

SUMMARY

Rotating Micro Machines and Micro Gas Turbines (MGT) must spin at high rotating speed to achieve high power density. MGT requires a starter to rotate to a certain speed from which it starts operating on its own. A Partial Admission Turbine Drive (PATD) is one such a starter used to accelerate MGT upto self sustain mode of operation.

Partial admission turbine is required to be designed and fabricated for a MGT. In this report the aerodynamic design of partial admission turbine by optimizing various design parameters like specific speed, specific diameter, blade chord etc is presented.

The turbine geometry has been optimized by design analysis. The turbine blade geometrical coordinates have been generated and used for machining the blades using three-axis milling machine. The complete assembly has been modeled using Solid Works software tool. A special rig was fabricated and the PATD was run up to 45000rpm. The rig design such as rotor bearing arrangement and its critical speed analysis were carried out.

Thus the scope of the present work involving the complete design, fabrication and testing of the PATD starting system in a special rig were successfully carried out.