

## **259d Rheological Characteristics of Anti-Icing Fluids**

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Anti-icing fluids are used prevent the formation of ice on aircraft surfaces. They are formulated to have a high viscosity when the fluid is at rest, producing a thicker layer than a deicing fluid, and a low viscosity under shear to enable the fluid to flow off aircraft surfaces during takeoff. The rheological properties of anti-icing fluids critically affect the performance of the fluid during its use; therefore, laboratory tests that predict the rheological properties of the fluid are important both for the development of fluids for this application and for insuring that the performance of commercialized fluids continue to meet performance specifications. In this work, we investigate the potential of dynamic oscillatory rheological measurements to characterize the performance of these fluids. In addition to providing a measure of the viscosity of these fluids, our dynamic oscillatory rheological measurements also provide a measure of the elastic properties of the fluids. We compare the data obtained from these measurements with those obtained by a controlled stress rheometer. We show that the deicing fluids behave as highly elastic fluids. They exhibit yield stress values and modulus versus frequency data characteristic of the plateau region for fluids with strong entanglement coupling or crosslinking even at the lowest frequency attainable in our tests ( $10^{-2}$  radians/sec).