Table 1: Wood Smoke Emissions

Pollutant	**Physical State**	**Emissions for g/kg Wood**
Carbon Monoxide	V	80-370
Methane	V	14-25
VOCs (C2-C7)	V	7-27
Aldehydes	V	0.6 -5.4
Formaldehyde	V	0.1- 0.7
Acrolein	V	0.02- 0.1
Propionaldehyde	V	0.1- 0.3
Butryaldehyde	V	0.01-1.7
Acetaldehyde	V	0.03 - 0.6
Furfural	V	0.2-1.6 1.6
Substituted Furans	V	0.15 -1.7
Benzene	V	0.6-4.0
Alkyl Benzenes	V	1-6
Toluene	V	0.15 -1.0
Acetic Acid	V	1.8 -2.4
Formic Acid	V	0.06-0.08
Nitrogen Oxides (NO,NO2)	V	0.2-0.9
Sulfur Dioxide	V	0.16-0.24
Methyl chloride	V	0.01-0.04
Napthalene	V	0.24-1.6
Substituted Napthalenes	V/P	0.3-2.1
Oxygenated Monoaromatics	V/P	1 - 7
Guaiacol (and derivatives)	V/P	0.4-1.6
Phenol (and derivatives)	V/P	0.2-0.8
Syringol (and derivatives)	V/P	0.7-2.7
Catechol (and derivatives	V/P	0.2-0.8
Total Particle Mass	P	7-30
Particulate Organic Carbon	P	2-20
Oxygenated PAHs	V/P	0.15-1
PAHs	V/P	
Fluorene	V/P	$4x10^{-5}$ - $1.7x10^{-2}$
Phenanthrene	V/P	$2x10^{-5}$ - $3.4x10^{-2}$
Anthracene	V/P	$5x10^{-5}$ - $2.1x10^{-5}$
Methylanthracenes	V/P	$7xl0^{-5}$ - $8x10^{-5}$
Fluoranthene	V/P	$7xl0^{-4}$- $4.2xl0^{-2}$
Pyrene	V/P	$8x10^{-4}$ - $3.1x10^{-2}$
Benzo(a)anthracene	V/P	$4x10^{-4}$ - $2x10^{-3}$
Chrysene	V/P	$5x10^{-4}x10^{-2}$
Benzofluoranthenes	V/P	$6x10^{-4}$- $5x10^{-3}$
Benzo(e)pyrene	V/P	$2x10^{-4}$ - $4x10^{-3}$
Benzo(a)pyrene	V/P	$3x10^{-4}$- $5x10^{-3}$

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Pollutant	**Physical State**	**Emissions for g/kg Wood**
Perylene	V/P	$5x10^{-5}$ - $3x10^{-3}$
Ideno(1,2,3-cd)pyrene	V/P	$2xl0^{-4}$- $1.3x10^{-2}$
Benz(ghi)perylene	V/P	$3x10^{-5}$- $1.lx10^{-2}$
Coronene	V/P	8x10-4- $3x10^{-3}$
Dibenzo(a,h)pyrene	V/P	3x104- $lx10^{-3}$
Retene	V/P	$7x10^{-3}$ - $3x10^{-2}$
Dibenzo(a,h) anthracene	V/P	$2x10^{-5}$ - $2xl0^{-3}$
Trace Elements		
Strontium	P	$3x10^{-3}$ - $1.8xl0^{-2}$
Magnesium	P	$2x10^{-4}$ - $3x10^{-3}$
Aluminum	P	$1x10^{-4}$ - $2.4x10^{-2}$
Silicon	P	$3x10^{-4}$ -$3.1x10^{-2}$
Sulphur	P	$1x10^{-3}$ - $2.9x10^{-2}$
Chlorine	P	$7x10^{-4}$ - $2.1xl0^{-1}$
Potassium	P	$3x10^{-3}$ - $8.6x10^{-2}$
Calcium	P	$9x10^{-4}$ -$1.8x10^{-2}$
Titanium	P	$4x10^{-5}$ - $3x10^{-3}$
Vanadium	P	$2x10^{-5}$ - $4x10^{-3}$
Chromium	P	$2xl0^{-5}$ - $3x10^{-3}$
Manganese	P	$7x10^{-5}$ $^{4}x10^{-3}$
Iron	P	$3xl0^{-6}$ - $5x10^{-3}$
Nickle	P	$1x10^{-6}$ - $1x10^{-3}$
Copper	P	$2xl0^{-4}$ - $9x10^{-4}$
Zinc	P	$7x10^{-4}$ - $8x10^{-3}$
Bromine	P	$7x10^{-5}$ - $9x10^{-4}$
Lead		$1x10^{-4}$ - $3x10^{-3}$
Particulate Elemental Carbon	P	0.3 - 5
Normal alkanes	P	$1x10^{-3}$ - $6x10^{-3}$
Cyclic di-and triterpenoids	P	
Dehydroabietic acid	P	0.01 - 0.05
Lupenone	P	$2x10^{-3}$ - $8x10^{-3}$
Friedelin	P	$4x10^{-6}$ - $2x10^{-5}$
Chlorinated Dioxins	P	$7x10^{-3}$ - $7x10^{-2}$
Particulate Acidity	P	$7x10^{-3}$ - $7x10^{-2}$
Additional wood smoke emissions found in other studies		
Cresol[33]	P	
Isopimaric acid[3]	P	
Ethylbenzene[3]	V	

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Pollutant	**Physical State**	**Emissions for g/kg Wood**
Arsenic[4]	P	
Cesium[9]	P	
Cadmium[4]	P	
Molybdenum[5]	P	
Selenium[5]	P	
Carbozole[2]	P	
Acridine[e2]		
Barium		
Phosphorus	P	
Sodium[7]	P	
Phenathrol[2]		
Phenathrene[2]	V	
[d]*10-phenanthrene*[2]	V	
Acenapthylene[2]	V	
Nitronaphthalene[2]	V	
[d]*12-chrysene*[2]	V	
3-methylcholanthrene[2]	V	
Acenapthene[2]	V	
Indeno (1,2,3,c,d,) pyrene[2]	V	
Molds in wood ash[13]		
Thermoactinomyces vulgaris [13]	S	**(0.1%),**
Penicillium sp mixture [13]	S	**(1/10 wt/vol).**
Aspergillus fumigatus[13]	S	**(0.1%),**
Cladosporium herbarium[13]	S	**(1/20 wt/vol),**
Micropolyspora faeni[13]	S	**(1/50 wt/vol),**
Alternaria tenius[13]	S	**(1/10 wt/vol),**

All pollutants and emission weights taken from A Summary of the Emissions Characterization and Noncancer Respiratory Effects of Wood Smoke, Timothy V. Larson & Jane Q.Koenig, From Table 2, EPA-453/R-93-036, 46p. (US EPA December 1993).

Molds based on isolates from wood ash cultures: Greer Laboratories, Lenoir, NC.