. Whenever periodic maintenance is carried out, tanks should be checked for slime growth. The maintenance programme mentioned above will reduce the likelihood of microbial contamination. The use of Kathon FP 1.5 in combination with such a maintenance programme will decrease the risk of contamination to a minimum.

CONSEQUENCES OF CONTAMINATION

Microbial contamination endangers both fuel quality and fuel systems. Some of the common manifestations and consequences of the problem are outlined below.

Fuel Quality:

Aviation fuel should be "clear and bright". Contaminated fuel is often hazy. The primary cause is an increase in the water content of the fuel resulting from the production of biosurfactants. These are by-products of microbial growth and alter the surface tension at the fuel/water interface. In consequence. the solubility of water in the fuel is increased

Additive Degradation:

Many additives present in fuels can be readily degraded by micro-organisms. This means their effect is lost and in consequence the fuel may no longer meet specification.

Structural Damage:

Certain micro-organisms can digest components of surface coatings or fuel lines, thus greatly reducing their in service life. Others, known as sulphate reducing bacteria (SRB), cause microbially induced pitting corrosion.

Filter Plugging:

Biopolymers are formed during microbial growth. These are gummy products which block fuel lines and plug filters.

Slime Growth:

Some micro-organisms grow to form filamentous slimes. These slimes can either float in the fuel, where they plug filters or adhere to surfaces. If slime adheres to equipment, for example a fuel gauge may give erratic readings. In addition. the susceptibility to microbially induced corrosion of surfaces covered with slime is greatly increased.

KATHON FP 1.5 PERFORMANCE BENEFITS

Kathon FP 1.5 has been designed to eradicate all kinds of microbial contamination. It therefore offers a number of outstanding performance benefits.

Approvals:

Kathon FP 1.5 is widely approved for use in Military and Civil aviation fuels. Full details of the approvals status of Kathon FP 1.5 are given in a separate bulletin.

Speed of kill:

Kathon FP 1.5 causes immediate inhibition of growth on coming into contact with a micro-organism. Growth inhibition rapidly becomes irreversible and results in cell death. This ensures rapid eradication of contamination (8-12 hours).

Broad Spectrum Activity:

Kathon FP 1.5 is effective against all commonly occurring aviation fuel contaminants (bacteria, fungi and yeasts).

Long Term Preservation:

Fuel treated with Kathon FP 1.5 will remain protected from contamination over long periods of time. It will also resist contamination if reinnoculated from another source.

Complete System Protection:

The partitioning characteristics of Kathon FP 1.5 ensure that it is present in both the fuel and the water phases. This enables:
a) Eradication of contamination in the water bottom, without hydrolysis
b) Protection of the treated fuel if transferred through a distribution system

Ease of use:

Kathon FP 1.5 is easily dosed into fuel. No special storage conditions for Kathon FP 1.5 are required.

Safety and support:

Rohm and Haas (now part of Dow) offer customers a comprehensive package of support services and data to promote the safe and effective use of Kathon FP 1.5. This includes extensive data on environmental fate, toxicology, materials compatibility and assistance in areas such as disposal and product handling.

No time constraint on use of fuel after treatment: Jet fuel containing Kathon FP 1.5 can be stored for several months before use.

DOSING OF KATHON FP 1.5

Kathon FP 1.5 should be added preferably by means of metered injection into the fuel line during aircraft refuelling. This ensures accurate dosing and even distribution of the production in the fuel. Suitable metering systems are available from several suppliers. Please contact your local Rohm and Haas office for recommendations. Overwing dosing is not recommended for reasons of worker safety and dosing accuracy. If these difficulties and good mixing of the product can be ensured, then overwing dosing will give equivalent results to metered injection.

Kathon FP 1.5 at recommended use levels will eradicate commonly occurring fuel contaminants in 8-12 hours. Following treatment, dead micro-organisms and other debris from the treated fuel will accumulate on the tank bottoms. This should be drained off. Filters should also be checked frequently and examined for the buildup of suspended solids.

Kathon FP 1.5 should be used as a part of routine fuel system maintenance programme. Biocide treatment is a complement to and not a substitute for good housekeeping.

Dose Levels: Kathon FP 1.5 recommended use level in aircraft fuel tank is 100 ppm. Never dose Kathon FP 1.5 as supplied into an empty fuel tank.

HANDLING SAFETY

Use of a metered injection system to dose Kathon FP 1.5 minimises worker exposure to the product as supplied. On those occasions where Kathon FP 1.5 is handled directly appropriate precautions should be taken. Avoid dermal and eye contact. Suitable protective clothing should be worn, including nitrile rubber gloves and safety goggles/face shield. After working with Kathon FP 1.5, wash thoroughly with soap and water, particularly before eating, drinking or smoking.

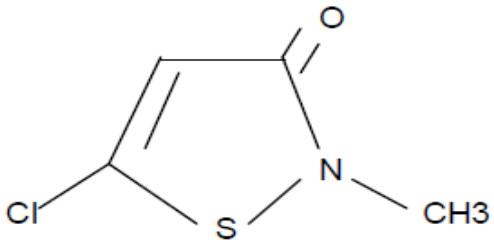
DRAINED WATER

Low levels of the active ingredients of Kathon FP 1.5 will be present in water drained from aircraft using treated fuel. This water can be discharged to a municipal or chemical sewer. Do not discharge directly to open bodies of water. Water pH is not modified by the presence of Kathon FP 1.5.

N.B.: This guideline applies only to water discharged from aircraft fuel tanks. Information relating to disposal of water bottoms from bulk storage tanks is given in the Kathon FP 1.5 Safety Guidelines. Detailed information on handling, storage, environmental effects and other safety issues is given in the Safety Guidelines Bulletin for Kathon FP 1.5 (www.fuelcare.com/pdf/kathonmsds.pdf).

CHEMICAL AND PHYSICAL PROPERTIES The active ingredients of Kathon FP 1.5 are identified using the IUPAC nomenclature as 5-chloro-2-methyl-4-isothiazolin-3-one and 2-methyl-4-isothiazolin-3-one.

Structural Formulae:



5-chloro -2-methyl-4-isothiazolin-3-one
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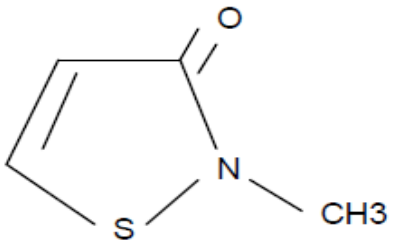
EINECS N° 2475007



2-methyl-4-isothiazolin -3-one
CAS Registry N° 2682-20-4
EINECS N° 2202396

Properties of Kathon FP 1.5:

- Appearance Yellow Liquid
- Odour Mild
- pH (as produced) 4 - 6
- Specific Gravity (25°C) 1.04
- Viscosity (25°C) 97.8 CpS
- These values do not constitute specifications

Kathon FP 1.5 and this data sheet are distributed by Fuelcare Ltd.

For further information go to www.fuelcare.com/kathon.htm

KATHON™ IS A TRADE NAME OF DOW MICROBIAL (FORMERLY ROHM & HAAS)