

APPENDIX A. Unit Equivalents

VOLUME

cm ³	liters	m ³	in ³	ft ³	oz (fl, U.S.)
1	0.001	0.000001	0.061024	0.000035315	0.033814
1000	1	0.001	61.024	0.035315	33.814
1000000	1000	1	61024.	35.315	33814.
16.387	0.016387	0.000016387	1	0.0005787	0.55411
28317	28.317	0.028317	1728.	1	957.51
29.574	0.029574	0.000029574	1.8047	0.0010444	1

PRESSURE

atm	mmHg, 0°C	20°C	in. water,		kPa
			lb/in ²	kg/cm ²	
1	760.		407.51	14.696	1.0333
0.0013158	1		0.53620	0.019337	0.13332
0.0024539	1.8650		1	0.036062	0.025354
0.068046	51.715		27.730	1	0.070307
0.96784	735.56	394.41	1.4223	1	98.066
0.0098692	7.5006		4.0219	0.14504	0.010197

CONCENTRATION IN AIR

Gas or Vapor			Aerosol		
parts per million	% by volume	mg/m ³	mg/m ³	particles per cm ³	MPPCF
1	0.0001	MW/V _m	1	S/1000	S/35310
10000	1	MW•10 ⁴ /V _m	1000/S	1	0.02832
V _m /MW.	V _m /MW•10 ⁴	1	35310/S	35.31	1

where V_m, the volume of 1 mole of gas, is:

$$V_m \text{ (L)} = 62.36 (t, ^\circ\text{C} + 273.15) / (P, \text{mm Hg})$$

V_m as a function of t and P

t, °C	p, mmHg			
	640	680	720	760
40	30.51	28.72	27.12	25.70
30	29.54	27.80	26.26	24.87
25	29.05	27.34	25.82	24.46
20	28.56	26.88	25.39	24.05
10	27.59	25.97	24.52	23.23
0	26.62	25.05	23.66	22.41

where S, specific mass in particles/μg, is:

$$S = 1 / [(4\pi/3)(D_s/2)^3 \cdot d \cdot 10^6]$$

where: D_s = Stokes diam, μm
d = particle density, g/cm³

EXAMPLES (assumes monodisperse aerosol):

Aerosol	μm	D _s , g/cm ³	d, p/μg	S,
Steel	10	7.5	7.5	250
Quartz	10	2.65	2.65	720
Fe ₂ O ₃	5	5.2	5.2	2900
Quartz	5	2.65	2.65	5800
Quartz	2	2.65	2.65	9•10 ⁴
PbOfume	1	9.5	9.5	2•10 ⁵
PbOfume	0.2	9.5	9.5	2.5•10 ⁷