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## Aerodynamics Performance for Stepped Labyrinth Seals for Gas Turbine Applications

This paper presents the leakage performance of various stepped labyrinth seals. A stationary seal test rig was set up and the leakage characteristics of three seal configurations with different numbers of steps and teeth were investigated for wide operating ranges in terms of pressure ratio and tip clearance. Both the solid and honeycomb land structures were tested. In the honeycomb case, two different sizes were used. The seal was shaped, typical of labyrinth seals for gas turbine applications. The influences of seal configuration, and clearance and honeycomb sizes on the leakage performance were investigated. The relative performances between different seal configurations were compared and their dependence on the land structure was investigated. The honeycomb structure was found to increase leakage for all test conditions. The leakage ratio (honeycomb/solid) was analyzed in terms of geometric variables.

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