

## Heat transfer characteristics of condensation with noncondensable gas in the preheater of the sewage sludge drying system

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The preheater of sewage sludge drying system has been investigated to increase drying efficiency. In the current drying system, energy consumption is about 1.3 ~ 1.5 times compared with the necessary energy to evaporate moisture contained in the sewage sludge. An air is generally used as a carrier gas in the dryer, so the dryer outlet gas is composed of noncondensable gas. In the preheater, heat is exchanged between dryer outlet gas composed of air and steam and sewage sludge, so the heat transfer characteristics of condensation with noncondensable gas is crucial to determine the whole efficiency of the proposed drying system. In this study, we used 1 ton/day shell-and-tube type preheater to investigate heat transfer characteristics of condensation with noncondensable gas. The overall heat transfer coefficient was obtained varying the temperature of dryer outlet gas from 90oC to 110oC. The correlation of steam condensing heat transfer coefficient in the presence of noncondensable gas was also developed.