

自吸旋涡泵变转速性能与内部流场试验 Self-priming Vortex Pump Variable Speed Performance and Internal Flow Test

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关键词: 旋涡泵 流场 相似理论 变转速 汽蚀余量

摘要: 研制25WZ1-12型自吸旋涡泵试验样机, 通过型式及变转速外特性试验, 得出旋涡泵 $qv-H$ 、 $qv-\eta$ 性能曲线变化规律, 验证 $qv-H$ 、 $qv-P$ 曲线换算满足相似理论比例定律, $qv-NPSH$ 曲线换算不满足汽蚀相似定律; 用5孔管束探针对流道流场进行测量, 得到流场静压 ps 、当量径向速度 v_{re} 和当量圆周速度 v_{ue} 随泵转速变化分布状况; 通过对试验数据的分析, 解释了外特性参数与内部流动参数之间的联系和变化规律, 指出旋涡泵的汽蚀类型及发生部位, 为旋涡泵优化设计和建立内部流动模型提供参考依据。 The 25WZ1-12 vortex self-priming pump test prototype was developed. Through the experiment of type and the external characteristics of the variable rotational speed, performance curves, such as $qv-H$ and $qv-\eta$, were obtained. The curve conversion for $qv-H$ meets the proportion law of similar theory, but the $qv-NPSH$ curve conversion does not satisfy the cavitation affinity law for the vortex pump. The flow channel field was measured with 5 hole probe, to gain the distribution of flow static pressure ps , equivalent v_{re} radial velocity and equivalent circumferential velocity v_{ue} at the various pump rotational speed. By analyze the test data, the relation between the external characteristic and the internal flow was discussed, also the type and location for the cavitations of the vortex pump was presented.

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