

For the attention of all parties involved in the manufacture, trading, testing, storage, handling and delivery of jet fuel

RISK OF CONTAMINATION OF AVIATION KEROSENE (JET FUEL) WITH BIODIESEL

The recent introduction of biodiesel into many countries has created a new threat to jet fuel quality. This note summarises the issues and highlights where extra attention is required to manage the increased risk.

It is now common (especially in Europe) for national governments to mandate the use of renewable components in automotive fuels. One of the most common options is to blend Fatty Acid Methyl Ester (FAME) into diesel to produce what is often called 'biodiesel'. Biodiesel is designated B5 when it contains 5% FAME. Pure FAME is often designated B100.

There are two main issues with introduction of FAME into diesel fuel that impact on jet fuel:

- 1) FAME is surface active and tends to stick to metal or glass surfaces. This creates new risks for cross contamination where supply chains handle both jet fuel and biodiesel.
- 2) FAME is a non-hydrocarbon fuel component. The jet fuel specification states explicitly that only hydrocarbon components or approved additives are allowed.

The international jet fuel specifications (eg DEF STAN 91-91) limit FAME content to less than 5 mg/kg (ppm w/w). Levels above 5 mg/kg, render the fuel off-specification.

This is a serious issue because there have been recent instances in which jet fuel containing above 5ppm FAME has, inadvertently, been supplied to the airport.

Cross contamination can arise from FAME sticking to surfaces or simple bulk contamination (note that the 5ppm specification limit is equivalent to only 1litre of B5 in 10,000 litres of jet fuel). Attention should be focused (but not limited to) the following areas:

- In **multiproduct pipelines**, pipewall effects can be mitigated with the use of intermediate buffers (see JIG Bulletin 15 at www.jointinspectiongroup.org). However, there is also the risk of trace biodiesel contamination in manifolds, pumps etc (see JIG Bulletin 16 at www.jointinspectiongroup.org).
- For **ships and barges**, care must be taken with tank cleaning and flushing and draining common lines including sea or jetty loading lines. Experience has shown that switching from a B5 to jet fuel requires at least a hot water tank wash (but preferably also an intermediate FAME-free cargo) to remove FAME residue. Switching from neat FAME to jet fuel requires particular care and some advocate at least 3 intermediate (zero-FAME) cargoes plus the hot water wash before loading jet fuel.
- Active tank cleaning rather than simple draining is required for **road tankers and rail tank cars** when switching between biodiesel and jet fuel. Dedicating facilities to jet fuel is an alternative means of ensuring compliance with the jet fuel specification.
- Experience has shown that the practice of 3 rinses for **sample cans** does not always remove all traces of FAME and therefore dedicated sample cans and new gloves are simple options to reduce the risk of false alarms.

JIG has issued previous bulletins with regard to the problems with FAME contamination and FAME testing (Bulletins 15, 16 and 20) and will send further communications in the future.

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