

多相流和计算流体力学

180°矩形弯管流场的实验测量和数值模拟

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摘要 对180°矩形弯管内的湍流流场用智能型五孔球探针进行了测量, 同时采用FLUENT 6.2对其进行数值模拟。流场测量和数值模拟结果表明: 180°矩形弯管由于流体旋转产生的离心力导致了弯管内压力分布的变化, 弯管内切向速度发生变化。切向速度在流体开始旋转0°~60°区间内侧的速度增大、压力减小, 外侧的速度降低、压力增大; 当转过60°截面后, 外侧的速度增大、压力减小, 内侧的速度降低、压力增大。

关键词

[180°矩形弯管](#) [流场](#) [测量](#) [数值模拟](#)

分类号

Experimental measurement and numerical simulation of flow field in a 180° curved duct with rectangular cross-section

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Abstract

The turbulent flow-field characteristics in a 180° curved duct with rectangular cross-section were investigated. The profiles of tangential velocity and pressure were measured by using five-hole probe and simulated by FLUENT 6.2. The results showed that centrifugal force was generated as the fluid rotated, which contributed to the change of tangential velocity and pressure. Tangential velocity increased and pressure decreased in the section between 0° and 60° when the fluid rotation began, while tangential velocity decreased and pressure increased in the section between 60° and 180° near the inner wall. On the contrary, the tangential velocity decreased and pressure increased in the section between 0° and 60°, but tangential velocity increased and pressure decreased in the section between 60° and 180° near the outer wall. This investigation indicated that turbulent flow-field characteristics in the 180° curved duct could be understood by combined experiment measurement and numerical simulation.

Key words

[180° curved duct with rectangular cross-section](#) [flow field](#) [experimental measurement](#) [numerical simulation](#)

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