

工程热物理

管束间气液两相过渡流型及其压力波动特性

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摘要:

采用高速摄像技术对矩形通道内气液两相流体垂直向上横掠2种节距比顺列管束的过渡流型及压差信号进行实验研究,在泡状流流动过程中拍摄到了S形泡状流。分析了各种流型转变的机制,基于实验数据绘制了流型界限图。对比分析了2种管束间不同过渡流型的压差波动信号,发现从泡状流到间歇流再到雾状流压差信号呈减小趋势。2种管束的压差信号波动幅值不同,节距比大的压差信号波动幅值大。实验发现气液两相折算速度对压差信号的波动有明显影响。

关键词: 气液两相流 顺列管束 高速摄像 过渡流型 压差信号

The Flow Pattern and Differential Pressure Fluctuations of Gas-liquid Two-phase Flow Across Tube Bundles

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Abstract:

The transitional flow and pressure signals of the gas-liquid two-phase flow, which gets vertical upward through the in-line tube bundles of two different pitch ratio in a rectangular channel, were researched by high-speed video camera, and we obtained the S-shaped flow image in the process of bubbly flow. After the analysis of a variety of flow patterns' transition mechanisms, the boundary maps of flow pattern were drawn based on the experimental data. The decreasing trend of the pressure signals was found from the bubbly flow to the intermittent flow and then to the mist flow by the comparison of the pressure fluctuation signals between the two bundles of different types of transitional flow. The pressure fluctuation amplitudes of the signal of the two bundles are different and the amplitude having the larger pitch ratio is bigger than others. In addition, it is found that the superficial velocity of gas-liquid two-phase on the pressure fluctuations has a significant effect on the pressure signals.

Keywords: gas-liquid two-phase flow in-line tube bundles high-speed video transitional flow pattern differential pressure signal

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