

基于流场数值模拟的高速磁力泵汽蚀性能研究 Cavitation Performance Research in High-speed Magnetic Drive Pump Based on Numerical Simulation of Flow Field

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关键词: 高速磁力泵 导流栅 流场 数值模拟 汽蚀性能

摘要: 为了改善高速磁力泵的抗汽蚀性能,在泵吸入口处设置导流栅。建立了吸入口设置导流栅和未设置导流栅的两种模型,采用Fluent软件对高速磁力泵内流场进行数值模拟,给出了各自内部压力分布以及粒子流动迹线图。通过两组数据的比较,得到了内部流场的主要特征,模拟表明高速磁力泵吸入口设置轴向可变速导流栅可以有效提高抗汽蚀性能。数值模拟与高速磁力泵真机的试验对比表明,两者几乎一致,为高速磁力泵的改进设计提供了一定的理论依据。The diffuser grid was mounted at the impeller inlet to improve the anti-cavitation properties of high-speed magnetic drive pump. The fluid field of two high-speed magnetic pump, with the diffuser grid and not, was numerical simulated by Fluent program. The distribution of pressure was taken out, and the trace of the particle was plotted. The main characteristics of the interior fluid field of the two pumps were obtained by comparing with two groups of data. The results show that the pump with the diffuser grid of changeable position in axial direction can improve the anti-cavitation performance. The application examples from practical tests favorably validated the results of simulation, which provide theoretical basis for improving the design.

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