

**Potential Emissions from Human Cremation**

Pollutant	Emission Factor (lb/ton) A	Emission Factor (lb/cremation) B	Rated Capacity (lbs/hr) C	Potential Number of Cremations			Potential Emissions				Emission Factor (lb/100 lb) K
				(per hr)	(per day)	(per year)	(lbs/hr)	(lbs/day)	(g/s)	(tons/yr)	
				D	E	F	G	H	I	J	
CO	2.947		200	1	12	4380	0.29	3.54	0.019	0.65	
NOx	3.56		200	1	12	4380	0.36	4.27	0.022	0.78	
PE filterable	1.28		200	1	12	4380	0.13	1.53	0.0081	0.28	0.064
SO2	2.173		200	1	12	4380	0.22	2.61	0.014	0.48	
VOC	0.299		200	1	12	4380	0.030	0.36	0.0019	0.065	
HCl	3.595		200	1	12	4380	0.36	4.31	0.023	0.79	
Lead	0.009		200	1	12	4380	0.00090	0.011	0.000057	0.0020	
Mercury, body	0.0001324		200	1	12	4380	1.32E-05	0.00016	8.35E-07	2.9E-05	
Mercury, teeth		0.00281	200	1	12	4380	0.00281	0.0337	0.000177	0.00615	
Mercury, total			200	1	12	4380	0.00282	0.0339	0.000178	0.00618	

**Mercury Emission Factor from Dental Amalgams**

Age Group	Avg Material in Restored Teeth (g/body) L	% of Fillings Containing Mercury (%) M	% Mercury in Amalgam Fillings (%) N	Mercury per Cremation	
				(g/crem) O	(lb/crem) P
				55-64	4.32
65-74	3.78	75	45	1.276	0.00281

<= worst case

**Notes:**

A (except PE): Emission factors from US EPA Nonpoint Emissions Methodology and Operator (NEMO) Tool for Cremation - Human and Animal used to generate area source emissions for the National Emissions Inventory. The HCl and lead emission factors are based on a 1999 crematory emission test (EPA-454/R-99-049). Remaining emission factors are from AP-42: Compilation of Air Emissions Factors, Fifth Edition, Volume I, Chapter 2.3 - Medical Waste Incineration, Tables 2.3-2 and 2.3-15.

A (PE only): WebFIRE dated 09-07-2016, SCC 31502101, Industrial Processes, Photo Equip/Health Care/Labs/Air Condit/SwimPools, Health Care - Crematoriums, Crematory Stack. Emissions Testing of a Propane Fired Incinerator at a Crematorium. October 29, 1992. (Confidential Report No. ERC-39). Emission factor is 0.085 lb/body. Average weight per body incinerated: body = 127 lbs; wrapping material = 4 lbs of cardboard and 2 lbs of wood. Emission factor = 0.085 lb / (127+4+2) \* 2000 lbs/ton = 1.28 lb/ton

B: See Notes L through P.

C: Rated capacity based on the largest crematory that emits less than 1 ton/yr of an air toxic. Based on STARS2 permit data, the average crematory size is 165 lbs/hr. The largest crematories are typically 200 lbs/hr. For all pollutants except dental mercury, the weight of the body incinerated is assumed to equal the hourly rated capacity of the crematory.

D, E, F: Potential number of cremations assumed to be 1 per hour, 12 per day (assuming 2 hours per cremation and 24 hours/day operation), 365 days per year.

G = A \* C / 2000. Conservatively assume it takes 1 hour to perform the cremation (i.e., body = 200 lbs).

H = G \* E

I = H \* 454 / 24 / 60 / 60. Note, this is the value used for air dispersion modeling.

J = H \* 365 / 2000

K = A / 2000 \* 100

L, M, N: Data obtained from Table 3 of the US EPA NEMO Tool for Cremation - Human and Animal used to generate area source emissions for the National Emissions Inventory. The data is based on a 2012 Bay Area Air Quality Management District report estimating the amount of mercury in teeth per person for 10 age groups, based on data from the CDC.

O = L \* (M / 100) \* (N / 100)

P = O / 454. The worst-case emission factor is for the 65-74 age group. This is the factor used in Column B.