

## Experimental study of hydrodynamic spiral groove mechanical seals

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### Abstract

The aim of this work is to present an experimental investigation of the behavior of non-contacting spiral groove hydrodynamic mechanical seals, operating with water.

This type of seals was initially designed for dry gas applications like compressor. But it tends to be more currently used in liquid applications where low friction values are necessary

The spiral grooves on the rotating ring produce, by a pumping effect, a hydrodynamic pressure which enhances the generation of a full fluid film of a few microns in thickness. During the tests, the leakage and frictional torque as well as the surfaces displacements are measured in stationary regime. It allows having an estimation of the film thickness and the lubrication regime. The effects of various fluid temperature, supply pressure and shaft velocity values are investigated and analysed. The critical speed of the seal faces separation is measured during start-up. Very low critical speed values were measured indicating that this kind of seal mainly works in hydrodynamic regime.