

Inventory of Environmental Releases (grams/year) of I-TEQ<sub>DF</sub>  
From Known Sources in the United States for 1995 and 1987

Emission Source Category	Confidence Rating <sup>a</sup> Reference Year 1995				Confidence Rating <sup>a</sup> Reference Year 1987		
	A	B	C	D	A	B	C
<b>Releases (g TEQ/yr) to Air</b>							
<b>WASTE INCINERATION</b>							
Municipal waste incineration		1,100				7,915	
Hazardous waste incineration		5.7				5.0	
Boilers/industrial furnaces			0.38				0.77
Medical waste/pathological incineration			461				2,440
Crematoria			9.1				5.5
Sewage sludge incineration		14.7				6.0	
Tire combustion			0.11				0.11
Pulp and paper mill sludge incinerators <sup>e</sup>							
Biogas Combustion				> 1			
<b>POWER/ENERGY GENERATION</b>							
Vehicle fuel combustion - leaded <sup>b</sup>			1.7				31.9
- unleaded			5.6				3.3
- diesel			33.5				26.3
Wood combustion - residential			62.8				89.6
- industrial		26.2				25.1	
Coal combustion - utility boilers		60.9				51.4	
Coal Combustion - residential				30.0			
Coal Combustion - commercial/Industrial				40.0			
Oil combustion - industrial/utility			9.3				15.5
Oil combustion - residential				6.0			
<b>OTHER HIGH TEMPERATURE SOURCES</b>							
Cement kilns (hazardous waste burning)			145.3				109.6
Lightweight aggregate kilns burning hazardous waste			3.3				2.4
Cement kilns (non hazardous waste burning)			16.6				12.7
Asphalt mixing plants				7			
Petroleum Refining Catalyst Regeneration			2.11				2.14
Cigarette combustion			0.8				1.0
Carbon reactivation furnaces			0.08				0.06
Kraft recovery boilers		2.3				2.0	
<b>MINIMALLY CONTROLLED OR UNCONTROLLED COMBUSTION<sup>d</sup></b>							
Backyard barrel burning <sup>f</sup>			595				573
Combustion of Landfill Gas				7.0			
Landfill fires				1,000			
Accidental Fires (Structural)				> 20			
Accidental Fires (Vehicles)				30.0			
Forest and Brush Fires				200			
<b>METALLURGICAL PROCESSES</b>							
Ferrous metal smelting/refining							
- Sintering plants		25.1					29.3
- Coke production				7.0			
- Electric arc furnaces				40.0			
- Foundries				20.0			

Inventory of Environmental Releases (grams/year) of I-TEQ<sub>DF</sub>  
From Known Sources in the United States for 1995 and 1987 (continued)

Emission Source Category	Confidence Rating <sup>a</sup> Reference Year 1995				Confidence Rating <sup>a</sup> Reference Year 1987		
	A	B	C	D	A	B	C
Nonferrous metal smelting/refining							
- Primary copper		< 0.5				< 0.5	
- Secondary aluminum			27.4				15.3
- Secondary copper			266				966
- Secondary lead		1.63				1.22	
- Primary Magnesium				15.0			
Drum and barrel reclamation			0.08				0.08
<b>CHEMICAL MANUF./PROCESSING SOURCES</b>							
Ethylene dichloride/vinyl chloride		11.2					
<b>TOTAL RELEASES TO AIR<sup>c</sup></b>			2,888				12,331
<i>Releases (g TEQ/yr) to Water</i>							
<b>CHEMICAL MANUF./PROCESSING SOURCES</b>							
Bleached chemical wood pulp and paper mills	28.0				356		
POTW (municipal) wastewater				10			
Ethylene dichloride/vinyl chloride		0.43					
<b>RESERVOIR SOURCES</b>							
Urban runoff to surface water				190			
Rural soil erosion to surface water				2,700			
<b>TOTAL RELEASES TO WATER<sup>c</sup></b>			28.43				356
<i>Releases (g TEQ/yr) to Land</i>							
<b>CHEMICAL MANUF./PROCESSING SOURCES</b>							
Bleached chemical wood pulp and paper mill sludge	2.0				14.1		
Ethylene dichloride/vinyl chloride		0.73					
Municipal wastewater treatment sludge	103				103		
Commercially marketed sewage sludge	3.5				3.5		
2,4-Dichlorophenoxy acetic acid	18.4				21.3		
<b>TOTAL RELEASES TO LAND<sup>c</sup></b>			127.6				141.8
<b>OVERALL RELEASES (g/yr) TO THE OPEN and CIRCULATING ENVIRONMENT</b>			<b>3,044</b> (SUM OF COLUMNS A, B, C)				<b>12,829</b> (SUM OF COLUMNS A, B, C)

<sup>1/</sup> The most reliable estimates of environmental releases are those sources within Categories A, B and C (see footnote 'a' for definitions).

- <sup>a</sup> A = Characterization of the Source Category judged to be **Adequate for Quantitative Estimation with High Confidence** in the **Emission Factor** and **High Confidence** in **Activity Level**.
- B = Characterization of the Source Category judged to be **Adequate for Quantitative Estimation with Medium Confidence** in the **Emission Factor** and at least **Medium Confidence** in **Activity Level**.
- C = Characterization of the Source Category judged to be **Adequate for Quantitative Estimation with Low Confidence** in either the **Emission Factor** and/or the **Activity Level**.
- D = **Preliminary Indication** of the Potential Magnitude of I-TEQ<sub>DF</sub> Emissions from "Unquantified" (i.e., Category D) Sources in Reference Year 1995. **Based on extremely limited data, judged to be clearly nonrepresentative.**
- <sup>b</sup> Leaded fuel production and the manufacture of motor vehicle engines requiring leaded fuel for highway use have been prohibited in the United States. (See Section 4.1 for details.)
- <sup>c</sup> TOTAL reflects only the total of the estimates made in this report.
- <sup>d</sup> This refers to conventional pollutant control, not dioxin emissions control. Very few of the sources listed in this inventory control specifically for CDD/CDF emissions.
- <sup>e</sup> Included within estimate for Wood Combustion - industrial.
- <sup>f</sup> This term refers to the burning of residential waste in barrels.

Inventory of Environmental Releases (grams/year) of TEQ<sub>DF</sub>-WHO<sub>98</sub>  
From Known Sources in the United States for 1995 and 1987

Emission Source Category	Confidence Rating <sup>a</sup> Reference Year 1995				Confidence Rating <sup>a</sup> Reference Year 1987		
	A	B	C	D	A	B	C
<b>Releases (g TEQ/yr) to Air</b>							
<b>WASTE INCINERATION</b>							
Municipal waste incineration		1,250				8,877	
Hazardous waste incineration		5.8				5.0	
Boilers/industrial furnaces			0.39				0.78
Medical waste/pathological incineration			488				2,590
Crematoria			9.1 <sup>e</sup>				5.5 <sup>e</sup>
Sewage sludge incineration		14.8				6.1	
Tire combustion			0.11				0.11
Pulp and paper mill sludge incinerators <sup>f</sup>							
Biogas Combustion				< 1			
<b>POWER/ENERGY GENERATION</b>							
Vehicle fuel combustion - leaded <sup>b</sup>			2.0				37.5
- unleaded			5.6				3.6
- diesel			33.5				27.8
Wood combustion - residential			62.8 <sup>e</sup>				89.6 <sup>e</sup>
- industrial		27.6				26.4	
Coal combustion - utility boilers		60.1				50.8	
Coal Combustion - residential				30			
Coal Combustion - commercial/Industrial				40			
Oil combustion - industrial/utility			10.7				17.8
Oil combustion - residential				6			
<b>OTHER HIGH TEMPERATURE SOURCES</b>							
Cement kilns (hazardous waste burning)			156.1				117.8
Lightweight aggregate kilns burning hazardous waste			3.3 <sup>e</sup>				2.4 <sup>e</sup>
Cement kilns (non hazardous waste burning)			17.8				13.7
Asphalt mixing plants				7			
Petroleum Refining Catalyst Regeneration			2.21				2.24
Cigarette combustion			0.8				1.0
Carbon reactivation furnaces			0.08 <sup>e</sup>				0.06 <sup>e</sup>
Kraft recovery boilers		2.3				2.0	
<b>MINIMALLY CONTROLLED OR UNCONTROLLED COMBUSTION<sup>d</sup></b>							
Backyard barrel burning <sup>g</sup>			628				604
Combustion of Landfill Gas				7			
Landfill fires				1,000			
Accidental Fires (Structural)				> 20			
Accidental Fires (Vehicles)				30			
Forest and Brush Fires				200			
<b>METALLURGICAL PROCESSES</b>							
Ferrous metal smelting/refining							
- Sintering plants		28					32.7
- Coke production				7.0			
- Electric arc furnaces				40			
- Foundries				20			

Inventory of Environmental Releases (grams/year) of TEQ<sub>DF</sub>-WHO<sub>98</sub>  
From Known Sources in the United States for 1995 and 1987 (continued)

Emission Source Category	Confidence Rating <sup>a</sup> Reference Year 1995				Confidence Rating <sup>a</sup> Reference Year 1987		
	A	B	C	D	A	B	C
Nonferrous metal smelting/refining							
- Primary copper		< 0.5 <sup>e</sup>				< 0.5 <sup>e</sup>	
- Secondary aluminum			29.1				16.3
- Secondary copper			271				983
- Secondary lead		1.72				1.29	
- Primary Magnesium				15.0			
Drum and barrel reclamation			0.08				0.08
<b>CHEMICAL MANUFAC./PROCESSING SOURCES</b>							
Ethylene dichloride/vinyl chloride		11.2 <sup>e</sup>					
<b>TOTAL RELEASES TO AIR<sup>c</sup></b>			3,125				13,515
<i>Releases (g TEQ/yr) to Water</i>							
<b>CHEMICAL MANUF./PROCESSING SOURCES</b>							
Bleached chemical wood pulp and paper mills	19.5				356		
POTW (municipal) wastewater				10			
Ethylene dichloride/vinyl chloride		0.43 <sup>e</sup>					
<b>RESERVOIR SOURCES</b>							
Urban runoff to surface water				190			
Rural soil erosion to surface water				2,700			
<b>TOTAL RELEASES TO WATER<sup>c</sup></b>			19.93				356
<i>Releases (g TEQ/yr) to Land</i>							
<b>CHEMICAL MANUF./PROCESSING SOURCES</b>							
Bleached chemical wood pulp and paper mill sludge	1.4				14.1		
Ethylene dichloride/vinyl chloride		0.73 <sup>e</sup>					
Municipal wastewater treatment sludge	76.6				76.6		
Commercially marketed sewage sludge	2.6				2.6		
2,4-Dichlorophenoxy acetic acid	28.9				33.4		
<b>TOTAL RELEASES TO LAND<sup>c</sup></b>			110.23				126.7
<b>OVERALL RELEASES (g/yr) TO THE OPEN and CIRCULATING ENVIRONMENT</b>			3,255 (SUM OF COLUMNS A, B, C)				13,998 (SUM OF COLUMNS A, B, C)

<sup>1/</sup> The most reliable estimates of environmental releases are those sources within Categories A, B and C (see footnote 'a' for definitions).

<sup>a</sup> A = Characterization of the Source Category judged to be **Adequate for Quantitative Estimation** with **High Confidence** in the **Emission Factor** and **High Confidence** in **Activity Level**.

B = Characterization of the Source Category judged to be **Adequate for Quantitative Estimation** with **Medium Confidence** in the **Emission Factor** and at least **Medium Confidence** in **Activity Level**.

C = Characterization of the Source Category judged to be **Adequate for Quantitative Estimation** with **Low Confidence** in either the **Emission Factor** and/or the **Activity Level**.

D = **Preliminary Indication** of the Potential Magnitude of I-TEQ<sub>DF</sub> Emissions from "Unquantified" (i.e., Category D) Sources in Reference Year 1995. **Based on extremely limited data, judged to be clearly nonrepresentative.**

<sup>b</sup> Leaded fuel production and the manufacture of motor vehicle engines requiring leaded fuel for highway use have been prohibited in the United States. (See Section 4.1 for details.)

<sup>c</sup> TOTAL reflects only the total of the estimates made in this report.

<sup>d</sup> This refers to conventional pollutant control, not dioxin emissions control. Very few of the sources listed in this inventory control specifically for CDD/CDF emissions.

<sup>e</sup> Congener-specific emissions data were not available; the I-TEQ<sub>DF</sub> emission estimate was used as a surrogate for the TEQ<sub>DF</sub>-WHO<sub>98</sub> emission estimate.

<sup>f</sup> Included within estimate for Wood Combustion - industrial.

<sup>g</sup> This term refers to the burning of residential waste in barrels.