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## Contamination of Jet Fuel: A Response to J. C. Jones

In response to J.C. Jones' comments on the contamination of jet fuel with biodiesel,<sup>1</sup> it is pertinent to point out that jet fuel is a highly specified petroleum distillate fuel product, for obvious safety reasons. The majority of the world's jet fuel conforms to the Aviation Fuel Quality Requirement for Jointly Operated Systems (AFQRJOS) or "Check List" published by the Joint Inspection Group (JIG) which combines the most stringent requirements of two international specifications, namely the UK MoD's Defence Standard DEF STAN 91-91 and ASTM D 1655. One important aspect of these specifications is that the fuel should not contain any additives (either deliberately or inadvertently introduced) that have not gained industry approval, which at the present time includes biodiesel. To approve jet fuel additives involves considerable testing by the various stakeholders, including fuel producers, airframe and engine manufacturers and military organizations, which often takes several years and considerable expense to complete.

As a general rule, therefore, and irrespective of whether polar biodiesel components might improve certain fuel properties such as conductivity, their introduction should not be considered as being beneficial. Indeed, the presence of such components in jet fuel can be an indication of poor handling procedures, and the trace levels (5 ppm) currently allowed by the specification has more to do with the transport system itself, which was never designed to prevent carryover at these levels. It should be recognised, however, that any perceived benefits could potentially be severely countered by detrimental effects on other, possibly more critical, jet fuel properties. The aviation fuels industry relies on shared delivery systems to transport jet fuel from the source of manufacture to aircraft, and it is important that any impacts of contamination, whether good or bad, should be fully established before the event, and the industry is currently addressing this very question from the perspective of the critical specification properties.<sup>2</sup>

For example, operators are at great pains to avoid water and dirt uptake as the fuel passes through the distribution system, as well as any contamination that could possibly reduce thermal stability and freezing characteristics. The inclusion of polar species from biodiesel could potentially stabilize higher water and dirt concentrations in the fuel, as well as introducing uncertain effects on thermal degradation. It is in respect of these latter properties, rather than combustion behaviour, that organizations responsible for safety in the aviation (fuels) industry have expressed concern over the jet fuel contamination by other fuel components. In fact, good combustion and emissions performance were reported last year in Virgin Atlantic's short demonstration flight using a 20% biofuel/80% aviation kerosene mixture.<sup>2</sup>

Only after conducting rigorous testing, it is not inconceivable that appropriate bio-derived fuels could play a part in the future aviation fuels industry.<sup>3</sup> At present, however, the industry remains vigilant in its efforts to avoid all sources of jet fuel contamination and to understand the implications if contamination at significant levels were to occur.

References

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