



On the Fluid Flow and Thermal Analysis of a Compliant Surface Foil Bearing and Seal[©]

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Foil gas bearings have been applied successfully to a wide range of high-speed rotating machinery such as air cycle machines (ACMs) and auxiliary power units (APUs). The performance of these bearings are based on the high pressure gas in a very thin layer between the journal and the bearing governed by the Reynolds equations. Generation of heat in these bearings especially at high journal rotating speed and high loads or at high ambient temperature directly affect their performance. Thermal and fluid flow analysis of an advanced compliant foil journal bearing/seal are presented. The side flow (known as leakage) and the approximate temperatures are the results of this analysis. The

result of preliminary analysis shows that the major portion of the heat is carried through conduction and using the modified Couette flow approximation for the present working fluid, air, helped in analysis of the temperature magnitude, which can be related to the gas viscosity behavior and thin gas film thicknesses.

KEY WORDS

Gas Bearings; Foil Bearings; Viscosity-Pressure Behavior; Seals