

OPERATION AND PERFORMANCE TESTING OF THE HAZARDOUS (BIOMEDICAL) WASTE INCINERATION PLANT FOR HOSPITALS

S S. WAHID

Mechanical Power Eng. & Energy Department, Faculty of Eng., El-Minia University, Egypt

ABSTRACT

The objectives of the present research are to implement the operating and performance testing of the hazardous waste incineration plants. The optimal design of these incineration plants are inline twin combustion chamber, fixed hearth, pyrolytic and controlled air (starved-air) incinerators, supplied with wet air pollution control systems (APCS), which are the most accepted safe, suitable and proper disposal method for hazard (biomedical) wastes. Many of our hazard wastes incineration plants have a capacity of 50, 100, and 250kg/h, were installed for real operating condition in general hospitals of Egyptian Ministry of Health & Population. Numerous runs were done for operating and performance testing on these incineration plants by the approved environmental laboratories of "Reference laboratory of Faculty of Science, Ain Shams University", and "Laboratories of Environmental Measurements" of branches of the "Egyptian Environmental Affairs Agency" (EEAA).

The results obtained from operating and performance testing of these incineration plants can be summarized as range values follow : The average temperature of primary combustion chamber was varied between 810-840°C, the temperature of secondary combustion chambers was varied between 1100-1140°C, temperature of gaseous emission from the chimney was varied between 110-130°C, and the temperature of the outer surfaces of the incinerator bodies was varied between 37-46°C, while, the ambient temperature was varies between 25-32°C. Residual ash was varied between 4-5%, corresponding to destruction rate varied between 95-96%. Particulate matter: 6.9-9.05mg/m³, organic carbon: 1.4-7.4mg/m³, HCl: 5.6- 8.3mg/m³, HF: 0.2-0.6mg/m³, CO: 28-92.5mg/m³, SO₂: 7.9-25.06mg/m³, NO_x: 45.5-88.1mg/m³. Moreover, the testing is also conducted to measure the heavy metals. Therefore, the emission of pollutants emitted from these incineration plants is found to be lower than the emission standard level issued from (EEAA). So, this incineration plants are complied with the specification and rules of "Egyptian Environmental Affairs Agency (EEAA)".

KEYWORDS: Incineration Plant, Operating Parameters, Gaseous Emission