

Investigation of Emission Characteristics of Brominated Dioxin(PBDD/PBDFs) in conjunction with PCDD/PCDFs in different types of waste incinerators and APC facilities

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The emission of chlorinated dioxin(PCDD/PCDFs) is recently one of the major problems of the waste incinerators. In Korea, there are few researches on the actual condition of brominated-dioxin(PBDD/PBDFs) which is one of new hazardous substances. The main purpose of this study is to investigate emission characteristics of brominated-dioxin in waste incinerators in conjunction with PCDDs/PCDFs. It compared emission levels for Cl & Br related dioxins/furans for waste incinerators with different APC systems. Analysis characteristics of chlorinated & brominated-dioxin were performed using HRGC/HRMS and SP-2331, Dioxin 2, DB5-MS column.

The test results could be summarized as follows

- 1) Emission concentrations of dioxin were measured in the range of 0.2498 ~ 3.9452 ng-TEQ/Sm³(average 1.0916 ng-TEQ/Sm³) in flue gas from industrial solid waste incinerators, 0.0120 ~ 0.0275 ng-TEQ/Sm³(average 0.0198 ng-TEQ/Sm³) in flue gas from municipal solid waste incinerators, 0.6638 ~ 2.4156 ng-TEQ/Sm³(average 1.5885 ng-TEQ/Sm³) in flue gas from infectious waste incinerators. The highest emission concentrations of dioxin were measured in infectious waste incinerators.
- 2) Emission concentrations of brominated-dioxin were measured in the range of 0.0008 ~ 0.0125 ng-TEQ/Sm³(average 0.0046 ng-TEQ/Sm³) in flue gas from industrial solid waste incinerators, 0.0000 ~ 0.0001 ng-TEQ/Sm³(average 0.00005 ng-TEQ/Sm³) in flue gas from municipal solid waste incinerators, 0.0008 ~ 0.0033 ng-TEQ/Sm³(average 0.0017 ng-TEQ/Sm³) in flue gas from infectious waste incinerators. The highest emission concentrations of brominated-dioxin were measured in industrial solid waste incinerators.
- 3) It is observed that concentrations of PCDFs are 1.5~4 times higher than those of PCDDs. The concentrations of PBDFs are relatively higher than those of PBDDs. This results come from the fact that the emission concentration of 2,3,7,8 TeBDF is much higher than any other isomer.
- 4) It is required to analyze the behaviors of precursors(chlorophenol, bromophenol) and characteristics of waste for the emission correlation between PCDD/PCDFs and PBDD/PBDFs because the concentrations of PBDD/PBDFs are much lower than those of PCDD/PCDFs.
- 5) In conclusion, the highest concentration of brominated-dioxins (0.0125 ng-TEQ/Sm³) in flue gas from incinerator was relatively low in comparison(0.86%) with the emission limit for dioxins in Korea. However, brominated-dioxins could be continuously released to the environment due to the increase of waste which contain brominated flame retardants. Additional research is quite essential to study the potential adverse impact of brominated dioxins/furans.