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POSTER

**EFFECTS OF AROMATIC TYPE AND CONCENTRATION IN FISCHER-TROPSCH
FUEL ON EMISSIONS PRODUCTION AND MATERIAL COMPATIBILITY**

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There has been continued interest in the potential use of fuels produced via the Fischer-Tropsch (FT) process for aviation applications. These fuels can be produced from various non-petroleum feedstocks, such as coal, natural gas and biomass, and could reduce reliance on foreign supply. FT fuels are typically comprised solely of *iso*- and *normal*-alkanes and do not contain aromatics or heteroatoms. These latter compounds are believed to provide seal-swell and other needed fit-for-use properties, but have also been shown to increase undesirable particulate matter (PM) and gaseous emissions during combustion. The eventual widespread use of FT fuels may require blending with an additional feedstock to provide specific operational properties. One potential option is to blend with an aromatic solvent. An improved understanding into the effect of the type and concentration of the aromatic solvent on overall system performance will assist in identifying potential candidates to meet the operational requirements. Of specific interest are the extent by which the combustion emissions and seal-swell behavior will be affected.

In this effort, three different aromatic solvents of varying molecular weight encompassing the range found in typical JP-8 fuels, were added both independently and as a blend to an FT fuel to assess their effects on the emissions of a T63 engine and on seal swelling. The engine was operated at two power conditions, idle and cruise, to study the effects of varying combustion temperatures and pressures. Strong impacts on the emissions were observed as a function of both the solvent type and blend concentration used. Improved swelling characteristics of nitrile rubber O-rings were observed with addition of the aromatic solvents. Test procedures, analysis techniques, and results will be presented.