

## STATIC AND DYNAMIC DATA LABYRINTH SEAL FOR OPTIMUM DESIGN

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### ABSTRACT

Labyrinth seal installed in a turbo-machinery may induce the unstable vibration, because the dynamic characteristics of the labyrinth seal has inherent unstable component due to circumferencial velocity in the seal. Many people have studied on this problem by experimental, theoretical and calculation studies and many papers have published on this problem, but there is no paper about how to design the labyrinth seal, that is, there is no necessary data to design a labyrinth seal which represent variation of physical characteristics for design variables. So turbo-machinery designer decides the configuration of the seal by traditional way.

In the labyrinth seal design, there are two important factors for designing a high efficiency and stable turbo-machinery in the labyrinth seal design. One is to reduce leakage loss and the other is to avoid the instability of rotor system. However these two factors may have trade off relations. So optimum design will be desired. This paper presents a static and dynamic design data to decide the seal configuration for obtaining high efficiency and stable rotor system, that is, when constraints and conditions of the seal are given, optimum seal configuration (fin height, width, clearance, number of fin and so on) will be able to decide.

**Keywords:** Labyrinth seal, Labyrinth seal data, seal leakage, stability of seal, Labyrinth seal design