# Stationär belastete Radial-Gleitlagersegmente mit und ohne Randleisten

## dreidimensionales Berechnungsverfahren mit finiten Elementen

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## Dreidimensionales Berechnungsverfahren mit finiten Elementen

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# Finite Element Analysis of Stationarily Loaded Journal Bearing Pads Including the Pocket Pad


## Abstract

Under conditions of high sliding speed and high specific load, the maximum temperature at the stationary surface does represent one of the main limits of operation. Elementary theories neglecting the effect of temperature variations across the lubricant film are not sufficient to predict the surface temperature maximum.

In the present paper, a three-dimensional finite element Galerkin solution is applied to the differential equation for the temperature, while the solution of the incompressible Reynolds equation is based on a two-dimensional finite element solution of a variational principle. The lubricant is assumed to be newtonian and its viscosity depends on the temperature and the pressure. Therefore an iterative procedure is required to solve the system of the two partial differential equations.

Different theoretical results are presented and compared with one- and two-dimensional solution method. Also the pocket bearing was investigated including the effect of hot-oil-carry-over. In a further analysis the influence of the gap geometry considering the variation of the oil film shape due to thermal and mechanical deformation of the pad is determined. In this context, the choice of the diametral clearance is a main point. The final analysis shows that the limit of specific load is a function of the bearing diameter.