Contribution ID: **187** Type: **Poster**

Flow Field Calculation and Optimization of Spiral Groove Dry Seal for Screw Vacuum Pump

Tuesday 19 June 2018 17:50 (20 minutes)

Screw vacuum pump, with a fully enclosed vacuum pumping process, integrates the latest achievements of mechanical, electronic control, thermodynamics and other disciplines. It has wide application prospects in raw materials chemical, chemical synthesis, drying, concentration and other fields. Dry gas seal is a new type of non-contact shaft seal on the basis of gas-lubricated bearing seal. The most used type of dry gas seal is the spiral groove seal. This study focused on the flow field calculation and the geometric parameters optimization of a single end face spiral groove dry gas seal for screw vacuum pumps. CFD method based on the coupled thermo-mechanical deformation was performed to simulate the flow field of spiral groove dry gas seal. Orthogonal method was carried out to optimize the structural parameters of spiral groove dry gas seal face. The dry gas sealing performance is further clarified by detecting and comparing the leakage rate of screw vacuum pump equipped with the optimized dry gas seal structure and the conventional seal structure. Theoretical analysis results proved the feasibility of dry gas seal for screw vacuum pump. The dry gas seal could realize the zero leakage and zero escape of the sealed medium to ensure the long-term safe and effective operation of screw vacuum pump.
Key words: dry gas seal; single end face spiral groove; screw vacuum pump; flow field; chemical industry

Primary author: Prof. XIE, Yuanhua (School of Mechanical Engineering and Automation, Northeastern University, Shenyang, 110819, China)

Co-authors: Prof. LIU, Kun (School of Mechanical Engineering and Automation, Northeastern University, Shenyang, 110819, China); Mr MA, Shiyu (School of Mechanical Engineering and Automation, Northeastern University, Shenyang, 110819, China)

Presenter: Prof. LIU, Kun (School of Mechanical Engineering and Automation, Northeastern University, Shenyang, 110819, China)

Session Classification: Poster Session Tuesday

Track Classification: Vacuum Science & Technology