

**11TH INTERNATIONAL CONFERENCE ON STABILITY,
HANDLING AND USE OF LIQUID FUELS
October 18-22, 2009
Prague, Czech Republic**

**STUDIES OF THE COMPATIBILITY OF DIEGME AND TRIEGME ICING
INHIBITOR ADDITIVES WITH AIRCRAFT TANK TOPCOAT MATERIAL**

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In the 2007 IASH conference, we reported on initial studies of the development of alternative fuel system icing inhibitor candidates for replacement of diethylene glycol monomethyl ether (DiEGME). DiEGME was implicated in an increasing incidence of reports of the peeling of topcoat material in the ullage space of integral wing tanks in the B52 and other military aircraft. Work has indicated that for the combination of DiEGME in JP-8 fuel, the icing inhibitor additive can concentrate in the tank ullage and condense at elevated concentrations on the upper tank walls. These high concentrations of DiEGME cause swelling and subsequent peeling of the epoxy-based topcoat.

In the current work we report on detailed studies of the compatibility of DiEGME and icing inhibitor replacement candidate triethylene glycol monomethyl ether (TriEGME) with fuel tank topcoat material. Tests were designed to simulate fuel tank wall exposures with subsequent topcoat degradation measured by icing inhibitor uptake analyses, pencil hardness evaluations, and attenuated total reflectance IR spectroscopy. The lower volatility of TriEGME relative to the JP-8 fuel components results in it being less able to concentrate in the tank ullage and promote topcoat failure. This was confirmed with lower additive levels measured in the ullage, condensed vapors, and the exposed topcoat material. The pencil hardness of topcoat material exposed to fuel vapors was significantly improved upon changing from DiEGME to TriEGME exposure. Plans for future evaluations will be described.