HISPEED NANO MAG SEAL

Goal of the project

The project technical objective is to achieve at experimental model scale new leakage-free MNF sealing systems for high peripheral speeds (up to 30 – 70 m•s-1) in the sealing area, designed to equip gas turbocompressors.

Short description of the project

The project proposes the development of magnetic nanofluid (MNF) seals which has significant advantages compared to conventional mechanical seals: hermetic sealing, exceptionally long lasting operation without intervention (~ 5 years), minimal wear (only viscous friction), virtually zero contamination, optimal torque transmission, wide operating range (10-8 mbar - 10 bar), relatively simple and cost efficient execution.

Project implemented by

- SC ROSEAL SA Odorheiu Secuiesc (CO)
- Romanian Academy – Timisoara Branch (P1)
- National Institute of R&D for Izotopic and Molecular Technologies Cluj-Napoca (P2)
- Politehnica University of Timisoara (P3)
- Romanina Research and Development Institue for Gas Turbines – COMOTI Bucharest (P4).

Implementation period

01. 07. 2014 – 30. 06. 2016

Main activities:

1. Laboratory and micropilot scale synthesis of magnetic nanofluids with carboxylic stabilizers and magnetizations between 400-1000 G. Samples characterization.
2. Conception, design and implementation of new experimental models of sealing systems with magnetic nanofluid, for high peripheral speeds
3. Testing and performance evaluation of new experimental models sealing systems with magnetic nanofluid, designed for high peripheral speeds

Results

Establishment of the laboratory scale methods for synthesis and characterization of magnetic nanofluids with carboxylic stabilizers and magnetization values between 400-1000 G.

Applicability and transferability of the results

The expected results will facilitate desgin and low cost industrial scale production of an original sealing system with stable MNF at high temperatures (160 – 180 °C), for high peripheral speeds (up to 30 – 70 m•s-1) in the sealing gap. They have some important advantages compared to conventional mechanical seals: hermetic sealing, high reliability, relatively simple construction, low execution cost. These performances indicate the market towards ROSEAL Co. is heading, namely the gas turbocompressors in fertilizer and petroleum refining industry.

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Research Centre

Research Centre for Engineering of Systems with Complex Fluids – Laboratory of Rheology and Magnetometry, from Politehnica University of Timisoara.

Research team

Tunde BORBATH, PhD - the director of the HiSpeedNanoMagSeal project (Romanian Academy - Timisoara Branch)
The Politehnica University of Timisoara (P3) research team in this project consist of 3 researchers and 2 research assistants, as follows:
Phys. Oana MARINICA
Assoc. Prof. Floriana D. STOIAN, PhD
Assoc. Prof. Nicolae CRAINIC, PhD
Res. Assist. Florica BALANEAN
Res. Assist. George GIULA

Contact information

Phys. Oana MARINICA
Center for Engineering of Systems with Complex Fluids, Laboratory of Rheology and Magnetometry
Address: Bd. Mihai Viteazu, No.1, RO300222, Timisoara
Phone: (+40) 256 403700; (+40) 256 403701
Fax: (+40) 256 403700
E-mail: oana.marinica@upt.ro;
Web: http://www.roseal.eu/HiSpeedNanoMagSeal/etape.html