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高寒地区沼气发酵料液加热增温装置传热特性

Heat transfer characteristics of warming methane fermentation liquid heating device in alpine region

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中文关键词: 发酵料液 加热增温 浸没蛇管式换热器 表面传热系数

英文关键词:fermentation liquid heating and warming immerse coil heat exchanger surface coefficient of heat transfer

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中文摘要:

在北方高寒地区，为了保证沼气厌氧发酵所需的稳定温度，同时考虑到沼气生产的成本和能量平衡等因素，本研究提出以沼气生产系统自身产出的沼气为燃料，以沼气热水锅炉为热源，通过水—发酵料液换热器对进入发酵反应器的料液进行加热增温的模式，并应用威尔逊图解法，对加热增温系统所选用的水-发酵料液浸没蛇管式换热器的传热特性进行了试验研究，得到了换热器壳侧水的表面传热系数、管内侧发酵料液的表面传热系数等参数的变化规律。该研究结果将为今后加热发酵料液用浸没蛇管式换热器的理论计算和结构设计提供依据。

英文摘要:

In order to ensure the required stable temperature of methane anaerobic fermentation in the northern alpine regions, taking many factors such as the cost of biogas production and energy balance into account, this paper proposed a new heating and warming model. The model took biogas produced by its own system as fuel and took gas hot water boiler as heat source. Fermentation liquid was heated when flowing through the water-fermented liquid heat exchanger. With Wilson Graphic method, the paper studied the heat transfer characteristics of water-fermented liquid in immerse coil heat exchanger and got variation of several parameters, such as surface coefficient of heat transfer of water in heat exchanger and fermented liquid in pipe. The results can provide theoretical references for structural design of immerse coil heat exchanger of heat fermentation liquid.

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