

# **NEW CONCEPT OF THE SPIN TEST SYSTEM WITH ACTIVE MAGNETIC BEARINGS**

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## **ABSTRACT**

*The bladed rotor of the turbomachinery should be tested at high speeds, usually run in vacuum chambers to avoid high-speed ventilation power losses. The development of active magnetic bearings and high-speed electric motors technology makes it possible to develop a new concept of the spin test machine system. Such a system integrates a high-speed drive electric motor and active magnetic bearings entirely mounted in the vacuum chamber (without coupling and sealing). The system has been developed for the needs of turbomachinery revamp and manufacturing industry looking for high flexibility, compactness (no seals, no oil system), and reduced maintenance (no contact, no wear).*

*An application of magnetic bearings as a system of spin test machine shaft suspension gives supplementary diagnostic capabilities, unparalleled to classic solutions.*

*The overall goal of an AMB controller is to stabilize the plant and to reach optimal performance. This leads to a new concept for control systems and actuators which allow one to consider the idea of test machine protection not only by vibration signal measurement but also by bearing dynamic forces analysis. An idea of maintaining a low level of dynamic forces and consequently a low level of vibrations in the whole operating range of the rotating system of the test spin rotor (including critical speeds) under test has been presented.*

*The complete system designed, built and tested under industrial conditions permits an expansion of new magnetic bearing applications that result in savings in both costs and time. The aim of this paper is to present a few capabilities of actuators that are connected with the designed digital structure of the bearings controller. Some experimental results are shown as well.*