

低比转数离心泵多相位定常全三维数值模拟 3-D Numerical Simulation for Low Specific-speed Centrifugal Pump with Multi-phase Position

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关键词: 离心泵 低比转数 多参考系模型 多相位 数值模拟

摘要: 针对定常流动是否具有全局代表性的疑问, 采用多参考系模型对某一低比转数离心泵在设计工况进行了多相位定常流动数值模拟。分析了由于叶轮与蜗壳相对位置的变化引起的泵扬程的变化规律, 同时捕捉到了全流场的速度、压力分布以及蜗壳第Ⅷ断面漩涡的结构与演化特征等重要流动信息。结果表明, 多相位定常流动数值模拟的结果实际上反映了泵内流场的非定常流动特性。 To the doubt whether steady flow is endowed with global representativeness, the numerical simulation was performed for a low specific-speed centrifugal pump at multi-phase position, under the designed operating conditions, by multiple reference frame model. Changes of the total head were investigated in detail, due to the relative position of impeller passage to volute. The important flow information, such as velocity, the pressure fields and characteristics of swirling flow and its developing process on the eighth cross-sections of the volute casing, were also gained. It was concluded that the result of steady numerical simulation with multi-phase position truly reflects the unsteady flow features in the pump flow field to a certain degree.

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