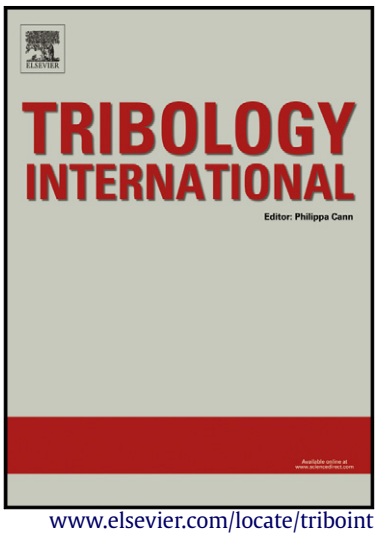


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R. Gawarkiewicz, T.A. Stolarski, K. Tesch

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# Acoustic journal bearing – a search for adequate configuration

R Gawarkiewicz, T A Stolarski[1)], K Tesch
Gdansk University of Technology, Gdansk, Poland
[1)] also Brunel University London, Uxbridge, Middlesex, United Kingdom
mesttas@brunel.ac.uk
Tel: +44(0) 1895 266693
Fax: +44(0) 1895 256392

Abstract
Classical non-contact bearings are already used in a number of specialist applications but there are some specialist areas where they cannot be used for variety of reasons and acoustic sliding bearings could be an alternative.
The paper presents the quest for a configuration of an acoustic journal bearing and shows that the overall shape of the bearing and its geometry are of a vital importance for the load capacity of the bearing. The results clearly demonstrate that the acoustic journal bearing with appropriate geometry can develop a load capacity of magnitude that can be sufficient for some practical applications.
The search for the appropriate configuration was carried out using finite element modelling and experimental validating testing.

Key words: journal bearing; acoustic levitation; squeeze film; experimental validation.

## 1. Introduction

Contactless interaction of objects (with rotational or linear motion) has significant advantages in many situations. Being non-contact, the systems can be operated at much higher speeds than using conventional bearings. Also, there should be no problems associated with overheating and wear of the bearing components. Thus, high precision of motion and high speed can both be achieved.

Classical non-contact bearings such as aerostatic bearings and magnetic bearings are already being used in many practical applications. However, a continuous supply of a large volume of clean air is required for the air bearings, which leads to a high running cost and sometimes a bulky installation. Magnetic bearings cannot be used for magnetically sensitive