

INFLUENCE OF DESIGN DEPENDANT PARAMETERS ON DIOXIN FORMATION DURING INCINERATION OF MSW

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The purpose of the investigation was to study the significance of plant design dependant parameters and passive parameters for the formation and emission of dioxins during incineration of MSW.

Fly ash samples stored from a previous investigation, the Danish Incinerator Dioxin Study, were used. Samples from two plants of differing design, both equipped with ESP, were selected. The operating conditions corresponded to different settings of active parameters. These were: High and low surplus of air, and high and low load (in a square parameter arrangement), as well as normal air and load (in the centre of the square). The distribution of primary and secondary air were neglected, as the previous study mentioned above had shown this parameter to be without significance. Furthermore, the plants were visited at two different occasions with an interval of several months, to study the influence of long term variations in the plants.

The dioxin concentration in the fly ash samples were measured, and the results correlated with parameters of the following types:

- 1: Passive parameters measured during operation, such as oven temperature and flue gas temperature.
- 2: Special design-dependant parameters, such as the gas stream velocity, turbulence and residence time, which were calculated from the dimensions of the combustion chambers.
- 3: Breakdown efficiency of expected precursor substances at the conditions prevailing in the combustion, computed thermodynamically.
- 4: Dioxins previously measured in the flue gas.
- 5: Metals and organic substances measured in the fly ash.

The correlations were performed using statistical principles based on general linear models. The results show a highly significant negative correlation between fly ash dioxin and fly ash Cu, and a weak correlation between flue gas dioxin and fly ash Cu. There is a weak positive correlation between flue gas dioxin and fly ash dioxin. The negative correlation between fly ash dioxin and Cu may be due to catalytic breakdown in the ESP.

