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Effect of Fuel Additives on Spray Performance of Alternative Jet Fuels[1] KUMARAN KANNAIYAN, REZA SADR, Texas A&M University at Qatar — Role of alternative fuels on reducing the combustion pollutants is gaining momentum in both land and air transport. Recent studies have shown that addition of nanoscale metal particles as fuel additives to liquid fuels have a positive effect not only on their combustion performance but also in reducing the pollutant formation. However, most of those studies are still in the early stages of investigation with the addition of nanoparticles at low weight percentages. Such an addition can affect the hydrodynamic and thermo-physical properties of the fuel. In this study, the near nozzle spray performance of gas-to-liquid jet fuel with and without the addition of alumina nanoparticles are investigated at macro- and microscopic levels using optical diagnostic techniques. At macroscopic level, the addition of nanoparticles is seen to enhance the sheet breakup process when compared to that of the base fuel. Furthermore, the microscopic spray characteristics such as droplet size and velocity are also found to be affected. Although the addition of nanoscale metal particles at low weight percentages does not affect the bulk fluid properties, the atomization process is found to be affected in the near nozzle region.

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