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DESIGN AND TEST PROGRAM IN THE DEVELOPMENT OF A 100 HP OIL-FREE, HIGH-SPEED BLOWER

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ABSTRACT

This paper describes the design procedures and testing program in the development of a 100 HP single shaft permanent magnet motor driven centrifugal compressor/blower using compliant foil bearings. The development program included design tradeoff studies assessing motor rotor and bearing configurations, selection of the compressor/blower, and design of the system thermal management system. This paper also describes the test program to assess dynamics, thermal management of the system and testing to assess compressor blower flow and pressure performance. This program demonstrates the successful integration of oil-free foil bearings, 4-pole composite wound permanent magnet motor, thermal management capabilities and a state of the art centrifugal compressor.