

PCDF/D CONCENTRATIONS BELOW 0.1 ng I-TE/m³ IN THE STACK GAS OF A MUNICIPAL WASTE INCINERATOR WITHOUT TERTIARY FLUE GAS CLEANING DEVICE

Funcke W.^A, Luthardt, P.^A, Philipp, Ch.^A, Ledebur, H.^B, Staberow P.^C,
Teichert, B.^D,

^A GfA - Gesellschaft für Arbeitsplatz- und Umweltanalytik mbH,
Otto-Hahn-Straße 22, D-4400 Münster, Germany

^B RSP Riemann, Sonnenschein & Partner GmbH, Südstraße 41, 4690 Herne 2

^C Waste Management GmbH & Co. MVA Hamm oHG, Am Lausbach 2,
4700 Hamm 4, Germany

^D Waste Management Deutschland GmbH, Im Teelbruch 134 b, 4300
Essen-Kettwig, Germany

Abstract

In Germany an estimated 1-2 billion DM is being invested for the modernization of existing municipal waste incinerators¹ to meet the limits of the 17. BImSchV which will become effective in 1994/1996². To meet these stack discharge limits, facility owners have several options to solve the problem technically by constructive changes of their plant. One suitable measure would be the installation of so-called tertiary pollution control devices, e.g. a coke filter³, to reduce especially PCDF/D emissions. In the scope of measurement programs at a MWI in Germany, conducted by the GfA, it was found that these actions are not needed at all facilities.

Introduction

Between 1990 and 1992, 22 PCDF/D emission measurements were performed at a municipal waste incinerator (MWI) in Germany. The concentrations of polychlorinated dibenzofurans and dibenzo(p)dioxins as well as the concentrations of the other parameters regulated by the 17. BImSchV were found to be below the stack discharge limits of this ordinance. The MWI has four separate lines with grate firing followed by a boiler for each line. The pollution control equipment each consists of a cyclone followed by spray adsorption (lime injection) and a fabric filter. The facility is not equipped with a tertiary pollution control device.

Results and Discussion

Table 1 shows the results of 22 PCDF/D emission measurements that were performed by the GfA at the facility mentioned above.

Table 1: PCDF/D concentrations expressed as corresponding I-TE values in the flue gas of a MWI in Germany; 0 °C, 1,013 hPa, dry, referred to 11 % O₂

Sample No.	Sampling (Month/Year)	Line	I-TE (NATO/CCMS) in the Flue Gas		
			after Boiler ₃ (ng/m ³)	before Fabric Filter (ng/m ³)	in the Stack ₃ (ng/m ³)
1	10/1990	2			0.051
2					0.042
3					0.044
4	03/1991	1	5.1	3.8	0.119
5			8.7	5.7	0.085
6			9.9	7.6	0.187
7		2	8.3	3.5	0.202
8			17.2	14.5	0.064
9			19.9	18.8	0.088
10		4	17.9	13.8	0.053
11			41.3	27.4	0.064
12			04/1991	3	
13					0.046
14					0.038
15					0.025
16	08/1991	3	6.9		0.017
17			10.9		0.010
18			14.9		0.012
19	04/1992	1	5.1		0.010
20			16.1		0.009
21	08/1992	2	5.0		0.045
22			3.2		0.087

Sampling time was 6 hours in all cases

The results in Table 1 indicate that the facility operates excellent concerning the PCDF/D emissions. In March 1991 the pollution control equipments of all four lines were investigated intensely to find the reasons for the PCDF/D reduction. The low PCDF/D concentrations in the stack gas are due to the performance of the fabric filters at the facility. As can be seen from the results received in March 1991 the main depositions of PCDF/Ds are obtained in the fabric filter, the deposition rates being between 94 and > 99 %. In measurements performed in 08/1991 and 04/1992 I-TE concentrations even around 0.01 ng/m³ were observed.

References

- 1 Dransfeld, P. Mechanismen der Dioxinbildung und -zerstörung, VDI-Bildungswerk BW 778: 1 - 41.
- 2 17. Verordnung zur Durchführung des Bundes-Immissionsschutzgesetzes (Verordnung über Verbrennungsanlagen für Abfälle und ähnliche brennbare Stoffe - 17. BImSchV), *Bundesgesetzblatt* 1990: 2545 .
- 3 Angenend, F-J, Schäfer, M, Stöckmann, M. Versuche zur weiterführenden Rauchgasreinigung im MHKW Essen-Karnap, Lecture at the VGB-Symposium, Thermische Abfallverwertung, 10.10.1991, Essen, Germany