

## Study of heat transfer characteristics of preheating system for sewage sludge

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The preheating system of sewage sludge has been investigated to increase energy efficiency of the drying system. In the current drying system, energy consumption is about 1.3 ~ 1.5 times compared with the energy to evaporate moisture contained in sewage sludge. In general, air is used as a carrier gas in the drying system, so the dryer outlet gas is composed of air and steam. The temperature range of the dryer outlet gas is above 90°C enough to preheat sewage sludge. The objective of the preheating system is to exchange heat between dryer outlet gas and sewage sludge of room temperature to save energy consumption in the drying system. In this study, 1 ton/day sewage sludge preheating system is designed as shell-and-tube type heat exchanger. In order to investigate heat transfer characteristics, the overall heat transfer coefficient is firstly calculated using water instead of sewage sludge. Then, the overall heat transfer coefficient is calculated using sewage sludge, varying dryer outlet gas temperature from 90°C to 110°C. The overall heat transfer coefficient in the experimental ranges is between 50 and 150 W/m<sup>2</sup>°C for both water and sewage sludge.