

Tilting-Pad Journal Bearings

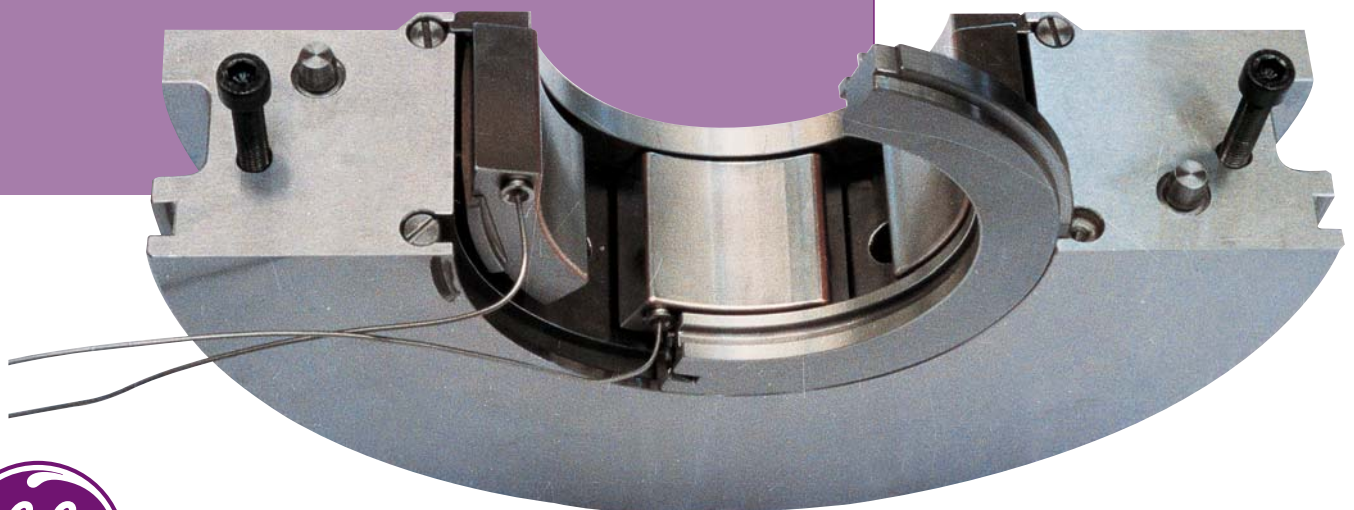
Benefits

- □ □ Increased production
- ■ □ Higher efficiency
- □ □ Compliance with environmental regulations
- ■ ■ Availability and Reliability
- ■ ■ Life extension

GE Oil & Gas tilting-pad journal bearings deliver many advantages including:

- Improved dynamic performance of the rotor-bearing system and drastic reduction of instability caused by lubricating oil
- Bearing adaptability to shaft movements as a result of to the ability of the shoe to tilt
- Uniformly distributed oil flow from five equidistant radial feed holes
- Reduced oil flow controlled by the oil seals
- Increased stability due to greater damping
- Lower spare parts costs since only the pads need to be changed
- Significant reduction in delivery time for spare parts as the shoes are standard components and readily available from stock
- Availability of a thermocouple kit to monitor the temperature of the bearing system (*Figure 1*)

Figure 1



What it is

Bearings for rotating parts are key components for the safe operation, mechanical integrity and durability of steam turbines. Research by GE Oil & Gas has led to the use of pivoted tilting-pad bearings as replacements for the previous generation of four-lobed and elliptical bearings (Figure 2). The new bearing system, designed

and produced by GE Oil & Gas, consists of a housing split along the centerline (Figure 3) with five shoes and a pad fitted under the rim of each shoe that allows the shoes to tilt (Figure 4). This modification can be applied to all steam turbines originally fitted with elliptical or lobed bearings.

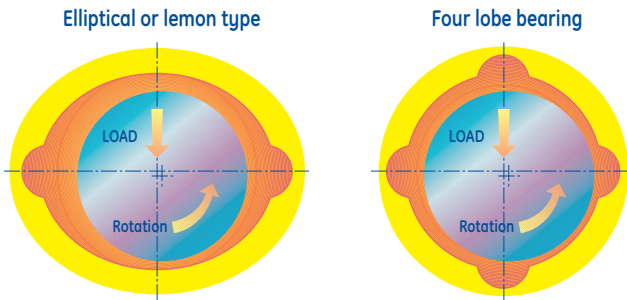


Figure 2



Figure 4

Figure 3

How it works

Each pad is circumferentially secured to the housing with radial pins to prevent the shoe from moving circumferentially, while allowing it to adjust to the position of the shaft. There are five oil feed holes in the bearing housing in the annular spaces between the shoes. Oil flow to the bearing is guaranteed and controlled by two calibrated metal oil seals that are removable in order to check lube oil flow by measuring the diameter. The journal shoes are made of low-carbon steel with

a babbitt coating on the bearing surface; the pads are made of high-carbon steel, heat treated to impart a high degree of hardness to the tilt surface. The bearing can be oriented in two positions according to the load support to be accommodated:

- Load on one shoe: standard configuration (Figure 5)
- Load between shoes: used for large rotors and/or critical flexure situations (Figure 5)

The GE Oil & Gas bearings have offset pivots that optimize the load distribution on the shoe when the rotor is in operation and provide a better oil film wedge (Figure 6).

In order to provide an optimum oil wedge and to guarantee greater supportable loads, the GE Oil & Gas tilting-pad bearings are preloaded. The preload value varies according to the dimensions and the specific application (Figure 6).

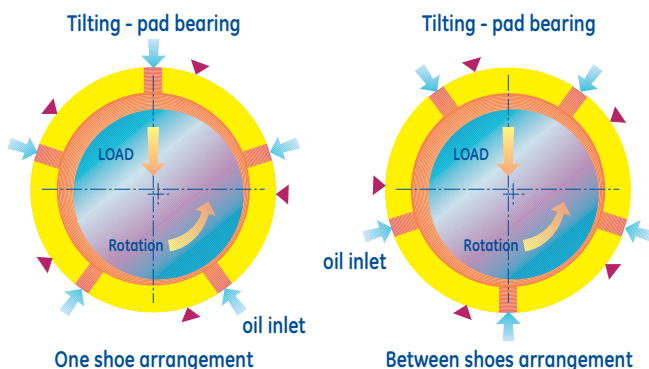


Figure 5

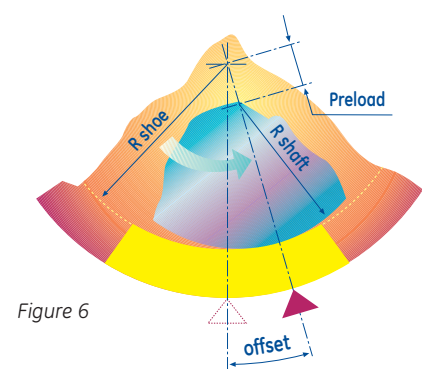


Figure 6



GE imagination at work