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刊庆特邀

流体诱导新型弹性管束强化传热实验

田茂诚[1], 姜波[2],冷学礼[1],程林[1]

1. 山东大学能源与动力工程学院, 济南 250061; 2. 山东电力研究院, 济南 250002

摘要：

为深入研究不同实验条件下新型弹性管束的传热特性,建立了传热综合实验台,计算得到了管束管外、管内及总传热系数随Re的变化曲线图。实验结果表明:新型弹性管束的管外平均表面传热系数基本为同Re数下的固定管束的3倍以上,强化传热效果明显。对比不同条件下的实验结果可以得出,汽-水换热条件最好、水-水换热条件次之、恒热流条件最差。原因为管内流体介质对弹性管束的振动特性影响较大,振动特性增强使得传热特性增强。

关键词： 振动 强化传热 弹性管束 换热器

Experimental research on heat transfer enhancement characteristics of a new type of flow-induced elastic tube bundle

TIAN Mao-cheng[1], JIANG Bo[2], LENG Xue-li[1], CHENG lin[1]

1. School of Energy Source and Power Engineering, Shandong University, Jinan 250061, China;
2. Shandong Electric Power Research Institute, Jinan 250061, China

Abstract:

Comprehensive heat transfer experimental platform was set up to investigate the heat transfer characteristics of a new type elastic tube bundle under different experimental conditions. In the experiment, variations of the external, internal and overall heat transfer coefficients with Reynolds number were obtained. The experimental results show that the average convective heat transfer coefficient outside the tube for the new type elastic tube bundle is 3 times more than that of the stationary tube bundle at the same Reynolds numbers, which indicates a significant heat transfer enhancement. From the comparison of experimental results under different conditions, it can be conclude that the best heat transfer performance can be obtained for the steam water heat transfer, which is better than that of the water water heat transfer, and the constant heat flux heat transfer exhibits the poorest performance. The reason is that the fluid medium inside the tube has great influence on vibration characteristics of the new type elastic tube bundle and the intensification of the tube bundle vibration leads to the enhancement of heat transfer performance.

Keywords: vibration heat transfer enhancement elastic tube bundle heat exchanger

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通讯作者:

作者简介:

作者Email:

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