TABLE T-12
VOLATILIZATION FACTORS
SOIL VAPOR TO OUTDOOR AIR

Parameter	Value	Units	Reference
Water-filled soil porosity (θw)	2.2E-01	(Lwater-Lsoil)	Default values for Silty Clay (SIC)
Total soil porosity (θ_T)	4.8E-01	(Lpore-Lsoil)	Default values for Silty Clay (SIC)
Air-filled soil porosity (θa)	2.7E-01	(Lair-Lsoil)	Default values for Silty Clay (SIC)
Soil bulk density (Pb)	1.38	g/cm3	Default values for Silty Clay (SIC)
Width of source-zone area (W)	4500	cm	one side of 0.5 acre source area
Depth to soil vapor sample (L)	229	cm	Site-specific, 7.5-ft bgs
Mixing zone height (δ_{air})	200	cm	Default (USEPA 2002)
Mean annual windspeed (Um)	3.70	m/s	Average site-specific value
	370	cm/s	

Chemical	Diffusivity in Air (D_{air})	Henry's Law Constant (H')	Diffusivity in Water (D_w)	Effective Diffusivity (D_{eff}) cm^2/s	Volatilization Factor (VF_{amb})
1,1,1-Trichloroethane	7.8E-02	7.0E-01	8.8E-06	4.0E-03	1.1E-06
1,1,2-Trichloroethane	7.8E-02	3.7E-02	8.8E-06	4.1E-03	1.1E-06
1,1-Dichloroethane	7.4E-02	2.3E-01	1.1E-05	3.9E-03	1.0E-06
1,1-Dichloroethylene	9.0E-02	1.1E+00	1.0E-05	4.7E-03	1.2E-06
1,2,4-Trimethylbenzene	6.1E-02	2.5E-01	7.9E-06	3.1E-03	8.4E-07
1,2-Dichloropropane	7.8E-02	1.1E-01	8.7E-06	4.1E-03	1.1E-06
1,3,5-Trimethylbenzene	6.0E-02	2.4E-01	8.7E-06	3.1E-03	8.3E-07
1,3-Butadiene	2.5E-01	3.0E+00	1.1E-05	1.3E-02	3.4E-06
1,4-Dichlorobenzene	6.9E-02	9.8E-02	7.9E-06	3.6E-03	9.5E-07
2-Hexanone	7.5E-02	3.8E-03	7.8E-06	3.9E-03	1.0E-06
4-Ethyltoluene	6.8E-02	2.1E-01	7.2E-06	3.5E-03	9.4E-07
Acetone	1.2E-01	1.6E-03	1.1E-05	6.6E-03	1.8E-06
Benzene	8.8E-02	2.3E-01	9.8E-06	4.6E-03	1.2E-06
Bromomethane	7.3E-02	2.6E-01	1.2E-05	3.8E-03	1.0E-06
Carbon disulfide	1.0E-01	1.2E+00	1.0E-05	5.4E-03	1.4E-06
Carbon tetrachloride	7.8E-02	1.2E+00	8.8E-06	4.0E-03	1.1E-06
Chloroethane	2.7E-01	3.6E-01	1.2E-05	1.4E-02	3.7E-06
Chloroform	1.0E-01	1.5E-01	1.0E-05	5.4E-03	1.4E-06
Chloromethane	1.3E-01	3.6E-01	6.5E-06	6.5E-03	1.7E-06
cis-1,2-Dichloroethene	7.4E-02	1.7E-01	1.1E-05	3.8E-03	1.0E-06
Cyclohexane	8.0E-02	8.2E+00	9.0E-06	4.2E-03	1.1E-06
Ethanol	1.5E-01	1.9E-04	1.6E-05	1.0E-02	2.7E-06
Ethylbenzene	7.5E-02	3.2E-01	7.8E-06	3.9E-03	1.0E-06
Freon 11 (Trichlorofluoromethane)	8.7E-02	4.0E+00	9.7E-06	4.5E-03	1.2E-06
Freon 113 (1,1,2-trichloro-1,2,2-trifluo	7.8E-02	2.0E+01	8.2E-06	4.0E-03	1.1E-06
Heptane	6.5E-02	8.4E+01	7.0E-06	3.4E-03	9.0E-07
Hexane	2.0E-01	6.8E+01	7.8E-06	1.0E-02	2.8E-06
Isopropanol	8.0E-02	8.8E-06	9.3E-06	3.2E-02	8.5E-06
Methyl ethyl ketone	8.1E-02	2.3E-03	9.8E-06	4.3E-03	1.1E-06
Methyl isobutyl ketone (MIBK)	7.5E-02	5.7E-03	7.8E-06	3.9E-03	1.0E-06
Methylene chloride	1.0E-01	9.0E-02	1.2E-05	5.2E-03	1.4E-06
Styrene	7.1E-02	1.1E-01	8.0E-06	3.7E-03	9.8E-07
Tetrachloroethylene	7.2E-02	7.5E-01	8.2E-06	3.7E-03	9.9E-07
Tetrahydrofuran	9.4E-02	5.8E-03	9.9E-06	4.9E-03	1.3E-06
Toluene	8.7E-02	2.7E-01	8.6E-06	4.5E-03	1.2E-06
Total Xylenes	7.4E-02	2.9E-01	8.5E-06	3.8E-03	1.0E-06
Trichloroethylene	7.9E-02	4.2E-01	9.1E-06	4.1E-03	1.1E-06
Vinyl chloride	1.1E-01	1.1E+00	1.2E-06	5.5E-03	1.5E-06

Notes:

$$VF_{amb} = \frac{1}{1 + \frac{U_{air} \cdot \delta_{air} \cdot L}{W \cdot D_{eff}}}$$

$$D_{eff} = D_{air} \frac{\theta_a^{3.33}}{\theta_T^2} + \frac{D_{water}}{H} \frac{\theta_w^{3.33}}{\theta_T^2}$$