

HOSPITAL WASTE INCINERATION IN A MSW COMBUSTOR:

CHLORINE, METALS AND DIOXIN MASS BALANCE

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Padua incinerator has been subjected to a systematic analytical campaign started in March 1988. In the present paper we will summarize the most significant data that have been noted. Measurement has been conducted by: University of Verona up to August 1988; "Fondazione Clinica del Lavoro" of Padua from September 1988 up to April 1990. Our Company has an Environmental Department that co-operated with this two Institutes during all the campaign and that makes analysis by its own.

Padua Incinerator has a potentiality of 150 Mg/day. In this plant it is possible to treat hospital waste within 15% of total waste (that is 22.5 Mg/day), expired medicines within 5% (that is 7.5 Mg/day).

Distribution of some pollutants in different kinds of emissions (solid, liquid and gaseous) are reported in succession.

Table N. 1 - Mass balance for inorganic pollutants: dally emissions in grams

	Chlorine	Mercury	Cadmium	Lead	Copper
Stack	68,000	328	3	88	16
Bottom ash	46,000	3.2	57	29187	46770
Fly ash	852,000	2.0	421	14212	2228
Water	224,000	0.1	1.2	30	11.2
Sludge	1,100	1.6	64	786	178
TOTAL	1,190,000	335	548	44,282	49,203

Table N. 2 - Mass balance for inorganic pollutants. Percentage distributions.

	Chlorine	Mercury	Cadmium	Lead	Copper
Stack	5.7 %	97.9 %	0.6 %	0.2 %	0 %
Bottom ash	3.8 %	1.0 %	10.5 %	65.9 %	95.1 %
Fly ash	71.8 %	0.6 %	78.9 %	32.1 %	4.5 %
Water	18.8 %	0 %	0.2 %	0.1 %	0 %
Sludge	0.1 %	0.5 %	11.8 %	1.7 %	0.4 %
TOTAL	100 %	100 %	100 %	100 %	100 %

Table N. 3 - Mass balance for trace organic pollutants: daily emissions in mg.

	PAH	PCB	PCDD	TCDD	PCDF
Stack	1016	1304	71	5.6	94
Bottom ash	54652	424	348	0	734
Fly ash	16973	3497	718	5.0	438
Water	511.1	51.7	0	0	0
Sludge	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL	73152	5277	1137	11	1265

n.a. - not analysed

Table N. 4 - Mass balance for trace organic pollutants. % distributions.

	PAH	PCB	PCDD	TCDD	PCDF
Stack	1.4 %	24.7 %	6.3 %	52.5 %	7.4 %
Bottom ash	74.7 %	8.0 %	30.6 %	0.0 %	58.0 %
Fly ash	23.2 %	66.3 %	63.1 %	47.5 %	34.6 %
Water	0.7 %	1.0 %	0.0 %	0.0 %	0.0 %
Sludge	n.a.	n.a.	n.a.	n.a.	n.a.
TOTAL	100 %	100 %	100 %	100 %	100 %

n.a. - not analysed

Chlorine: 71.6% of this element is emitted as Chloride in fly ash. 18.8% in waste water. Only 5.7% as HCl in gaseous emission in the atmosphere.

Mercury: 98.6% of this pollutant is emitted through the stack as a gas.

Cadmium: 78.9% of this metal is removed with the fly ash. 22.3 % of Cadmium is present in Bottom ash and in the sludge.

Lead: 98% of this element is present in bottom (65.9%) and fly ash (32.1%).

Copper: 99.6% of Cu is present in bottom (95.1%) and fly ash (4.5%).

PAH: 97.9% of these compounds are present in bottom and fly ash.

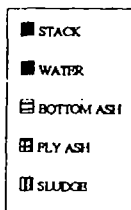
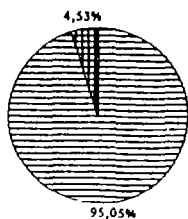
PCB: 66.3 % of these compounds are present in fly ash, 24.7% are emitted in the atmosphere through the stack.

PCDD: 63.1 % of PCDD are present in fly ash, 30.6% in bottom ash and 6.3 % at the stack.

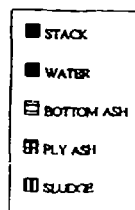
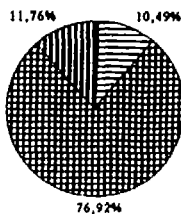
TCDD: 47.5 % of TCDD are present in fly ash, 52.5 % at the stack. No TCDD have been found in water or in bottom ash.

PCDF: 58.0 % of total PCDF are present in bottom ash, 34.6% in fly ash and 7.4 % at the stack.

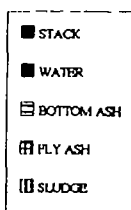
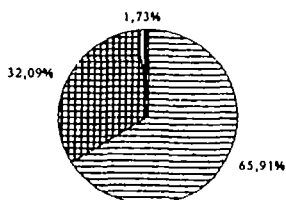
COPPER



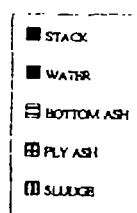
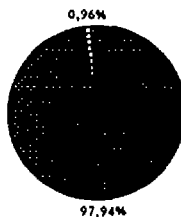
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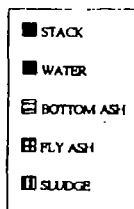
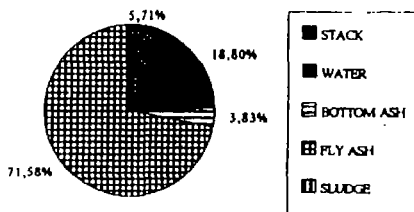
LEAD



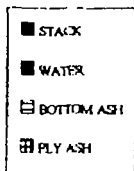
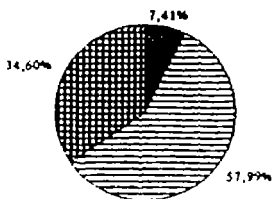
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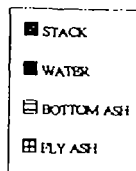
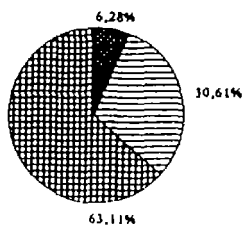
CHLORIDE



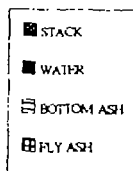
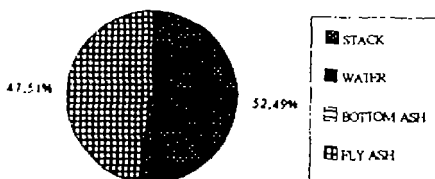
PCDFs



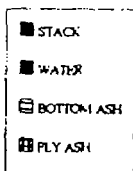
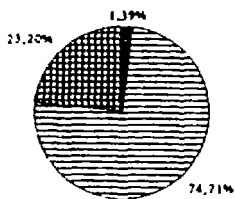
PCDDs



TCDDs



PAHs



PCBs

