



**SITE INVESTIGATION
RESULTS REPORT**

VOLUME III OF VI

**FORMER THYPIN STEEL, INC. FACILITY
MANORHAVEN, NEW YORK**

November 16, 2001

Prepared for:

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ROUX

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VOLUME III

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ATTACHMENT 1

SCS Soil Type	K _s (cm/h)	α (1/cm)	N (unitless)	M (unitless)	D _v (cm ² /s)	θ _s (cm ³ /cm ³)	θ _i (cm ³ /cm ³)	Mean Grain Diameter (cm)
C	0.61	0.01496	1.253	0.2019	0.459	0.098	0.0092	
CL	0.34	0.01581	1.416	0.2938	0.442	0.079	0.016	
L	0.50	0.01112	1.472	0.3207	0.399	0.061	0.020	
LS	4.38	0.03475	1.746	0.4273	0.390	0.049	0.040	
S	26.78	0.03524	3.177	0.6852	0.375	0.053	0.044	
SC	0.47	0.03342	1.208	0.1722	0.385	0.117	0.025	
SCL	0.55	0.02109	1.330	0.2481	0.384	0.063	0.029	
SI	1.82	0.00658	1.679	0.4044	0.489	0.050	0.0046	
SIC	0.40	0.01622	1.321	0.2430	0.481	0.111	0.0039	
SiCL	0.46	0.00839	1.521	0.3425	0.482	0.090	0.0056	
SIL	1.76	0.00506	1.663	0.3987	0.439	0.065	0.011	
SL	0.60	0.02667	1.449	0.3099	0.387	0.039	0.030	

Chemical Properties Lookup Table

CAS No.	Chemical	Organic carbon partition coefficient, K _{oc} (cm ³ /g)	Diffusivity in air, D _a (cm ² /s)	Diffusivity in water, D _w (cm ² /s)	Pure component water solubility, S (mg/L)	Henry's law constant, H' (unitless)	Henry's law constant at reference temperature, H (atm·m ³ /mol)	Henry's law constant reference temperature, T _R (°C)	Normal boiling point, T _b (°K)	Critical temperature, T _c (°K)	Enthalpy of vaporization at the normal boiling point, ΔH _{v,b} (cal/mol)	Unit risk factor, URF (μg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)	Molecular weight, MW			
50293	DDT	2.63E+06	1.37E-02	4.95E-06	2.50E-02	3.32E-04	8.10E-06	25	533.15	720.75	22,000	9.7E-05	0.0E+00	354.49			
50328	Benzo(a)pyrene	1.02E+06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	1.13E-06	25	715.90	969.27	19,000	2.1E-03	0.0E+00	252.32			
51285	2,4-Dinitrophenol	1.02E-02	2.73E-02	9.08E-06	2.79E+03	2.79E-07	4.44E-08	25	605.28	827.85	25,000	0.0E+00	7.0E-03	184.11			
53703	Dibenz(a,h)anthracene	3.80E+06	2.02E-02	5.18E-06	2.49E-03	6.03E-07	1.47E-08	25	743.24	990.41	29,995	2.1E-03	0.0E+00	278.36			
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	153.82			
56553	Benz(a)anthracene	3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	3.34E-06	25	708.15	1004.79	16,000	2.1E-04	0.0E+00	228.30			
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	409.78			
58999	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	6.80E+00	5.74E-04	1.40E-05	25	596.55	839.36	15,000	3.7E-04	0.0E+00	290.83			
60571	Dieldrin	1.25E-02	1.25E-02	4.74E-06	1.95E-01	6.19E-04	1.51E-05	25	613.32	842.25	17,000	4.6E-03	0.0E+00	360.91			
65650	Benzoic Acid	5.76E-01	5.36E-02	7.97E-06	3.50E+03	6.31E-05	1.54E-06	25	720.00	751.00	12,094	0.0E+00	1.4E+01	122.12			
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.88E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	58.08			
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	119.38			
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	0.0E+00	236.74			
71363	Butanol	6.92E+00	8.00E-02	9.30E-06	7.40E+04	3.61E-04	8.80E-06	25	390.88	563.05	10,346	0.0E+00	3.5E-01	74.12			
71432	Benzene	5.89E+01	8.80E-02	8.80E-06	1.75E+03	2.28E-01	5.56E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	78.11			
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.39E+03	7.05E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	1.0E+00	133.41			
72208	Endrin	1.23E+04	1.25E-02	4.74E-06	2.50E-01	3.08E-04	7.51E-06	25	718.15	986.20	15,000	0.0E+00	1.1E-03	380.91			
72435	Methoxychlor	9.77E+04	1.56E-02	4.48E-06	4.50E-02	6.48E-04	1.58E-05	25	651.02	848.49	16,000	0.0E+00	1.8E-02	345.66			
72548	DDD	1.00E+06	1.69E-02	4.78E-06	9.00E-02	1.64E-04	4.00E-06	25	639.90	863.77	17,000	9.7E-05	0.0E+00	318.03			
72559	DDE	4.47E+06	1.44E-02	5.87E-06	1.20E-01	8.61E-04	2.10E-05	25	636.44	860.38	15,000	0.0E+00	0.0E+00	320.05			
74839	Methyl bromide	1.05E+01	7.28E-01	1.21E-05	1.52E+04	2.56E-01	6.24E-03	25	276.71	487.00	5,714	0.0E+00	5.0E-03	94.94			
75014	Vinyl chloride (chloroethene)	1.86E+01	1.06E-01	1.23E-05	2.76E+03	1.11E+00	2.71E-02	25	259.25	432.00	5,250	4.4E-06	1.0E-01	62.50			
75150	Carbon disulfide	4.57E+01	1.04E-01	1.17E-05	1.30E+04	8.98E-02	2.19E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00	84.93			
75252	Bromofom	8.71E+01	1.49E-02	1.03E-05	1.19E+03	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	76.13			
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.08E-05	6.74E+03	2.19E-02	5.34E-04	25	422.35	696.00	9,479	1.1E-06	0.0E+00	252.73			
75354	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	1.60E-03	25	363.15	585.85	7,800	1.8E-05	0.0E+00	163.83			
75354	1,1-Dichloroethane	5.89E+01	9.00E-02	1.04E-05	2.25E+03	2.30E-01	5.61E-03	25	330.55	523.00	6,895	0.0E+00	5.0E-01	98.96			
76448	Heptachlor	1.41E+06	1.12E-02	5.69E-06	1.80E-01	4.47E-02	2.61E-02	25	304.75	576.05	6,247	5.0E-05	0.0E+00	96.94			
77474	Hexachlorocyclopentadiene	2.00E+05	1.61E-02	7.21E-06	1.80E+00	1.11E+00	1.09E-03	25	603.69	846.31	13,000	1.3E-03	0.0E+00	373.32			
78591	Isophorene	4.68E+01	6.23E-02	6.78E-06	1.20E+04	2.72E-04	2.71E-02	25	512.15	745.00	10,931	0.0E+00	7.0E-05	272.77			
78875	1,2-Dichloropropane	4.37E+01	7.82E-02	6.73E-06	4.24E+03	1.15E-01	6.63E-06	25	488.35	716.00	10,271	2.7E-07	0.0E+00	138.21			
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	2.82E+03	3.74E-02	2.80E-03	25	369.52	572.00	7,590	0.0E+00	4.0E-03	112.99			
79016	Trichloroethylene	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	9.12E-04	25	386.15	602.00	8,322	1.6E-05	0.0E+00	133.41			
79345	1,1,2,2-Tetrachloroethane	9.35E+01	7.10E-02	7.90E-06	2.97E+03	4.22E-01	1.03E-02	25	360.36	544.20	7,500	1.7E-06	0.0E+00	131.39			
83329	Acenaphthene	7.08E+03	4.21E-02	7.69E-06	4.24E+02	1.41E-02	3.44E-04	25	419.60	661.15	8,996	5.8E-05	0.0E+00	167.85			
84662	Diethylphthalate	2.88E+02	2.56E-02	6.35E-06	1.08E+03	6.36E-03	1.55E-04	25	550.54	803.15	12,155	0.0E+00	2.1E-01	154.21			
84742	Di-n-butyl phthalate	3.9E+04	4.38E-02	7.86E-06	1.12E+01	1.85E-05	4.51E-07	25	567.15	757.00	13,733	0.0E+00	2.8E+00	222.24			
85687	Butyl benzyl phthalate	5.75E+04	1.74E-02	4.83E-06	1.26E+00	3.85E-08	9.39E-10	25	613.15	798.67	14,751	0.0E+00	3.5E-01	278.35			
86306	N-Nitrosodiphenylamine	1.29E+03	3.12E-02	6.35E-06	2.69E+00	5.17E-05	1.28E-06	25	660.60	839.68	14,000	0.0E+00	7.0E-01	312.37			
86737	Fluorene	1.89E+04	3.63E-02	7.88E-06	3.51E+01	2.05E-04	5.07E-05	25	632.28	870.45	7,300	1.4E-06	0.0E+00	198.23			
86748	Carbazole	3.9E+03	3.90E-02	7.03E-06	1.98E+00	2.61E-03	6.37E-05	25	570.44	890.00	12,666	0.0E+00	1.4E-01	166.22			
87683	Hexachloro-1,3-butadiene	5.37E+04	5.61E-02	6.16E-06	7.48E+00	6.26E-07	1.53E-08	25	627.87	899.00	13,977	5.7E-06	0.0E+00	167.21			
87865	Pentachloro-1,3-butadiene	5.92E+02	5.60E-02	6.10E-06	3.23E+00	3.34E-01	8.15E-03	25	486.15	738.00	10,206	2.2E-05	0.0E+00	260.76			
															16,109	3.4E-05	266.34

Chemical Name	3.81E+02	3.18E-02	6.25E-06	8.00E+02	3.19E-06	7.78E-06	25	519.15	749.03	12,000	3.1E-08	0.0E+00	197.45
88062 2,4,6-Trichlorophenol	2.00E+03	5.90E-02	7.50E-06	3.10E+01	1.98E-02	4.83E-04	25	491.14	748.40	10,373	0.0E+00	0.0E+00	128.18
91203 Naphthalene	7.24E+02	1.94E-02	6.74E-06	3.11E+00	1.64E-07	4.00E-09	25	560.26	754.03	20,000	1.3E-04	0.0E+00	253.13
95476 o-Xylene	3.63E+02	7.40E-02	1.00E-05	1.78E+02	2.13E-01	1.20E-03	25	417.60	630.30	8,661	0.0E+00	7.0E+00	106.17
95601 2-Methylphenol (o-cresol)	9.12E+01	7.40E-02	8.30E-06	2.60E+04	4.92E-05	1.20E-03	25	484.19	697.60	10,800	0.0E+00	1.8E-01	108.14
95578 1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.79E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	147.00
95954 2,4,5-Trichlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	128.56
98953 Nitrobenzene	1.60E+03	2.91E-02	7.03E-06	1.20E+03	1.78E-04	4.34E-06	25	526.15	759.13	11,000	0.0E+00	3.5E-01	197.45
100414 Ethylbenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.84E-04	2.40E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	123.11
100425 Styrene	3.63E+02	7.50E-02	7.80E-06	1.69E+02	3.23E-01	7.88E-03	25	409.34	617.20	8,501	0.0E+00	1.0E+00	106.17
105679 2,4-Dimethylphenol	2.09E+02	7.10E-02	8.00E-06	3.10E+02	1.13E-01	2.76E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	104.15
106423 p-Xylene	3.89E+02	5.84E-02	8.69E-06	7.87E+03	8.20E-05	2.00E-06	25	484.13	707.60	11,329	0.0E+00	7.0E-02	122.17
106478 1,4-Dichlorobenzene	6.17E+02	6.90E-02	8.44E-06	1.85E+02	7.66E-03	7.66E-03	25	447.21	684.75	8,525	0.0E+00	7.0E+00	106.17
107062 1,2-Dichloroethane	6.11E+01	4.83E-02	1.01E-05	7.38E+01	3.14E-01	3.72E-07	25	503.65	754.00	9,271	0.0E+00	8.0E-01	147.00
108054 Vinyl acetate	1.74E+01	1.04E-01	9.90E-06	5.30E+03	2.43E-03	2.43E-03	25	411.52	616.20	11,689	0.0E+00	1.4E-02	127.57
108383 m-Xylene	5.25E+00	8.50E-02	9.20E-06	8.52E+03	4.01E-02	9.78E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	98.96
108883 Toluene	4.07E+02	7.00E-02	7.80E-06	2.00E+04	2.10E-02	5.12E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	86.09
108907 Chlorobenzene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	7.2E-01	6.34E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	106.17
108952 Phenol	2.19E+02	7.30E-02	8.70E-06	4.72E+02	2.72E-01	7.36E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	92.14
111444 Bis(2-chloroethyl)ether	2.88E+01	8.20E-02	9.10E-06	8.28E+04	1.52E-01	3.71E-03	25	404.87	632.40	8,410	0.0E+00	2.0E-02	112.56
115297 Endosulfan	1.55E+01	6.92E-02	7.53E-06	1.72E+04	7.38E-04	3.98E-07	25	455.02	694.20	10,920	0.0E+00	2.1E+00	94.11
117817 Bis(2-ethylhexyl)phthalate	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.59E-04	1.80E-05	25	674.43	942.94	10,803	3.3E-04	0.0E+00	143.11
117840 Di-n-octyl phthalate	1.51E+07	3.51E-02	3.66E-06	3.40E-01	4.19E-06	1.02E-07	25	657.15	806.00	15,999	4.0E-06	2.1E-02	406.92
118741 Hexachlorobenzene	8.32E+07	1.51E-02	3.58E-06	6.20E+00	2.74E-03	6.88E-05	25	704.09	862.22	14,000	0.0E+00	7.0E-02	390.57
120127 Anthracene	5.50E+04	5.42E-02	5.91E-06	6.20E+00	5.41E-02	1.32E-03	25	582.95	825.00	14,447	4.6E-04	0.0E+00	284.78
120821 1,2,4-Trichlorobenzene	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	6.51E-05	25	615.18	873.00	13,121	0.0E+00	1.1E+00	178.24
120832 2,4-Dichlorophenol	1.78E+03	3.00E-02	8.23E-06	3.00E+02	5.82E-02	1.42E-03	25	488.15	725.00	10,471	0.0E+00	2.0E-01	181.45
121142 2,4-Dinitrotoluene	1.47E+02	3.46E-02	8.77E-06	4.50E+03	1.30E-04	3.17E-06	25	482.15	708.17	15,000	0.0E+00	1.1E-02	163.00
124481 Chlorodibromomethane	9.55E+01	2.03E-01	7.06E-06	2.70E+02	3.80E-06	9.27E-08	25	590.00	814.00	13,467	1.9E-04	0.0E+00	182.14
127184 Tetrachloroethylene	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.21E-02	7.83E-04	25	394.40	620.20	5,900	2.4E-05	0.0E+00	208.28
129000 Pyrene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	1.84E-02	25	667.95	936.00	14,370	0.0E+00	1.1E-01	202.28
156592 cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-05	1.35E-01	4.51E-04	1.10E-05	25	333.65	544.00	7,192	0.0E+00	3.5E-02	96.94
156605 trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	3.50E+03	1.67E-01	4.07E-03	25	320.85	516.50	6,717	0.0E+00	7.0E-02	96.94
193385 Indeno(1,2,3-cd)pyrene	3.47E+06	1.90E-02	5.66E-06	6.30E+03	3.85E-01	9.38E-03	25	809.15	1078.24	19,000	2.1E-04	0.0E+00	276.34
205992 Benzo(b)fluoranthene	1.23E+06	2.26E-02	5.66E-06	2.20E+05	6.56E-05	1.60E-06	25	715.90	969.27	17,000	2.1E-04	0.0E+00	252.32
206440 Fluoranthene	1.23E+06	3.02E-02	6.35E-06	2.06E+01	4.55E-03	1.11E-04	25	656.95	905.00	13,815	0.0E+00	1.4E-01	202.28
207089 Benzo(k)fluoranthene	1.07E+05	2.26E-02	5.66E-06	8.00E+04	3.40E-05	1.61E-05	25	753.15	1019.70	16,455	2.1E-05	0.0E+00	228.30
218019 Chrysene	1.23E+06	2.48E-02	6.21E-06	1.60E+03	3.88E-03	9.46E-05	25	714.15	979.00	18,000	2.1E-05	0.0E+00	252.32
309002 Aldrin	2.45E+06	1.32E-02	4.86E-06	1.80E+01	6.97E-03	1.70E-04	25	603.01	839.37	15,000	4.9E-03	0.0E+00	364.92
319846 alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.35E-04	1.06E-05	25	596.55	839.36	15,000	1.8E-03	0.0E+00	290.83
319857 beta-HCH (beta-BHC)	4.57E+01	6.26E-02	1.00E-05	2.40E+01	3.05E-05	7.44E-07	25	581.15	877.38	19,000	5.3E-04	0.0E+00	290.83
542756 1,3-Dichloropropane	6.92E+01	3.27E-02	7.28E-06	2.80E+03	7.26E-01	1.77E-02	25	558.00	770.00	12,938	4.0E-06	2.0E-02	110.97
606202 2,6-Dinitrotoluene	6.21647 N-Nitrosodi-n-propylamine	3.27E-02	7.28E-06	1.82E+02	3.06E-05	7.46E-07	25	558.00	770.00	12,938	1.9E-04	0.0E+00	182.14
621647 N-Nitrosodi-n-propylamine	2.40E+01	5.45E-02	8.17E-06	9.89E+03	7.26E-01	1.77E-02	25	509.60	746.87	6,100	2.0E-03	0.0E+00	130.19
1024573 Heptachlor epoxide	8.32E+04	1.32E-02	4.23E-06	2.00E+01	9.23E-05	2.25E-06	25	613.96	848.76	16,000	2.6E-03	0.0E+00	389.32
743997 Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	5.62E-02	4.87E-01	1.14E-02	25	629.88	1750.00	14,127	0.0E+00	3.0E-04	200.59
8001352 Toxaphene	2.57E+05	1.16E-02	4.34E-06	7.40E-01	2.46E-04	6.00E-06	25	657.15	873.31	15,000	3.2E-04	0.0E+00	413.81

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)

71556 5.71E+00

Chemical

1,1,1-Trichloroethane

ENTER Average groundwater temperature, T_s ($^{\circ}\text{C}$)

ENTER Depth below grade to bottom of enclosed space floor, L_f (cm)

ENTER Depth below grade to water table, L_{wr} (cm)

ENTER Thickness of soil stratum A, h_A (cm)

ENTER Thickness of soil stratum B, h_B (cm)

ENTER Thickness of soil stratum C, h_C (cm)

ENTER Totals must add up to value of L_{wr} (cell D28)

15 15 246 246

ENTER Soil stratum directly above water table, (Enter A, B, or C)

ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v) (cm²)

ENTER Soil stratum A SCS soil type directly above water table

ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v) (cm²)

A S S

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)

ENTER Stratum A soil total porosity, n^A (unitless)

ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)

ENTER Stratum B soil total porosity, n^B (unitless)

ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)

1.5 0.375 0.253258113

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)

ENTER Stratum C soil total porosity, n^C (unitless)

ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)

ENTER Stratum C soil total porosity, n^C (unitless)

ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)

A S S

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)

ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)

ENTER Enclosed space floor length, L_B (cm)

ENTER Enclosed space floor width, W_B (cm)

ENTER Enclosed space height, H_B (cm)

ENTER Floor-wall seam crack width, w (cm)

ENTER Indoor air exchange rate, ER (1/h)

15 40 915 762 274 0.1

ENTER Enclosed space thickness, L_{crack} (cm)

ENTER Enclosed space floor length, L_B (cm)

ENTER Enclosed space floor width, W_B (cm)

ENTER Enclosed space height, H_B (cm)

ENTER Floor-wall seam crack width, w (cm)

ENTER Indoor air exchange rate, ER (1/h)

15 40 915 762 274 0.1

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)

ENTER Exposure duration, ED (yrs)

ENTER Exposure frequency, EF (days/yr)

ENTER Target risk for carcinogens, TR (unitless)

ENTER Target risk for noncarcinogens, TRHQ (unitless)

70 9 9 260 1.0E-06 1

ENTER Averaging time for carcinogens, AT_C (yrs)

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)

ENTER Exposure duration, ED (yrs)

ENTER Exposure frequency, EF (days/yr)

ENTER Target risk for carcinogens, TR (unitless)

ENTER Target risk for noncarcinogens, TRHQ (unitless)

70 9 9 260 1.0E-06 1

MORE ↓

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}\text{K}$)	Critical temperature, T_C ($^{\circ}\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{y}$)	Reference conc., RfC (mg/m^3)
---	---	--	---	---	--	---	--	--	---	--

7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00
----------	----------	----------	----	-------	--------	--------	----------	----------	---------	---------

END

Exposure duration, τ (sec)	Source-separation, L_s (cm)	Stratum A air-filled porosity, $\theta_{a,A}$ (cm^3/cm^3)	Stratum B air-filled porosity, $\theta_{a,B}$ (cm^3/cm^3)	Stratum C air-filled porosity, $\theta_{a,C}$ (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{we} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, $k_{g,A}$ (cm^2)	Stratum A effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{v,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2.84E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} ($atm \cdot m^3/mol$)	Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D_{eff}^A (cm^2/s)	Stratum B effective diffusion coefficient, D_{eff}^B (cm^2/s)	Stratum C effective diffusion coefficient, D_{eff}^C (cm^2/s)	Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm^2/s)	Total overall effective diffusion coefficient, D_{eff}^T (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	7.831	1.09E-02	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peplet number, $exp(Pe)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot m^3$) ⁻¹	Reference conc., RfC (mg/m^3)
15	2.62E+03	0.10	1.99E+01	5.01E-04	3.35E+02	#NUM!	5.88E-05	1.54E-01	NA	1.0E+00

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (ug/L)	Indoor exposure groundwater noncarcinogen (ug/L)	Risk-based indoor exposure groundwater conc. (ug/L)	Pure component water solubility, S (ug/L)	Final indoor exposure groundwater conc. (ug/L)
NA	NA	NA	1.33E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.1E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)

71556 5.71E+00

Chemical

1,1,1-Trichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade to bottom of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability), k_v (cm^2)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	15	246	246			A	S	S

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER Stratum B soil total porosity, n^B (unitless)

0.253258113

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

0.253258113

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

0.253258113

ENTER Stratum C soil total porosity, n^C (unitless)

0.253258113

ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

0.253258113

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)

15 40

ENTER Enclosed space floor length, L_B (cm)

915

ENTER Enclosed space floor width, W_B (cm)

762

ENTER Enclosed space height, H_B (cm)

274

ENTER Floor-wall seam crack width, w (cm)

0.1

ENTER Indoor air exchange rate, ER (1/h)

0.45

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)

70 3

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)

3

ENTER Exposure duration, ED (yrs)

3

ENTER Exposure frequency, EF (days/yr)

350

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$)	Reference conc., RfC (mg/m^3)
---	---	---	--	---	---	--	--	--	---	--

7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00
----------	----------	----------	----	-------	--------	--------	----------	----------	---------	---------

END

Source- building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm ³ /cm ³)	Stratum B soil air-filled porosity, θ_a^B (cm ³ /cm ³)	Stratum C soil air-filled porosity, θ_a^C (cm ³ /cm ³)	Stratum A effective total fluid saturation, S_{se} (cm ³ /cm ³)	Stratum A soil intrinsic permeability, k_i (cm ²)	Stratum A soil relative air permeability, k_{rg} (cm ²)	Stratum A soil effective vapor permeability, K_v (cm ²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm ³ /cm ³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³)	Floor- wall seam perimeter, X_{crack} (cm)
Exposure duration, τ (sec)	231	0.122	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354

Area of enclosed space below grade, A_B (cm ²)	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,T_S}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, $H^*_{T_S}$ (unitless)	Henry's law constant at ave. groundwater temperature, $H^*_{T_S}$ (unitless)	Vapor viscosity at ave. soil temperature, μ_{T_S} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm ² /s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm ² /s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm ² /s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm ² /s)	Total overall effective diffusion coefficient, D^{eff}_T (cm ² /s)	Diffusion path length, L_d (cm)
Bldg. ventilation rate, $Q_{building}$ (cm ³ /s)	4.81E-04	15	7,831	4.60E-01	1.09E-02	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231

Convection path length, L_p (cm)	Source vapor conc., $C_{sources}$ (µg/m ³)	Average vapor flow rate into bldg., Q_{soil} (cm ³ /s)	Crack radius, r_{crack} (cm)	Crack effective diffusion coefficient, D^{crack} (cm ² /s)	Area of crack, A_{crack} (cm ²)	Exponent of equivalent foundation Peclet number, exp(Pe ^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m ³)	Unit risk factor, URF (µg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)
15	2.62E+03	1.99E+01	0.10	5.01E-04	3.35E+02	#NUM!	5.88E-05	1.54E-01	NA	1.0E+00

END

INCREMENTAL RISK CALCULATIONS:

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc. (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.33E+06	NA	NA	1.5E-04

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER ENTER
Initial groundwater conc., C_w ($\mu\text{g/L}$)

71556 5.71E+00

Chemical

1,1,1-Trichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, P_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, P_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, P_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	
1.5	0.375	0.253258113							

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed floor thickness, L_{CRACK} (cm)	Soil-bldg. pressure differential, ΔP (g/cm-s^2)	Enclosed floor length, L_B (cm)	Enclosed floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)			
15	40	915	762	274	0.1	0.45			

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)		
70	3	3	350	1.0E-06	1		

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d^{-1}$)	Reference conc., RTC (mg/m^3)
7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00

END

Exposure duration, t (sec)	Source-separation, L_1 (cm)	Stratum A air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_w^A (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+07	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H^*_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ^*_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^*_{A} (cm^2/s)	Stratum B effective diffusion coefficient, D^*_{B} (cm^2/s)	Stratum C effective diffusion coefficient, D^*_{C} (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	7,831	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m ³)
15	2.62E+03	0.10	1.99E+01	5.01E-04	3.35E+02	#NUM!	5.88E-05	1.54E-01	NA	1.0E+00

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.33E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.5E-04

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3, 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

71556 5.71E+00

Chemical

1,1,1-Trichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375 0.253258113

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE

ENTER Enclosed space thickness, L_{crack} (cm)

15 40 915 762 274 0.1

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_b (cm)	Enclosed space floor width, W_b (cm)	Enclosed space height, H_b (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)

MORE

ENTER Averaging time for carcinogens, AT_c (yrs)

70 6 6 300 1.0E-06 1

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_c (yrs)	Averaging time for noncarcinogens, AT_{nc} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, TR (unitless)	Target hazard quotient for carcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Target hazard quotient for carcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y$) ⁻¹	Reference conc., RIC (mg/m^3)
7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (ug/L)	Indoor exposure groundwater noncarcinogen (ug/L)	Risk-based indoor exposure groundwater conc. (ug/L)	Pure component water solubility, S (ug/L)	Final indoor exposure groundwater conc. (ug/L)
NA	NA	NA	1.33E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL
DOWN
TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

GW-ADV
Version 2.3; 03/01

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

75343 2.94E+00

Chemical

1,1-Dichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

0.253258113

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

0.253258113

ENTER Enclosed space floor thickness, L_{crack} (cm)

15 40

ENTER Enclosed space floor length, L_B (cm)

915

ENTER Enclosed space floor width, W_E (cm)

762

ENTER Enclosed space height, H_B (cm)

274

ENTER Floor-wall seam crack width, w (cm)

0.1

ENTER Indoor air exchange rate, ER (1/h)

0.45

ENTER Averaging time for carcinogens, AT_C (yrs)

70

ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)

9

ENTER Exposure duration, ED (yrs)

9

ENTER Exposure frequency, EF (days/yr)

260

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Exposure duration, τ (sec)	231	Stratum A soil air-filled porosity, $\theta_{f,A}$ (cm^3/cm^3)	0.122	Stratum B soil air-filled porosity, $\theta_{f,B}$ (cm^3/cm^3)	ERROR	Stratum C soil air-filled porosity, $\theta_{f,C}$ (cm^3/cm^3)	ERROR	Stratum A effective total fluid saturation, S_{fe} (cm^3/cm^3)	0.622	Stratum A soil intrinsic permeability, k_i (cm^2)	1.00E-07	Stratum A soil relative air permeability, k_{rg} (cm^2)	0.238	Stratum A soil effective vapor permeability, k_v (cm^2)	2.38E-08	Thickness of capillary zone, L_{cz} (cm)	17.05	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	0.375	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	0.122	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	0.253	Floor wall seam perimeter, X_{crack} (cm)	3,354
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Area of enclosed space below grade, A_B (cm^2)	6.97E+05	Crack-to-total area ratio, η (unitless)	4.81E-04	Crack depth below grade, Z_{crack} (cm)	15	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	7,395	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)	3.64E-03	Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)	1.54E-01	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	1.77E-04	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm^2/s)	4.80E-04	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm^2/s)	0.00E+00	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm^2/s)	0.00E+00	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm^2/s)	4.80E-04	Total overall effective diffusion coefficient, $D_{eff,T}$ (cm^2/s)	4.80E-04	Diffusion path length, L_d (cm)	231
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Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	2.39E+04	Crack radius, r_{crack} (cm)	0.10	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	1.99E+01	Crack effective diffusion coefficient, D_{crack} (cm^2/s)	4.80E-04	Area of crack, A_{crack} (cm^2)	3.35E+02	Exponent of foundation number, exp(Pe ^f) (unitless)	#NUM!	Infinite indoor attenuation coefficient, α (unitless)	5.66E-05	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	2.56E-02	Unit risk factor, URF ($\mu g/m^3$) ⁻¹	NA	Reference conc., RfC (mg/m ³)	5.0E-01
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END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	5.06E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.6E-05

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

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CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

75343 2.94E+00

Chemical

1,1-Dichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375 0.253258113

ENTER Stratum A soil total porosity, θ_w^A (cm^3/cm^3)

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

ENTER Stratum B soil total porosity, θ_w^B (unitless)

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

ENTER Stratum C soil total porosity, θ_w^C (unitless)

ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)

ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)

ENTER Enclosed space floor length, L_B (cm)

ENTER Enclosed space floor width, W_B (cm)

ENTER Enclosed space height, H_B (cm)

ENTER Enclosed floor crack seam width, W (cm)

ENTER Indoor air exchange rate, ER (1/h)

15 40 915 762 274 0.1

MORE ↓

ENTER Averaging time for carcinogens, AT_c (yrs)

ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)

ENTER Exposure duration, ED (yrs)

ENTER Exposure frequency, EF (days/yr)

ENTER Target risk for carcinogens, TR (unitless)

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

70 3 3 350 1.0E-06 1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d^{-1}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	0.0E+00	5.0E-01

END

Exposure duration, τ (sec)	9.46E+07	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354
Source-building separation, L_T (cm)														
Stratum A soil air-filled porosity, $\theta_{s,A}$ (cm^3/cm^3)														
Stratum B soil air-filled porosity, $\theta_{s,B}$ (cm^3/cm^3)														
Stratum C soil air-filled porosity, $\theta_{s,C}$ (cm^3/cm^3)														
Stratum A effective total fluid saturation, S_{le} (cm^3/cm^3)														
Stratum A soil intrinsic permeability, K_i (cm^2)														
Stratum A soil relative air permeability, K_{rg} (cm^2)														
Stratum A soil effective vapor permeability, K_v (cm^2)														
Thickness of capillary zone, L_{cz} (cm)														
Total porosity in capillary zone, $n_{t,cz}$ (cm^3/cm^3)														
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)														
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)														
Floor-wall seam perimeter, X_{crack} (cm)														

Area of enclosed space below grade, A_s (cm^2)	6.97E+05	4.81E-04	15	7.395	3.64E-03	1.54E-01	1.77E-04	4.80E-04	0.00E+00	4.80E-04	4.80E-04	4.80E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)													
Crack-to-total area ratio, η (unitless)													
Crack depth below grade, Z_{crack} (cm)													
Crack depth below grade, Z_{crack} (cm)													
Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)													
Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)													
Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)													
Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)													
Stratum A effective diffusion coefficient, D_{eff}^A (cm^2/s)													
Stratum B effective diffusion coefficient, D_{eff}^B (cm^2/s)													
Stratum C effective diffusion coefficient, D_{eff}^C (cm^2/s)													
Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm^2/s)													
Total overall effective diffusion coefficient, D_{eff}^T (cm^2/s)													
Diffusion path length, L_d (cm)													

Convection path length, L_p (cm)	15	1.99E+01	4.80E-04	4.80E-04	3.35E+02	5.66E-05	2.56E-02	NA	5.0E-01
Source vapor conc., C_{source} ($\mu g/m^3$)									
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)									
Crack radius, r_{crack} (cm)									
Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)									
Area of crack, A_{crack} (cm^2)									
Exponent of equivalent foundation Pecllet number, exp(Pe)									
Infinite source indoor attenuation coefficient, α (unitless)									
Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)									
Reference conc., RfC (mg/m ³)									
Unit risk factor, URF ($\mu g/m^3 \cdot s^{-1}$)									

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.9E-05

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	5.06E+06	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER
Initial groundwater conc., C_w ($\mu\text{g/L}$)

75343 2.94E+00

Chemical

1,1-Dichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade to bottom of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	15	246	246			A	S	S

MORE ↓

ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375 0.253258113

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE ↓

ENTER
Enclosed floor thickness, L_{crack} (cm)

15 40 915 762 274 0.1

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)

MORE ↓

ENTER
Averaging time for carcinogens, AT_C (yrs)

70 6 6 300 1.0E-06 1

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, TR (unitless)	Target hazard quotient for THQ (unitless)	Target hazard quotient for THQ (unitless)

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	0.0E+00	5.0E-01

END

Exposure duration, τ (sec)	1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
Source-building separation, L_I (cm)														
Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)														
Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)														
Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)														
Stratum A effective total fluid saturation, S_{we} (cm^3/cm^3)														
Stratum A soil relative air permeability, k_{rg} (cm^2)														
Stratum A soil effective vapor permeability, k_v (cm^2)														
Thickness of capillary zone, L_{cz} (cm)														
Total porosity in capillary zone, n_{cz} (cm^3/cm^3)														
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)														
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)														
Floor-wall seam perimeter, X_{crack} (cm)														

Area of enclosed space below grade, A_B (cm^2)	2.39E+04	6.97E+05	4.81E-04	15	7.395	3.64E-03	1.54E-01	1.77E-04	4.80E-04	0.00E+00	0.00E+00	4.80E-04	4.80E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)														
Crack-to-total area ratio, η (unitless)														
Crack depth below grade, Z_{crack} (cm)														
Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,IS}$ (cal/mol)														
Henry's law constant at ave. groundwater temperature, H'_{IS} (atm-m ³ /mol)														
Henry's law constant at ave. groundwater temperature, H'_{IS} (unitless)														
Vapor viscosity at ave. soil temperature, μ_{VS} (g/cm-s)														
Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)														
Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)														
Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)														
Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)														
Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)														
Diffusion path length, L_d (cm)														

Convection path length, L_p (cm)	15	1.99E+01	4.80E-04	3.35E+02	5.66E-05	2.56E-02	5.0E-01	NA	5.0E-01
Source vapor conc., C_{source} ($\mu g/m^3$)									
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)									
Crack radius, r_{crack} (cm)									
Crack effective diffusion coefficient, D^{crack} (cm^2/s)									
Area of crack, A_{crack} (cm^2)									
Exponent of equivalent foundation number, exp(Pe)									
Infinite source indoor attenuation coefficient, α (unitless)									
Unit risk factor, URF ($\mu g/m^3 \cdot y$)									
Reference conc., RfC (mg/m^3)									
Building concentration, $C_{building}$ ($\mu g/m^3$)									

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER ENTER
Initial groundwater conc., $C_{w,i}$ ($\mu\text{g/L}$)

156592 6.79E+00

Chemical

cis-1,2-Dichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Totals must add up to value of L_{wt} (cell D28)		Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	15	246	246					A	S

MORE ↓

ENTER ENTER
Soil dry bulk density, ρ_s^A (g/cm^3)

1.5 0.375 0.253258113

ENTER ENTER
Soil-bldg pressure differential, ΔP (g/cm-s^2)

15 40 915

ENTER ENTER
Enclosed space floor length, L_b (cm)

15 40 915

ENTER ENTER
Enclosed space floor width, W_b (cm)

15 40 915

ENTER ENTER
Enclosed space floor thickness, L_{crack} (cm)

15 40 915

ENTER ENTER
Soil dry bulk density, ρ_b^B (g/cm^3)

15 40 915

ENTER ENTER
Soil dry bulk density, ρ_b^C (g/cm^3)

15 40 915

ENTER ENTER
Soil porosity, n^A (unitless)

15 40 915

ENTER ENTER
Soil porosity, n^B (unitless)

15 40 915

ENTER ENTER
Soil porosity, n^C (unitless)

15 40 915

ENTER ENTER
Soil water-filled porosity, θ_w^A (cm^3/cm^3)

15 40 915

ENTER ENTER
Soil water-filled porosity, θ_w^B (cm^3/cm^3)

15 40 915

ENTER ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

15 40 915

ENTER ENTER
Soil total porosity, n^C (unitless)

15 40 915

ENTER ENTER
Soil total porosity, n^C (unitless)

15 40 915

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Soil total porosity, n^C (unitless)

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Soil total porosity, n^C (unitless)

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Soil total porosity, n^C (unitless)

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Soil total porosity, n^C (unitless)

15 40 915

ENTER ENTER
Soil total porosity, n^C (unitless)

15 40 915

ENTER ENTER
Soil total porosity, n^C (unitless)

15 40 915

END

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RIC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.6E-04

MESSAGE AND ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

156592 6.79E+00

Chemical

cis-1,2-Dichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Totals must add up to value of L_{wt} (cell D28)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246	246			A	S	

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

ENTER Stratum B soil total porosity, n^B (unitless)

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

ENTER Stratum C soil total porosity, n^C (unitless)

ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)

15

ENTER Enclosed space floor length, L_B (cm)

915

ENTER Enclosed space floor width, W_B (cm)

762

ENTER Enclosed space height, H_B (cm)

274

ENTER Floor-wall seam crack width, w (cm)

0.1

ENTER Indoor air exchange rate, ER (1/h)

0.45

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)

70

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)

3

ENTER Exposure duration, ED (yrs)

3

ENTER Exposure frequency, EF (days/yr)

350

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vb} (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot yr^{-1}$)	Reference conc., RIC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

Exposure duration, τ (sec)	231	9.46E+07	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	0.122	ERROR	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	0.622	Stratum A soil intrinsic permeability, K_i (cm^2)	1.00E-07	0.238	Stratum A soil relative air permeability, K_{rg} (cm^2)	2.38E-08	17.05	Thickness of capillary zone, L_{cz} (cm)	0.375	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	0.122	Air-filled porosity in capillary zone, $\theta_{g,cz}$ (cm^3/cm^3)	0.253	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	3.354	Floor-wall seam perimeter, X_{crack} (cm)
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Area of enclosed space below grade, A_B (cm^2)	231	6.97E+05	Crack-to-total area ratio, η (unitless)	4.81E-04	7.684	Crack depth below grade, Z_{crack} (cm)	15	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,IS}$ (cal/mol)	7.684	Henry's law constant at ave. groundwater temperature, H^*_{IS} (atm-m ³ /mol)	2.59E-03	1.10E-01	1.77E-04	1.77E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	231	6.97E+05	Crack-to-total area ratio, η (unitless)	4.81E-04	7.684	Crack depth below grade, Z_{crack} (cm)	15	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,IS}$ (cal/mol)	7.684	Henry's law constant at ave. groundwater temperature, H^*_{IS} (atm-m ³ /mol)	2.59E-03	1.10E-01	1.77E-04	1.77E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Area of enclosed space below grade, A_B (cm^2)	231	6.97E+05	Crack-to-total area ratio, η (unitless)	4.81E-04	7.684	Crack depth below grade, Z_{crack} (cm)	15	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,IS}$ (cal/mol)	7.684	Henry's law constant at ave. groundwater temperature, H^*_{IS} (atm-m ³ /mol)	2.59E-03	1.10E-01	1.77E-04	1.77E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Area of enclosed space below grade, A_B (cm^2)	231	6.97E+05	Crack-to-total area ratio, η (unitless)	4.81E-04	7.684	Crack depth below grade, Z_{crack} (cm)	15	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,IS}$ (cal/mol)	7.684	Henry's law constant at ave. groundwater temperature, H^*_{IS} (atm-m ³ /mol)	2.59E-03	1.10E-01	1.77E-04	1.77E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Area of enclosed space below grade, A_B (cm^2)	231	6.97E+05	Crack-to-total area ratio, η (unitless)	4.81E-04	7.684	Crack depth below grade, Z_{crack} (cm)	15	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,IS}$ (cal/mol)	7.684	Henry's law constant at ave. groundwater temperature, H^*_{IS} (atm-m ³ /mol)	2.59E-03	1.10E-01	1.77E-04	1.77E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231

Convection path length, L_p (cm)	15	2.39E+04	Source vapor conc., C_{source} ($\mu g/m^3$)	0.10	1.99E+01	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	15	Crack radius, r_{crack} (cm)	0.10	4.79E-04	4.79E-04	3.35E+02	5.64E-05	4.21E-02	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Convection path length, L_p (cm)	15	2.39E+04	Source vapor conc., C_{source} ($\mu g/m^3$)	0.10	1.99E+01	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	15	Crack radius, r_{crack} (cm)	0.10	4.79E-04	4.79E-04	3.35E+02	5.64E-05	4.21E-02	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Convection path length, L_p (cm)	15	2.39E+04	Source vapor conc., C_{source} ($\mu g/m^3$)	0.10	1.99E+01	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	15	Crack radius, r_{crack} (cm)	0.10	4.79E-04	4.79E-04	3.35E+02	5.64E-05	4.21E-02	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Convection path length, L_p (cm)	15	2.39E+04	Source vapor conc., C_{source} ($\mu g/m^3$)	0.10	1.99E+01	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	15	Crack radius, r_{crack} (cm)	0.10	4.79E-04	4.79E-04	3.35E+02	5.64E-05	4.21E-02	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Convection path length, L_p (cm)	15	2.39E+04	Source vapor conc., C_{source} ($\mu g/m^3$)	0.10	1.99E+01	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	15	Crack radius, r_{crack} (cm)	0.10	4.79E-04	4.79E-04	3.35E+02	5.64E-05	4.21E-02	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc.; (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-03

MESSAGE: AND ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)
156592 6.79E+00

Chemical

cis-1,2-Dichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Soil temperature, T_s ($^{\circ}\text{C}$)	Depth below grade to bottom of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability), k_v (cm^2)	Soil stratum A SCS soil type (used to estimate soil vapor permeability), k_v (cm^2)
15	15	246	246			A	S	S

MORE ↓

ENTER Stratum A soil dry soil total porosity, n^A (unitless)
0.375

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)
0.253258113

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)
762

ENTER Stratum B soil total porosity, n^B (unitless)
274

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)
0.1

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)
915

ENTER Stratum C soil total porosity, n^C (unitless)
762

ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
0.1

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)
40

ENTER Enclosed space floor length, L_B (cm)
915

ENTER Enclosed space floor width, W_B (cm)
762

ENTER Enclosed space height, H_B (cm)
274

ENTER Enclosed space floor area, A_B (cm^2)
762

ENTER Enclosed space volume, V_B (cm^3)
762

ENTER Enclosed space air exchange rate, ER (1/h)
0.45

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)
6

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)
6

ENTER Exposure duration, ED (yrs)
6

ENTER Exposure frequency, EF (days/yr)
300

ENTER Target risk for carcinogens, TR (unitless)
1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
1

MORE ↓

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

Exposure duration, τ (sec)	1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Area of enclosed space below grade, A_B (cm^2)	6.97E+05	4.81E-04	15	7,684	2.59E-03	1.10E-01	1.77E-04	0.00E+00	0.00E+00	0.00E+00	4.79E-04	4.79E-04	4.79E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)														

Source building separation, L_T (cm)														
Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)														
Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)														
Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)														
Stratum A effective total fluid saturation, S_{se} (cm^3/cm^3)														
Stratum A soil intrinsic permeability, k_i (cm^2)														
Stratum A soil relative air permeability, k_{gA} (cm^2)														
Stratum A soil effective vapor permeability, k_v (cm^2)														
Thickness of capillary zone, L_{cz} (cm)														
Total porosity in capillary zone, n_{cz} (cm^3/cm^3)														
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)														
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)														
Floor-wall seam perimeter, X_{crack} (cm)														

Convection path length, L_p (cm)	7.46E+02	0.10	1.99E+01	4.79E-04	3.35E+02	#NUM!	5.64E-05	4.21E-02	NA	3.5E-02
Source vapor conc., C_{source} ($\mu g/m^3$)										
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)										
Crack radius, r_{crack} (cm)										
Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)										
Exponent of equivalent foundation number, $\exp(Pe)$ (unitless)										
Area of crack, A_{crack} (cm^2)										
Area of crack, A_{crack} (cm^2)										
Exponent of equivalent foundation number, $\exp(Pe)$ (unitless)										
Infinite source indoor attenuation coefficient, α (unitless)										
Infinite source indoor attenuation coefficient, α (unitless)										
Unit risk factor, URF ($\mu g/m^3$) ⁻¹										
Reference conc., RfC (mg/m^3)										

END

INCREMENTAL RISK CALCULATIONS:

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc. (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	3.50E+06	NA	NA	9.9E-04

MESSAGE AND ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL
DOWN
TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

127184 1.01E+01

Chemical

Tetrachloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375 0.253258113

ENTER Stratum A soil total porosity, θ_w^A (cm^3/cm^3)

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)

15 40 915 762 274 0.1 0.45

ENTER Enclosed space floor width, W_b (cm)

ENTER Floor-wall seam crack width, W (cm)

MORE ↓

ENTER Averaging time for carcinogens, A_{TC} (yrs)

70 9 260 1.0E-06 1

ENTER Exposure duration, ED (yrs)

ENTER Target risk for carcinogens, TR (unitless)

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^\circ\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_b ($^\circ\text{K}$)	Critical temperature, T_c ($^\circ\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{yr}$)	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.8E-07	0.0E+00

END

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, $\theta_{a,A}$ (cm^3/cm^3)	Stratum B soil air-filled porosity, $\theta_{a,B}$ (cm^3/cm^3)	Stratum C soil air-filled porosity, $\theta_{a,C}$ (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{le} (cm^3/cm^3)	Stratum A soil intrinsic permeability, K_i (cm^2)	Stratum A soil relative air permeability, K_{rg} (cm^2)	Stratum A soil effective vapor permeability, K_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^2/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^2/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^2/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
2.84E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_b (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,gs}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{Tgs} (atm-m ³ /mol)	Henry's law constant at ave. groundwater temperature, H_{Tgs} (unitless)	Vapor viscosity at ave. soil temperature, μ_{Tgs} (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm^2/s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm^2/s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm^2/s)	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm^2/s)	Total overall effective diffusion coefficient, $D_{eff,t}$ (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	9.502	1.05E-02	4.46E-01	1.77E-04	4.62E-04	0.00E+00	0.00E+00	4.62E-04	4.62E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of foundation Peclet number, exp(Pe)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\text{-}^{-1}$)	Reference conc., RfC (mg/m ³)
15	4.49E+03	0.10	1.99E+01	4.62E-04	3.35E+02	#NUM!	5.46E-05	2.45E-01	5.8E-07	NA

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.3E-08	NA

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

127184 1.01E+01

Chemical

Tetrachloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Soil dry bulk density, P_b^A (g/cm^3)	Soil total porosity, n^A (unitless)	Soil water-filled porosity, θ_w^A (cm^3/cm^3)	Soil dry bulk density, P_b^B (g/cm^3)	Soil total porosity, n^B (unitless)	Soil water-filled porosity, θ_w^B (cm^3/cm^3)	Soil dry bulk density, P_b^C (g/cm^3)	Soil total porosity, n^C (unitless)	Soil water-filled porosity, θ_w^C (cm^3/cm^3)	Soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.375	0.253258113							

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP ($\text{g/cm} \cdot \text{s}^2$)	Enclosed space floor length, L_b (cm)	Enclosed space floor width, W_b (cm)	Enclosed space height, H_b (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)
15	40	915	762	274	0.1	0.45	0.45

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_c (yrs)	Averaging time for noncarcinogens, AT_{nc} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
70	3	3	350	1.0E-06	1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d^{-1}$)	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.8E-07	0.0E+00

END

Source- building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm ³ /cm ³)	Stratum B soil air-filled porosity, θ_a^B (cm ³ /cm ³)	Stratum C soil air-filled porosity, θ_a^C (cm ³ /cm ³)	Stratum A effective total fluid saturation, S_{ie} (cm ³ /cm ³)	Stratum A soil intrinsic permeability, k_i (cm ²)	Stratum A soil relative air permeability, k_{rg} (cm ²)	Stratum A soil effective vapor permeability, k_v (cm ²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm ³ /cm ³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³)	Floor- wall seam perimeter, X_{crack} (cm)
Exposure duration, τ (sec)	231	0.122	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Area of enclosed space below grade, A_B (cm ²)	Crack- to-total area ratio, η_1 (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D_{eff}^A (cm ² /s)	Stratum B effective diffusion coefficient, D_{eff}^B (cm ² /s)	Stratum C effective diffusion coefficient, D_{eff}^C (cm ² /s)	Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm ² /s)	Total overall effective diffusion coefficient, D_{eff}^T (cm ² /s)	Diffusion path length, L_d (cm)
2,39E+04	6.97E+05	4.81E-04	15	9,502	4.46E-01	1.77E-04	4.62E-04	0.00E+00	0.00E+00	4.62E-04	4.62E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m ³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm ³ /s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm ² /s)	Area of crack, A_{crack} (cm ²)	Exponent of equivalent foundation Peclet number, $\exp(Pe)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m ³)	Unit risk factor, URF (µg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)
15	4.49E+03	0.10	1.99E+01	4.62E-04	3.35E+02	#NUM!	5.46E-05	2.45E-01	5.8E-07	NA

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.9E-09	NA

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER ENTER
Initial groundwater
conc.,
 C_w
($\mu\text{g/L}$)
no dashes)

127184 1.01E+01

Chemical

Tetrachloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade to bottom of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A soil type (used to estimate soil vapor permeability)	Soil stratum A soil type (used to estimate soil vapor permeability), k_v (cm^2)	
15	15	246	246			A	S	S	

MORE \downarrow

ENTER ENTER
Soil-bldg. pressure differential, ΔP
(g/cm^2)

1.5 0.375 0.253258113

ENTER ENTER
Enclosed space floor length, L_B (cm)

15 40 915

ENTER ENTER
Enclosed space floor width, W_B (cm)

70 6 300

END

ENTER ENTER
Soil-bldg. pressure differential, ΔP
(g/cm^2)

1.5 0.375 0.253258113

ENTER ENTER
Enclosed space floor length, L_B (cm)

15 40 915

ENTER ENTER
Enclosed space floor width, W_B (cm)

70 6 300

ENTER ENTER
Soil-bldg. pressure differential, ΔP
(g/cm^2)

1.5 0.375 0.253258113

ENTER ENTER
Enclosed space floor length, L_B (cm)

15 40 915

ENTER ENTER
Enclosed space floor width, W_B (cm)

70 6 300

ENTER ENTER
Soil-bldg. pressure differential, ΔP
(g/cm^2)

1.5 0.375 0.253258113

ENTER ENTER
Enclosed space floor length, L_B (cm)

15 40 915

ENTER ENTER
Enclosed space floor width, W_B (cm)

70 6 300

ENTER ENTER
Soil-bldg. pressure differential, ΔP
(g/cm^2)

1.5 0.375 0.253258113

ENTER ENTER
Enclosed space floor length, L_B (cm)

15 40 915

ENTER ENTER
Enclosed space floor width, W_B (cm)

70 6 300

Diffusivity in air, D_a (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}\text{K}$)	Critical temperature, T_C ($^{\circ}\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{y}$)	Reference conc., RfC (mg/m^3)
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7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.8E-07	0.0E+00
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END

Exposure duration, τ (sec)	1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
Source-building separation, L_T (cm)														
Stratum A soil air-filled porosity, $\theta_{a,A}$ (cm^3/cm^3)	Stratum A soil air-filled porosity, $\theta_{a,A}$ (cm^3/cm^3)	Stratum B soil air-filled porosity, $\theta_{a,B}$ (cm^3/cm^3)	Stratum C soil air-filled porosity, $\theta_{a,C}$ (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{we} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)		

Area of enclosed space below grade, A_B (cm^2)	6.97E+05	4.81E-04	15	9.502	1.05E-02	4.46E-01	1.77E-04	4.62E-04	0.00E+00	4.62E-04	4.62E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)												
Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Crack vaporization at ave. groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)	Enthalpy of vaporization at ave. groundwater temperature, H_{Ts} (atm- m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{Ts} (unitless)	Vapor viscosity at ave. soil temperature, μ'_{Ts} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_g (cm)	

Convection path length, L_p (cm)	4.49E+03	0.10	1.99E+01	4.62E-04	3.35E+02	#NUM!	5.46E-05	2.45E-01	5.8E-07	NA
Source vapor conc., C_{source} ($\mu g/m^3$)										
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Average crack radius, r_{crack} (cm)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Exponent of equivalent foundation Peclet number, $\exp(Pe')$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot 1$)	Reference conc., RIC (mg/m ³)			

15
END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc. (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	2.00E+05	NA	1.0E-08	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL
DOWN
TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER ENTER
Initial groundwater conc., C_w ($\mu\text{g/L}$)

79016 1.14E+01

Chemical

Trichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Totals must add up to value of L_{WT} (cell D28)		
15	15	246	246			A	S	S
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Soil stratum A porosity, n^A (unitless)	Soil stratum A soil total porosity, θ_w^A (cm^3/cm^3)	Soil stratum A soil dry bulk density, P_b^A (g/cm^3)	Soil stratum B soil total porosity, n^B (unitless)	Soil stratum B soil dry bulk density, P_b^B (g/cm^3)	Soil stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Soil stratum C soil total porosity, n^C (unitless)	Soil stratum C soil dry bulk density, P_b^C (g/cm^3)	Soil stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.375	0.253258113						
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP ($\text{g}/\text{cm}\cdot\text{s}^2$)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)		
15	40	915	762	274	0.1	0.45		
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, THQ (unitless)	Target hazard quotient for carcinogens, noncarcinogens, THQ (unitless)		
70	9	9	260	1.0E-06	1			
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Used to calculate risk-based groundwater concentration.								

MORE ↓

MORE ↓

MORE ↓

MORE ↓

END

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., R(C) (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.10E+03	1.7E-06	0.0E+00

END

Source- building separation, L _T (cm)	Stratum A soil air-filled porosity, θ _{sA} (cm ³ /cm ³)	Stratum B soil air-filled porosity, θ _{sB} (cm ³ /cm ³)	Stratum C soil air-filled porosity, θ _{sC} (cm ³ /cm ³)	Stratum A effective total fluid saturation, S _{le} (cm ³ /cm ³)	Stratum A soil relative air permeability, k _{rg} (cm ²)	Stratum A soil effective vapor permeability, k _v (cm ²)	Thickness of capillary zone, L _{cz} (cm)	Total porosity in capillary zone, n _{cz} (cm ³ /cm ³)	Air-filled porosity in capillary zone, θ _{s,cz} (cm ³ /cm ³)	Water-filled porosity in capillary zone, θ _{w,cz} (cm ³ /cm ³)	Floor- wall seam perimeter, X _{crack} (cm)	
2.84E+08	231	0.122	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354

Area of enclosed space below grade, A _B (cm ²)	Crack- to-total area ratio, η ₁ (unitless)	Crack depth below grade, Z _{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, ΔH _{v,TS} (cal/mol)	Henry's law constant at ave. groundwater temperature, H _{TS} (atm·m ³ /mol)	Henry's law constant at ave. groundwater temperature, H _{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ _{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D ^{eff} _A (cm ² /s)	Stratum B effective diffusion coefficient, D ^{eff} _B (cm ² /s)	Stratum C effective diffusion coefficient, D ^{eff} _C (cm ² /s)	Capillary zone effective diffusion coefficient, D ^{eff} _{cz} (cm ² /s)	Total overall effective diffusion coefficient, D ^{eff} _T (cm ² /s)	Diffusion path length, L _d (cm)
2.39E+04	6.97E+05	4.81E-04	15	8.495	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	231

Convection path length, L _p (cm)	Source vapor conc., C _{source} (μg/m ³)	Crack radius, r _{crack} (cm)	Average vapor flow rate into bldg., Q _{soil} (cm ³ /s)	Crack effective diffusion coefficient, D ^{crack} (cm ² /s)	Exponent of equivalent foundation Peclet number, exp(Pe)	Infinite source indoor attenuation coefficient, α	Infinite source bldg. conc., C _{building} (μg/m ³)	Reference conc., RIC (mg/m ³)
15	3.01E+03	0.10	1.99E+01	5.08E-04	3.35E+02	5.97E-05	1.80E-01	NA

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.8E-08	NA

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.10E+06	NA

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

79016 1.14E+01

Chemical

Trichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

ENTER Stratum C soil total porosity, n^C (unitless)

ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)

15 40

ENTER Enclosed space floor length, L_B (cm)

915

ENTER Enclosed space floor width, W_B (cm)

762

ENTER Enclosed space height, H_B (cm)

274

ENTER Indoor air exchange rate, ER (1/h)

0.45

MORE

ENTER Averaging time for carcinogens, AT (yrs)

70

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)

3

ENTER Exposure duration, ED (yrs)

3

ENTER Exposure frequency, EF (days/yr)

350

ENTER Target hazard quotient for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^{\circ}\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}\text{K}$)	Critical temperature, T_C ($^{\circ}\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{y}$)	Reference conc., RIC (mg/m^3)
---	---	--	---	--	--	---	--	---	---	--

7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.10E+03	1.7E-06	0.0E+00
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END

Exposure duration, τ (sec)	9.46E+07	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354
Source-building separation, L_T (cm)														
Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)														
Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)														
Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)														
Stratum A effective total fluid saturation, S_{we} (cm^3/cm^3)														
Stratum A soil relative air permeability, k_{rg} (cm^2)														
Stratum A soil effective vapor permeability, k_v (cm^2)														
Thickness of capillary zone, L_{cz} (cm)														
Total porosity in capillary zone, n_{cz} (cm^3/cm^3)														
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)														
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)														
Floor-wall seam perimeter, X_{crack} (cm)														

Area of enclosed space below grade, A_B (cm^2)	6.97E+05	4.81E-04	15	8.495	6.26E-03	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	5.08E-04	231
Bldg ventilation rate, $Q_{building}$ (cm^3/s)														
Crack-to-total area ratio, η (unitless)														
Crack depth below grade, Z_{crack} (cm)														
Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)														
Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)														
Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)														
Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)														
Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)														
Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)														
Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)														
Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)														
Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)														
Diffusion path length, L_d (cm)														

Convection path length, L_p (cm)														
Source vapor conc., C_{source} ($\mu g/m^3$)														
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)														
Crack radius, r_{crack} (cm)														
Crack effective diffusion coefficient, D^{eff}_{crack} (cm^2/s)														
Area of crack, A_{crack} (cm^2)														
Exponent of equivalent foundation Peclet number, $\exp(Pe_f)$ (unitless)														
Infinite source indoor attenuation coefficient, α (unitless)														
Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)														
Unit risk factor, URF ($\mu g/m^3$) ⁻¹														
Reference conc., RfC (mg/m ³)														

15	3.01E+03	0.10	1.99E+01	5.08E-04	3.35E+02	#NUM!	5.97E-05	1.80E-01	1.7E-06	NA
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END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	1.3E-08	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	NA
--	---------	--	----

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	NA	Indoor exposure groundwater noncarcinogen (µg/L)	NA	Risk-based indoor exposure groundwater conc. (µg/L)	NA	Pure component water solubility, S (µg/L)	1.10E+06	Final indoor exposure groundwater conc. (µg/L)	NA
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MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

79016 1.14E+01

Chemical

Trichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_F (cm)	Depth to bottom of water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v)	Soil stratum B SCS soil type	Soil stratum C SCS soil type
15	15	246	246			A	S	S	S

MORE \downarrow

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, P_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, P_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, P_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.375	0.253258113							

MORE \downarrow

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. floor pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)			
15	40	915	762	274	0.1	0.45			

MORE \downarrow

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, TR (unitless)	Target hazard quotient for carcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
70	6	6	300	1.0E-06	1		

MORE \downarrow

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{L,0}$ (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{ow} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d$) ⁻¹	Reference conc., RTC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.10E+03	1.7E-06	0.0E+00

END

Exposure duration, τ (sec)	231	0.122	ERROR	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	0.375	0.122	0.253	3,354
Source-building separation, L_t (cm)													
Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)													
Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)													
Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)													
Stratum A effective total fluid saturation, S_{fb} (cm^3/cm^3)													
Stratum A soil intrinsic permeability, k_i (cm^2)													
Stratum A soil relative air permeability, k_{ra} (cm^2)													
Stratum A soil effective vapor permeability, k_v (cm^2)													
Thickness of capillary zone, L_{cz} (cm)													
Total porosity in capillary zone, n_{cz} (cm^3/cm^3)													
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)													
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)													
Floor-wall seam perimeter, X_{crack} (cm)													

Area of enclosed space below grade, A_b (cm^2)													
Crack-to-total area ratio, η (unitless)													
Crack depth below grade, Z_{crack} (cm)													
Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)													
Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)													
Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)													
Vapor viscosity at ave. soil temperature, μ_{HS} (g/cm-s)													
Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)													
Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)													
Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)													
Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)													
Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)													
Diffusion path length, L_d (cm)													

2.39E+04	6.97E+05	4.81E-04	15	8.495	6.26E-03	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	231
Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., C_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Pecllet number, $exp(Pe)$ (unitless)	Infinite indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot 1$)	Reference conc., RIC (mg/m^3)			
15	3.01E+03	0.10	1.99E+01	5.08E-04	3.35E+02	#NUM!	5.97E-05	1.80E-01	1.7E-06	NA			
END													

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.2E-08	NA

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (ug/L)	Indoor exposure groundwater noncarcinogen (ug/L)	Risk-based indoor exposure groundwater conc. (ug/L)	Pure component water solubility, S (ug/L)	Final indoor exposure groundwater conc. (ug/L)
NA	NA	NA	1.10E+06	NA

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT):

SCROLL DOWN TO "END"

END

Soil Properties Lookup Table

SCS Soil Type	K _c (cm/h)	α (1/cm)	N (unitless)	M (unitless)	D _w (cm ² /s)	D _a (cm ² /s)	Diffusivity in water, D _w (cm ² /s)	Pure component water solubility, S (mg/L)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m ³ /mol)	Henry's reference temperature, T _R (°C)	Normal boiling point, T _b (°K)	Critical temperature, T _c (°K)	Enthalpy of vaporization at the normal boiling point, ΔH _{v,b} (cal/mol)	Unit risk factor, URF (μg/m ³) ⁻¹	Reference conc., R/C (mg/m ³)	URF extrapolated (X)	R/C extrapolated (X)
C	0.61	0.01496	1.253	0.2019	4.95E-06	1.37E-02	4.95E-06	2.50E-02	3.32E-04	8.10E-06	25	533.15	720.75	22,000	9.7E-05	0.0E+00		
CL	0.34	0.01581	1.416	0.2938	9.00E-06	4.30E-02	9.00E-06	1.62E-03	4.63E-05	1.13E-06	25	715.90	969.27	19,000	2.1E-03	0.0E+00	X	
L	0.50	0.01112	1.472	0.3207	9.06E-06	2.73E-02	9.06E-06	2.79E+03	1.82E-05	4.44E-07	25	605.28	827.85	25,000	0.0E+00	7.0E-03	X	X
LS	4.38	0.03475	1.746	0.4273	5.18E-06	2.02E-02	5.18E-06	2.49E-03	6.03E-07	1.47E-08	25	743.24	990.41	29,995	2.1E-03	0.0E+00	X	
S	26.78	0.03524	3.177	0.6852	8.80E-06	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	X	
SC	0.47	0.03342	1.208	0.1722	9.00E-06	5.10E-02	9.00E-06	9.40E-03	1.37E-04	3.34E-06	25	708.15	1004.79	16,000	2.1E-04	0.0E+00	X	
SCL	0.55	0.02109	1.330	0.2481	4.37E-06	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	X	
SI	1.82	0.00858	1.679	0.4044	7.34E-06	1.42E-02	7.34E-06	6.80E+00	5.74E-04	1.40E-05	25	566.55	839.36	15,000	3.7E-04	0.0E+00	X	
SIC	0.40	0.01622	1.321	0.2430	4.46E-06	1.25E-02	4.46E-06	1.95E-01	6.19E-04	1.51E-05	25	613.32	842.25	17,000	4.0E-03	0.0E+00	X	
SICL	0.46	0.00839	1.521	0.3425	4.46E-06	5.36E-02	4.46E-06	3.50E+03	6.31E-05	1.54E-06	25	720.00	751.00	12,094	0.0E+00	1.4E+01	X	X
SIL	0.76	0.00506	1.663	0.3987	4.76E-06	1.14E-01	4.76E-06	7.92E+03	1.59E-03	3.88E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	X	X
SL	1.60	0.02867	1.449	0.3099	4.76E-06	1.04E-01	4.76E-06	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	X	X
						1.04E-01	1.00E-05	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	0.0E+00	X	X
						8.00E-02	9.30E-06	7.40E+04	3.61E-04	8.80E-06	25	390.88	562.16	10,346	0.0E+00	3.5E-01	X	X
						8.80E-02	8.80E-06	1.75E+03	2.28E-01	5.56E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	X	X
						7.80E-02	8.80E-06	1.35E+03	7.05E-01	1.72E-02	25	347.24	545.00	7,136	0.0E+00	1.0E+00	X	X
						4.74E-06	4.74E-06	2.50E-01	3.08E-04	7.51E-06	25	718.15	986.20	15,000	0.0E+00	1.8E-02	X	X
						1.56E-02	1.56E-02	4.46E-06	6.48E-04	1.58E-05	25	419.60	848.49	16,000	0.0E+00	1.8E-02	X	X
						1.69E-02	1.69E-02	4.76E-06	1.64E-04	4.00E-06	25	639.90	863.77	17,000	6.9E-05	0.0E+00	X	X
						4.47E+06	4.47E+06	9.00E-02	8.61E-04	2.10E-05	25	636.44	860.38	15,000	9.7E-05	0.0E+00	X	X
						1.05E+01	1.05E+01	1.21E-05	2.56E-01	6.24E-03	25	276.71	467.00	5,714	0.0E+00	5.0E-03	X	X
						7.28E-02	7.28E-02	1.52E+04	1.11E+00	2.71E-02	25	259.25	432.00	5,250	4.4E-06	1.0E-01	X	X
						1.06E-01	1.06E-01	2.76E+03	8.98E-02	2.19E-03	25	313.00	510.00	6,706	4.7E-07	3.0E+00	X	X
						1.01E-01	1.01E-01	1.30E+04	1.24E+00	3.02E-02	25	319.00	552.00	6,391	0.0E+00	7.0E-01	X	X
						1.04E-01	1.04E-01	1.19E+03	1.24E+00	5.34E-04	25	422.35	696.00	9,479	1.1E-06	0.0E+00	X	X
						1.49E-02	1.49E-02	3.10E+03	2.19E-02	1.60E-03	25	363.15	585.85	7,800	1.8E-05	0.0E+00	X	X
						2.98E-02	2.98E-02	6.74E+03	6.56E-02	1.60E-03	25	330.55	523.00	6,895	5.0E-05	0.0E+00	X	X
						7.42E-02	7.42E-02	5.06E+03	2.30E-01	5.61E-03	25	304.75	576.05	6,247	5.0E-05	0.0E+00	X	X
						9.00E-02	9.00E-02	2.25E+03	1.07E+00	2.61E-02	25	603.69	846.31	13,000	1.3E-03	0.0E+00	X	X
						1.12E-02	1.12E-02	5.69E-06	4.47E-02	2.71E-02	25	512.15	745.00	10,931	0.0E+00	7.0E-05	X	X
						1.61E-02	1.61E-02	1.10E+00	1.11E+00	6.63E-06	25	613.75	716.00	10,271	2.7E-07	0.0E+00	X	X
						7.82E-02	7.82E-02	2.80E+03	2.72E-04	2.80E-03	25	369.52	572.00	7,590	0.0E+00	4.0E-03	X	X
						6.23E-02	6.23E-02	2.80E+03	1.15E-01	2.80E-03	25	368.15	602.00	8,322	1.6E-05	0.0E+00	X	X
						7.80E-02	7.80E-02	4.42E+03	3.74E-02	1.03E-02	25	360.36	544.20	7,500	1.7E-06	0.0E+00	X	X
						9.10E-02	9.10E-02	1.10E+03	4.22E-01	3.44E-04	25	419.60	661.15	8,996	5.8E-05	0.0E+00	X	X
						7.10E-02	7.10E-02	2.97E+03	1.41E-02	1.55E-04	25	560.54	803.15	12,155	0.0E+00	2.1E-01	X	X
						4.21E-02	4.21E-02	4.24E+00	6.36E-03	4.51E-07	25	567.15	757.00	13,733	0.0E+00	2.8E+00	X	X
						2.56E-02	2.56E-02	1.08E+03	1.85E-05	14,751	25	613.75	798.67	14,000	0.0E+00	7.0E-01	X	X
						4.38E-02	4.38E-02	1.12E+01	3.85E-08	9.39E-10	25	600.60	839.68	14,000	0.0E+00	0.0E+00	X	X
						1.74E-02	1.74E-02	2.69E+00	5.17E-05	1.26E-06	25	632.28	890.45	7,300	0.0E+00	0.0E+00	X	X
						3.12E-02	3.12E-02	3.51E+01	2.05E-04	5.00E-06	25	632.28	890.45	7,300	0.0E+00	1.4E-01	X	X
						7.88E-06	7.88E-06	1.98E+00	2.61E-03	6.37E-05	25	627.87	899.00	12,666	0.0E+00	4.0E+00	X	X
						3.90E-02	3.90E-02	7.48E+00	6.26E-07	1.53E-08	25	627.87	899.00	12,666	0.0E+00	1.4E-01	X	X
						5.61E-02	5.61E-02	3.23E+00	3.34E-01	8.15E-03	25	582.15	738.00	10,206	2.2E-05	0.0E+00	X	X
						5.60E-02	5.60E-02	1.95E+03	1.00E-06	2.44E-08	25	582.15	738.00	10,206	3.4E-05	0.0E+00	X	X
						3.18E-02	3.18E-02	8.00E+02	3.19E-04	7.78E-06	25	519.15	749.03	12,000	3.1E-06	0.0E+00	X	X
						1.94E-02	1.94E-02	6.25E-06	1.98E-02	4.83E-04	25	491.14	748.40	10,373	0.0E+00	3.0E-03	X	X
						5.90E-02	5.90E-02	3.10E+00	1.64E-07	4.00E-09	25	560.26	754.03	20,000	1.3E-04	0.0E+00	X	X
						8.70E-02	8.70E-02	1.78E+02	2.13E-01	5.20E-03	25	417.60	630.30	8,661	0.0E+00	7.0E+00	X	X
						7.40E-02	7.40E-02	2.60E+04	4.92E-05	1.20E-06	25	464.19	697.60	10,800	0.0E+00	1.8E-01	X	X

Chemical Properties Lookup Table

CAS No.	Chemical	Organic carbon partition coefficient, K _{oc} (cm ³ /g)	Diffusivity in air, D _a (cm ² /s)	Diffusivity in water, D _w (cm ² /s)	Pure component water solubility, S (mg/L)	Henry's law constant at reference temperature, H' (unitless)	Henry's law constant at reference temperature, H (atm-m ³ /mol)	Henry's reference temperature, T _R (°C)	Normal boiling point, T _b (°K)	Critical temperature, T _c (°K)	Enthalpy of vaporization at the normal boiling point, ΔH _{v,b} (cal/mol)	Unit risk factor, URF (μg/m ³) ⁻¹	Reference conc., R/C (mg/m ³)	URF extrapolated (X)	R/C extrapolated (X)
50293	DDT	2.63E+06	1.37E-02	4.95E-06	2.50E-02	3.32E-04	8.10E-06	25	533.15	720.75	22,000	9.7E-05	0.0E+00		
50328	Benzo(a)pyrene	1.02E-02	4.30E-02	9.00E-06	1.62E-03	4.63E-05	1.13E-06	25	715.90	969.27	19,000	2.1E-03	0.0E+00	X	
51285	2,4-Dinitrophenol	1.02E-02	2.73E-02	9.06E-06	2.79E+03	1.82E-05	4.44E-07	25	605.28	827.85	25,000	0.0E+00	7.0E-03	X	X
53703	Dibenz(a,h)anthracene	3.80E+06	2.02E-02	5.18E-06	2.49E-03	6.03E-07	1.47E-08	25	743.24	990.41	29,995	2.1E-03	0.0E+00	X	
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02	25	349.90	556.60	7,127	1.5E-05	0.0E+00	X	
56553	Benzo(a)anthracene	3.98E+05	5.10E-02	9.00E-06	9.40E-03	1.37E-04	3.34E-06	25	708.15	1004.79	16,000	2.1E-04	0.0E+00	X	
57749	Chlordane	1.20E+05	1.18E-02	4.37E-06	5.60E-02	1.99E-03	4.85E-05	25	624.24	885.73	14,000	1.0E-04	7.0E-04	X	
58989	gamma-HCH (Lindane)	1.07E+03	1.42E-02	7.34E-06	6.80E+00	5.74E-04	1.40E-05	25	566.55	839.36	15,000	3.7E-04	0.0E+00	X	
60571	Dieldrin	2.14E+04	1.25E-02	4.46E-06	1.95E-01	6.19E-04	1.51E-05	25	613.32	842.25	17,000	4.0E-03	0.0E+00	X	
65850	Benzoic Acid	5.79E-01	5.36E-02	7.97E-06	3.50E+03	6.31E-05	1.54E-06	25	720.00	751.00	12,094	0.0E+00	1.4E+01	X	X
67641	Acetone	5.79E-01	1.14E-01	1.14E-05	1.00E+06	1.59E-03	3.88E-05	25	329.20	508.10	6,955	0.0E+00	3.5E-01	X	X
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	25	334.32	536.40	6,988	2.3E-05	0.0E+00	X	X
67721	Hexachloroethane	1.78E+03	2.50E-03	6.80E-06	5.00E+01	1.59E-01	3.88E-03	25	458.00	695.00	9,510	4.0E-06	0.0E+00	X	X
71363	Butane	6.92E+00	8.00E-02	9.30E-06	7.40E+04	3.61E-04	8.80E-06	25	390.88	562.16	10,346	0.0E+00	3.5E-01	X	X
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.75E+03	2.28E-01	5.56E-03	25	353.24	562.16	7,342	7.8E-06	0.0E+00	X	X

95501	1,2-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	1.56E+02	7.79E-02	1.90E-03	25	453.57	705.00	9,700	0.0E+00	2.0E-01	X
95578	2-Chlorophenol	3.88E+02	5.01E-02	9.46E-06	2.20E+04	1.60E-02	3.90E-04	25	447.53	675.00	9,572	0.0E+00	1.8E-02	X
95954	2,4,5-Trichlorophenol	1.60E+03	2.91E-02	7.03E-06	1.20E+03	1.78E-04	4.34E-06	25	526.15	759.13	11,000	0.0E+00	3.5E-01	X
98953	Nitrobenzene	6.46E+01	7.60E-02	8.60E-06	2.09E+03	9.84E-04	2.40E-05	25	483.95	719.00	10,566	0.0E+00	2.0E-03	
100414	Ethylbenzene	3.63E+02	7.50E-02	8.00E-06	1.69E+02	3.23E-01	7.88E-03	25	409.34	617.20	8,501	0.0E+00	1.0E+00	
100425	Styrene	7.76E+02	7.10E-02	8.00E-06	3.10E+02	1.13E-01	2.76E-03	25	418.31	636.00	8,737	0.0E+00	1.0E+00	
105679	2,4-Dimethylphenol	2.08E+02	5.84E-02	8.68E-06	7.87E+03	8.20E-05	2.00E-06	25	484.13	707.60	11,329	0.0E+00	7.0E-02	X
106423	p-Xylene	3.89E+02	7.69E-02	8.44E-06	1.85E+02	3.14E-01	7.66E-03	26	411.52	616.20	8,525	0.0E+00	7.0E+00	X
106467	1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03	25	447.21	684.75	9,271	0.0E+00	8.0E-01	X
106478	p-Chloroaniline	6.61E+01	4.83E-02	1.01E-05	5.30E+03	1.36E-05	3.32E-07	25	503.65	754.00	11,689	0.0E+00	1.4E-02	X
107062	1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.01E-02	9.78E-04	25	356.65	561.00	7,643	2.6E-05	0.0E+00	
108054	Vinyl acetate	5.25E+00	8.50E-02	9.20E-06	2.00E+04	2.10E-02	5.12E-04	25	345.65	519.13	7,800	0.0E+00	2.0E-01	X
108383	m-Xylene	4.07E+02	7.00E-02	8.00E-06	1.61E+02	3.01E-01	7.34E-03	25	412.27	617.05	8,523	0.0E+00	7.0E+00	X
108883	Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-02	6.63E-03	25	383.78	591.79	7,930	0.0E+00	4.0E-01	X
108907	Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	3.71E-03	25	404.87	632.40	8,410	0.0E+00	2.0E-02	X
108952	Phenol	8.20E+01	8.20E-02	9.10E-06	8.28E+04	1.63E-04	3.98E-07	25	455.02	684.20	10,920	0.0E+00	2.1E+00	X
111444	Bis(2-chloroethyl)ether	1.55E+01	6.92E-01	7.53E-06	1.72E+04	7.38E-01	1.80E-05	25	451.15	659.79	10,803	3.3E-04	0.0E+00	X
115297	Endosulfan	2.14E+03	1.15E-02	4.55E-06	5.10E-01	4.59E-04	1.12E-05	25	674.43	942.94	14,000	0.0E+00	2.1E-02	X
117817	Bis(2-ethylhexyl)phthalate	1.51E+07	3.51E-02	3.68E-06	3.00E-01	4.18E-06	1.02E-07	25	704.09	882.22	14,000	0.0E+00	7.0E-02	X
117841	Hexachlorobenzene	8.32E+02	1.51E-02	3.58E-06	2.00E-02	2.74E-03	6.68E-05	25	582.55	825.00	14,447	4.6E-04	0.0E+00	X
118741	Hexachlorocyclopentadiene	5.50E+04	5.42E-02	5.91E-06	6.20E+00	5.41E-02	1.32E-03	25	582.55	825.00	14,447	4.6E-04	0.0E+00	X
120127	Anthracene	2.95E+04	3.24E-02	7.74E-06	4.34E+02	2.67E-03	6.51E-05	25	615.18	873.00	13,121	0.0E+00	1.1E+00	X
120821	1,2,4-Trichlorobenzene	1.78E+03	3.00E-02	8.23E-06	3.00E+02	5.82E-02	1.42E-03	25	486.15	725.00	10,471	0.0E+00	2.0E-01	X
120832	2,4-Dichlorophenol	1.47E+02	3.46E-02	8.77E-06	4.50E+03	1.30E-04	3.17E-06	25	482.15	708.17	15,000	0.0E+00	1.1E-02	X
121142	2,4-Dinitrotoluene	9.55E+01	2.03E-01	7.08E-06	2.70E+03	3.80E-06	9.27E-08	25	590.00	814.00	13,457	1.9E-04	0.0E+00	X
124481	Chlorodibromomethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.21E-02	7.83E-04	25	416.14	678.20	5,900	2.4E-05	0.0E+00	X
127184	Tetrachloroethylene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	1.84E-02	25	394.40	620.20	8,288	5.8E-07	0.0E+00	X
129000	Pyrene	1.05E+05	2.72E-02	7.24E-06	1.35E-01	4.51E-04	1.10E-05	25	667.95	936.00	14,370	0.0E+00	1.1E-01	X
156592	cis-1,2-Dichloroethylene	3.55E+01	7.36E-02	1.13E-06	3.50E+03	1.67E-01	4.07E-03	25	333.65	544.00	7,192	0.0E+00	3.5E-02	X
156605	trans-1,2-Dichloroethylene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.85E-01	9.39E-03	25	320.85	516.50	6,717	0.0E+00	7.0E-02	X
193395	Indeno(1,2,3-cd)pyrene	3.47E+06	1.90E-02	5.68E-06	2.20E-05	6.56E-05	1.60E-06	25	809.15	1078.24	19,000	2.1E-04	0.0E+00	X
205992	Benzobifluoranthene	1.23E+06	2.26E-02	5.58E-06	1.50E-03	4.55E-03	1.11E-04	25	715.90	969.27	17,000	2.1E-04	0.0E+00	X
206440	Fluoranthene	1.07E+05	3.02E-02	6.35E-06	2.08E-01	6.60E-04	1.61E-05	25	655.95	905.00	13,815	0.0E+00	1.4E-01	X
207089	Benzok(j)fluoranthene	1.23E+05	2.26E-02	5.56E-06	8.00E-04	8.29E-07	8.29E-07	25	753.15	1019.70	18,000	2.1E-05	0.0E+00	X
218019	Chrysene	3.98E+05	2.48E-02	6.21E-06	1.60E-03	3.88E-03	9.46E-05	25	714.15	979.00	16,455	2.1E-06	0.0E+00	X
309002	Aldrin	2.45E+06	1.32E-02	4.88E-06	1.80E-01	6.97E-03	1.70E-04	25	603.01	839.37	15,000	4.9E-03	0.0E+00	X
319846	alpha-HCH (alpha-BHC)	1.23E+03	1.42E-02	7.34E-06	2.00E+00	4.35E-04	1.06E-05	25	596.55	839.36	15,000	1.8E-03	0.0E+00	X
319857	beta-HCH (beta-BHC)	1.26E+03	1.42E-02	7.34E-06	2.40E-01	3.05E-05	7.44E-07	25	596.55	839.36	19,000	5.3E-04	0.0E+00	X
542756	1,3-Dichloropropene	4.57E+01	6.26E-02	1.00E-05	2.80E+03	7.26E-01	1.77E-02	25	381.15	587.38	7,900	4.0E-06	2.0E-02	X
606202	2,6-Dinitrotoluene	6.92E+01	3.27E-02	7.28E-06	1.82E+02	3.06E-05	7.46E-07	25	558.00	770.00	12,938	1.9E-04	0.0E+00	X
621647	N-Nitrosodi-n-propylamine	2.40E+01	5.45E-02	8.17E-06	9.89E+03	9.23E-06	2.25E-06	25	509.60	746.87	6,100	2.0E-03	0.0E+00	X
1024573	Heptachlor epoxide	8.32E+04	1.32E-02	4.23E-06	2.00E-01	3.90E-04	9.51E-06	25	613.96	848.76	16,000	2.6E-03	0.0E+00	X
7439976	Mercury (elemental)	5.20E+01	3.07E-02	6.30E-06	5.62E-02	4.67E-01	1.14E-02	25	629.88	1750.00	14,127	0.0E+00	3.0E-04	X
8001352	Toxaphene	2.57E+05	1.16E-02	4.34E-06	7.40E-01	2.46E-04	6.00E-06	25	657.15	873.31	15,000	3.2E-04	0.0E+00	X

Groundwater - Youth PAEI

Attachment

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

79016 1.00E+02

Chemical

Trichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth of enclosed space floor, L_F (cm)	Depth to bottom of enclosed space floor, below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER Stratum B soil total porosity, n^B (unitless)

0.253258113

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

0.253258113

ENTER Stratum C soil total porosity, n^C (unitless)

0.253258113

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

0.253258113

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)

15 40

ENTER Enclosed space floor length, L_B (cm)

915

ENTER Enclosed space height, H_B (cm)

274

ENTER Floor-wall seam crack width, w (cm)

0.1

ENTER Indoor air exchange rate, ER (1/h)

0.45

MORE

ENTER Averaging time for carcinogens, AT_c (yrs)

70 12

ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)

12

ENTER Exposure duration, ED (days/yr)

300

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot s^{-1}$)	Reference conc., RFC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.10E+03	1.7E-06	0.0E+00

END

Exposure duration, τ (sec)	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354
Source-building separation, L_T (cm)		θ_a^A	Stratum A soil air-filled porosity, θ_a^B	Stratum B soil air-filled porosity, θ_a^C	Stratum A effective total fluid saturation, S_{le}	Stratum A soil intrinsic permeability, k_i	Stratum A soil relative air permeability, K_{rg}	Stratum A effective vapor permeability, k_v	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	2.39E+04	6.97E+05	4.81E-04	15	8,495	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	231	
Area of enclosed space below grade, A_B (cm^2)		Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)	Exponent of equivalent foundation Pecllet number, exp(Pe)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m^3)	Stratum A enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,T,S}$ (cal/mol)	Stratum B effective diffusion coefficient, D_B^{eff} (cm^2/s)	Stratum C effective diffusion coefficient, D_C^{eff} (cm^2/s)	Total overall effective diffusion coefficient, D^I (cm^2/s)
Area of enclosed space below grade, A_B (cm^2)		Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)	Exponent of equivalent foundation Pecllet number, exp(Pe)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m^3)	Stratum A enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,T,S}$ (cal/mol)	Stratum B effective diffusion coefficient, D_B^{eff} (cm^2/s)	Stratum C effective diffusion coefficient, D_C^{eff} (cm^2/s)	Total overall effective diffusion coefficient, D^I (cm^2/s)

Convection path length, L_p (cm)	15	2.65E+04	0.10	1.99E+01	5.08E-04	3.35E+02	5.97E-05	1.58E+00	1.7E-06	NA
Source vapor conc., C_{source} ($\mu g/m^3$)		Crack radius, r_{crack} (cm)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)	Exponent of equivalent foundation Pecllet number, exp(Pe)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m^3)

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.10E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.8E-07	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3, 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)	Initial groundwater conc., C_w (numbers only, no dashes) ($\mu\text{g/L}$)
79016	1.00E+02								
Chemical	Trichloroethylene								
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum SCS soil type directly above water table	Soil stratum SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE

MORE

MORE

MORE

END

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum A soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)
1.5	0.375	0.253256113											
ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Floor-wall seam crack width, w (cm)	Target risk for carcinogens, TR (unitless)	Exposure frequency, EF (days/yr)	Exposure duration, ED (yrs)	Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Target hazard quotient for noncarcinogens, THQ (unitless)
15	40	915	762	274	0.1	0.45							

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot s^{-1}$)	Reference conc., RTC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7,505	360.36	544.20	1.66E+02	1.10E+03	1.7E-06	0.0E+00

END

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A air-filled porosity, $\theta_{f,A}$ (cm^3/cm^3)	Stratum B air-filled porosity, $\theta_{f,B}$ (cm^3/cm^3)	Stratum C air-filled porosity, $\theta_{f,C}$ (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{fe} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, K_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{g,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)	Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, $D_{eff,A}$ (cm^2/s)	Stratum B effective diffusion coefficient, $D_{eff,B}$ (cm^2/s)	Stratum C effective diffusion coefficient, $D_{eff,C}$ (cm^2/s)	Capillary zone effective diffusion coefficient, $D_{eff,cz}$ (cm^2/s)	Total overall effective diffusion coefficient, D_{eff} (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	8,495	2.65E-01	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Pectel number, exp(Pe') (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m ³)
15	2.65E+04	0.10	1.99E+01	5.08E-04	3.35E+02	#NUM!	5.97E-05	1.58E+00	1.7E-06	NA

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	2.2E-07	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)	NA
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RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	NA	Indoor exposure groundwater noncarcinogen (µg/L)	NA	Risk-based indoor groundwater exposure conc., (µg/L)	NA	Pure component water solubility, S (µg/L)	1.10E+06	Final indoor exposure groundwater conc. (µg/L)	NA
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MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

79016 1.00E+02

Chemical

Trichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Totals must add up to value of L_{wt} (cell D28)		Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	15	246	246					A	S

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
1.5	0.375	0.253258113							S

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_b (cm)	Enclosed space floor width, W_b (cm)	Enclosed space height, H_b (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)			
15	40	915	762	274	0.1	0.45			

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_c (yrs)	Averaging time for noncarcinogens, AT_{nc} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)		
70	30	30	320	1.0E-06	1		

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d^{-1}$)	Reference conc., RfC (mg/m^3)
7.90E-02	9.10E-06	1.03E-02	25	7.505	360.36	544.20	1.66E+02	1.10E+03	1.7E-06	0.0E+00

END

9.46E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
Exposure duration, τ (sec)	Source-building separation, L_I (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{le} (cm^3/cm^3)	Stratum A soil intrinsic permeability, K_i (cm^2)	Stratum A soil relative permeability, K_g (cm^2)	Stratum A soil effective vapor permeability, K_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)

2.39E+04	6.97E+05	4.81E-04	15	8.495	6.26E-03	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	231
Bldg. ventilation rate, Q_{bldg} (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{Ts} (atm-n ³ /mol)	Henry's law constant at ave. groundwater temperature, H'_{Ts} (unitless)	Vapor viscosity at ave. soil temperature, μ_{Ts} (g/cm-s)	Stratum A effective diffusion coefficient, D_{eff}^A (cm^2/s)	Stratum B effective diffusion coefficient, D_{eff}^B (cm^2/s)	Stratum C effective diffusion coefficient, D_{eff}^C (cm^2/s)	Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm^2/s)	Total overall effective diffusion coefficient, D_{eff}^{tot} (cm^2/s)	Diffusion path length, L_d (cm)

2.39E+04	6.97E+05	4.81E-04	15	8.495	6.26E-03	2.65E-01	1.77E-04	5.08E-04	0.00E+00	0.00E+00	5.08E-04	5.08E-04	231
Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{oil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., C_{bldg} ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3$) ⁻¹	Reference conc., RIC (mg/m^3)			

15	2.65E+04	0.10	1.99E+01	5.08E-04	3.35E+02	#NUM!	5.97E-05	1.58E+00	1.7E-06	NA			

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E-06	NA

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.10E+06	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

GW-ADV
Version 2.3; 03/01

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

Chemical

127184 1.00E+02

Tetrachloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wtr} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A soil type (used to estimate soil vapor permeability)	Soil stratum A soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, P_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, P_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, P_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	
1.5	0.375	0.253258113							

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	
15	40	915	762	274	0.1	0.45	

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
70	12	12	300	1.0E-06	1

END

Used to calculate risk-based groundwater concentration.

Source- building separation, L_I (cm)	Stratum A soil air-filled porosity, θ_a^A (cm ³ /cm ³)	Stratum B soil air-filled porosity, θ_a^B (cm ³ /cm ³)	Stratum C soil air-filled porosity, θ_a^C (cm ³ /cm ³)	Stratum A effective total fluid saturation, S_{ie} (cm ³ /cm ³)	Stratum A soil intrinsic permeability, k_i (cm ²)	Stratum A soil relative air permeability, k_{rg} (cm ²)	Stratum A soil effective vapor permeability, k_v (cm ²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm ³ /cm ³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³)	Floor- wall seam perimeter, X_{crack} (cm)
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3.78E+08	231	0.122	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
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Area of enclosed space below grade, A_B (cm ²)	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m ³ /mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D_{eff}^A (cm ² /s)	Stratum B effective diffusion coefficient, D_{eff}^B (cm ² /s)	Stratum C effective diffusion coefficient, D_{eff}^C (cm ² /s)	Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm ² /s)	Total overall effective diffusion coefficient, D_{eff}^T (cm ² /s)	Diffusion path length, L_d (cm)
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2.39E+04	6.97E+05	4.81E-04	15	9.502	1.05E-02	1.77E-04	4.62E-04	0.00E+00	0.00E+00	4.62E-04	4.62E-04	231
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Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m ³)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm ³ /s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm ² /s)	Area of crack, A_{crack} (cm ²)	Exponent of equivalent foundation Peclet number, α (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m ³)	Unit risk factor, URF (µg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)
--	---	---	--	--	--	--	---	---	--	--

15	4.46E+04	0.10	1.99E+01	4.62E-04	3.35E+02	#NUM!	5.46E-05	2.44E+00	5.8E-07	NA
----	----------	------	----------	----------	----------	-------	----------	----------	---------	----

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER
Initial groundwater conc., C_w ($\mu\text{g/L}$)
no dashes

127184 1.00E+02

Chemical

Tetrachloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wr} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A soil type (used to estimate soil vapor permeability)	Soil stratum S soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Soil dry bulk density, P_b^A (g/cm^3)	Soil total porosity, n^A (unitless)	Soil water-filled porosity, θ_w^A (cm^3/cm^3)	Soil dry bulk density, P_b^B (g/cm^3)	Soil total porosity, n^B (unitless)	Soil water-filled porosity, θ_w^B (cm^3/cm^3)	Soil dry bulk density, P_b^C (g/cm^3)	Soil total porosity, n^C (unitless)	Soil water-filled porosity, θ_w^C (cm^3/cm^3)	Soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.375	0.253258113							

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP ($\text{g}/\text{cm-s}^2$)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)
15	40	915	762	274	0.1	0.45			

END

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
70	6	6	350	1.0E-06	1				

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d^{-1}$)	Reference conc., RIC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.8E-07	0.0E+00

END

Exposure duration, τ (sec)	1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
Source-building separation, L_T (cm)														
Stratum A air-filled porosity, θ_a^A (cm^3/cm^3)														
Stratum B air-filled porosity, θ_a^B (cm^3/cm^3)														
Stratum C air-filled porosity, θ_a^C (cm^3/cm^3)														
Stratum A effective total fluid saturation, S_{se} (cm^3/cm^3)														
Stratum A soil intrinsic permeability, k_i (cm^2)														
Stratum A soil relative air permeability, k_{rg} (cm^2)														
Stratum A soil effective vapor permeability, k_v (cm^2)														
Thickness of capillary zone, L_{cz} (cm)														
Total porosity in capillary zone, n_{cz} (cm^3/cm^3)														
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)														
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)														
Floor-wall seam perimeter, X_{crack} (cm)														

Area of enclosed space below grade, A_b (cm^2)	6.97E+05	4.81E-04	15	9.502	1.05E-02	4.46E-01	1.77E-04	4.62E-04	0.00E+00	4.62E-04	4.62E-04	4.62E-04	4.62E-04	231
Bldg ventilation rate, $Q_{building}$ (cm^3/s)														
Crack-to-total area ratio, η (unitless)														
Crack depth below grade, Z_{crack} (cm)														
Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)														
Henry's law constant at ave. groundwater temperature, H_{Ts} (atm-m ³ /mol)														
Henry's law constant at groundwater temperature, H_{Ts} (unitless)														
Vapor viscosity at ave. soil temperature, μ_{Ts} (g/cm-s)														
Stratum A effective diffusion coefficient, D_{eff}^A (cm^2/s)														
Stratum B effective diffusion coefficient, D_{eff}^B (cm^2/s)														
Stratum C effective diffusion coefficient, D_{eff}^C (cm^2/s)														
Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm^2/s)														
Total overall effective diffusion coefficient, D_{eff}^T (cm^2/s)														
Diffusion path length, L_d (cm)														

Convection path length, L_p (cm)	15	4.46E+04	0.10	1.99E+01	4.62E-04	3.35E+02	5.46E-05	2.44E+00	5.8E-07	NA
Source vapor conc., C_{source} ($\mu g/m^3$)										
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)										
Crack radius, r_{crack} (cm)										
Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)										
Exponent of equivalent foundation Pecllet number, $\exp(Pe)$ (unitless)										
Infinite source indoor attenuation coefficient, α (unitless)										
Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)										
Unit risk factor, URF ($\mu g/m^3$) ⁻¹										
Reference conc., RfC (mg/m ³)										

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.2E-07	NA

MESSAGE AND ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER ENTER
Initial groundwater
Chemical CAS No. conc.,
C_w
(numbers only, (µg/L)
no dashes)

127184 1.00E+02

Chemical

Tetrachloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T _s (°C)	Depth below grade to bottom of enclosed space floor, L _f (cm)	Depth below grade to water table, L _{wT} (cm)	Thickness of soil stratum A, h _A (cm)	Thickness of soil stratum B, h _B (cm)	Thickness of soil stratum C, h _C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	15	246	246			A	S	S

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, P _{bA} (g/cm ³)	Stratum A soil total porosity, n ^A (unitless)	Stratum A soil water-filled porosity, θ _{wA} (cm ³ /cm ³)	Stratum B soil dry bulk density, P _{bB} (g/cm ³)	Stratum B soil total porosity, n ^B (unitless)	Stratum B soil water-filled porosity, θ _{wB} (cm ₃ /cm ³)	Stratum C soil dry bulk density, P _{bC} (g/cm ³)	Stratum C soil total porosity, n ^C (unitless)	Stratum C soil water-filled porosity, θ _{wC} (cm ³ /cm ³)
1.5	0.375	0.253258113						

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L _{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm-s ²)	Enclosed space floor length, L _B (cm)	Enclosed space floor width, W _B (cm)	Enclosed space height, H _B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	
15	40	915	762	274	0.1	0.45	

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT _C (yrs)	Averaging time for noncarcinogens, AT _{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target hazard quotient for carcinogens, TR (unitless)
70	30	30	320	1.0E-06

MORE ↓

Used to calculate risk-based groundwater concentration.

END

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^\circ\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^\circ\text{K}$)	Critical temperature, T_C ($^\circ\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{y}^{-1}$)	Reference conc., RfC (mg/m^3)
7.20E-02	8.20E-06	1.84E-02	25	8,288	394.40	620.20	1.55E+02	2.00E+02	5.8E-07	0.0E+00

END

Source- building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm ³ /cm ³)	Stratum B soil air-filled porosity, θ_a^B (cm ³ /cm ³)	Stratum C soil air-filled porosity, θ_a^C (cm ³ /cm ³)	Stratum A effective total fluid saturation, S_{le} (cm ³ /cm ³)	Stratum A soil intrinsic permeability, k_i (cm ²)	Stratum A soil relative air permeability, k_{rg} (cm ²)	Stratum A soil effective vapor permeability, k_v (cm ²)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm ³ /cm ³)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm ³ /cm ³)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm ³ /cm ³)	Floor- wall seam perimeter, X_{crack} (cm)
---	---	---	---	---	--	--	--	--	---	---	---	---

9.46E+08	231	0.122	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
----------	-----	-------	-------	-------	----------	-------	----------	-------	-------	-------	-------	-------

Area of enclosed space below grade, A_B (cm ²)	Crack- to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{Ts} (atm-m ³ /mol)	Henry's law constant at ave. groundwater temperature, H_{Ts} (unitless)	Vapor viscosity at ave. soil temperature, μ_{Ts} (g/cm-s)	Stratum A effective diffusion coefficient, D_{eff}^A (cm ² /s)	Stratum B effective diffusion coefficient, D_{eff}^B (cm ² /s)	Stratum C effective diffusion coefficient, D_{eff}^C (cm ² /s)	Capillary zone effective diffusion coefficient, D_{eff}^{cz} (cm ² /s)	Total overall effective diffusion coefficient, D_{eff}^T (cm ² /s)	Diffusion path length, L_d (cm)
--	--	--	--	---	--	--	---	---	---	---	---	---

2.39E+04	6.97E+05	4.81E-04	15	9,502	4.46E-01	1.77E-04	4.62E-04	0.00E+00	0.00E+00	4.62E-04	4.62E-04	231
----------	----------	----------	----	-------	----------	----------	----------	----------	----------	----------	----------	-----

Convection path length, L_p (cm)	Source vapor conc., C_{source} (µg/m ³)	Average vapor flow rate into bldg., Q_{soil} (cm ³ /s)	Crack radius, r_{crack} (cm)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm ² /s)	Area of crack, A_{crack} (cm ²)	Exponent of equivalent foundation Peclet number, exp(Pe) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m ³)	Unit risk factor, URF (µg/m ³) ⁻¹	Reference conc., RfC (mg/m ³)
--	---	--	---	--	--	---	---	---	--	--

15	4.46E+04	0.10	1.99E+01	4.62E-04	3.35E+02	#NUM!	5.46E-05	2.44E+00	5.8E-07	NA
----	----------	------	----------	----------	----------	-------	----------	----------	---------	----

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.00E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.3E-07	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER
Initial groundwater conc., C_w ($\mu\text{g/L}$)

156592 7.60E+01

Chemical

cis-1,2-Dichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum SCS soil type directly above water table	Soil stratum SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

ENTER
Soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375

ENTER
Soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER
Soil dry bulk density, ρ_b^B (g/cm^3)

ENTER
Soil water-filled porosity, θ_w^B (cm^3/cm^3)

ENTER
Soil dry bulk density, ρ_b^C (g/cm^3)

ENTER
Soil total porosity, n^C (unitless)

ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

ENTER
Soil total porosity, n^C (unitless)

ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE ↓

ENTER
Soil-bldg. pressure differential, ΔP ($\text{g}/\text{cm-s}^2$)

15 40

ENTER
Enclosed space floor length, L_B (cm)

915

ENTER
Enclosed space floor width, W_B (cm)

762

ENTER
Enclosed space height, H_B (cm)

274

ENTER
Floor-wall seam crack width, w (cm)

0.1

ENTER
Indoor air exchange rate, ER (1/h)

0.45

MORE ↓

ENTER
Averaging time for carcinogens, AT_c (yrs)

70

ENTER
Averaging time for noncarcinogens, AT_{nc} (yrs)

12

ENTER
Exposure duration, ED (yrs)

12

ENTER
Exposure frequency, EF (days/yr)

300

ENTER
Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER
Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot yr^{-1}$)	Reference conc., RfC (mg/m^3)
---	---	---	--	--	---	--	--	--	---	--

7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02
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END

Exposure duration, τ (sec)	3.78E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
Source-building separation, L_T (cm)														
Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)														
Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)														
Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)														
Stratum A effective total fluid saturation, S_{le} (cm^3/cm^3)														
Stratum A soil intrinsic permeability, K_i (cm^2)														
Stratum A soil relative air permeability, K_{rg} (cm^2)														
Stratum A soil effective vapor permeability, K_v (cm^2)														
Thickness of capillary zone, L_{cz} (cm)														
Total porosity in capillary zone, n_{cz} (cm^3/cm^3)														
Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)														
Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)														
Floor-wall seam perimeter, X_{crack} (cm)														

Area of enclosed space below grade, A_B (cm^2)	2.39E+04	6.97E+05	4.81E-04	15	7.684	2.59E-03	1.10E-01	1.77E-04	4.79E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)														
Crack-to-total area ratio, η (unitless)														
Crack depth below grade, Z_{crack} (cm)														
Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)														
Henry's law constant at ave. groundwater temperature, H'_{Ts} (atm-m ³ /mol)														
Henry's law constant at ave. groundwater temperature, H'_{Ts} (unitless)														
Vapor viscosity at ave. soil temperature, μ_{Ts} (g/cm-s)														
Stratum A effective diffusion coefficient, D^A_{eff} (cm^2/s)														
Stratum B effective diffusion coefficient, D^B_{eff} (cm^2/s)														
Stratum C effective diffusion coefficient, D^C_{eff} (cm^2/s)														
Capillary zone diffusion coefficient, D^{cz}_{eff} (cm^2/s)														
Total overall effective diffusion coefficient, D^T_{eff} (cm^2/s)														
Diffusion path length, L_d (cm)														

Convection path length, L_p (cm)	15	1.99E+01	4.79E-04	3.35E+02	5.64E-05	4.71E-01	NA	3.5E-02
Source vapor conc., C_{source} ($\mu g/m^3$)								
Average vapor flow rate into bldg., Q_{soil} (cm^3/s)								
Crack radius, r_{crack} (cm)								
Crack effective diffusion coefficient, D^{crack} (cm^2/s)								
Area of crack, A_{crack} (cm^2)								
Exponent of equivalent foundation Peclet number, $\exp(Pe')$ (unitless)								
Infinite source indoor attenuation coefficient, α (unitless)								
Unit risk factor, URF ($\mu g/m^3 \cdot yr^{-1}$)								
Reference conc., RfC (mg/m^3)								

15	8.34E+03	0.10	1.99E+01	4.79E-04	3.35E+02	5.64E-05	4.71E-01	NA	3.5E-02
----	----------	------	----------	----------	----------	----------	----------	----	---------

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.1E-02

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

156592 7.60E+01

Chemical

cis-1,2-Dichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246	246	246	A	S	S	

MORE ↓

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

1.5 0.375

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

0.253258113

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

762

ENTER Stratum B soil total porosity, n^B (unitless)

274

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

0.1

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

0.45

ENTER Stratum C soil total porosity, n^C (unitless)

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)

15 40

ENTER Enclosed space floor length, L_B (cm)

915

ENTER Enclosed space floor width, W_B (cm)

762

ENTER Enclosed space height, H_B (cm)

274

ENTER Floor-wall seam crack width, w (cm)

0.1

ENTER Indoor air exchange rate, ER (1/h)

0.45

MORE ↓

ENTER Averaging time for carcinogens, AT_c (yrs)

70

ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)

6

ENTER Exposure duration, ED (yrs)

6

ENTER Exposure frequency, EF (days/yr)

350

ENTER Target risk for carcinogens, TR (unitless)

1.0E-06

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

Exposure duration, τ (sec)	Source-building separation, L_1 (cm)	Stratum A soil air-filled porosity, $\theta_{a,A}$ (cm^3/cm^3)	Stratum B soil air-filled porosity, $\theta_{a,B}$ (cm^3/cm^3)	Stratum C soil air-filled porosity, $\theta_{a,C}$ (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{le} (cm^3/cm^3)	Stratum A soil intrinsic permeability, K_i (cm^2)	Stratum A soil relative air permeability, K_{rg} (cm^2)	Stratum A soil effective vapor permeability, K_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_g (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	7.684	1.10E-01	1.77E-04	4.79E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Pecllet number, $\exp(Pe')$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3 \cdot \text{y}^{-1}$)	Reference conc., RfC (mg/m^3)
15	8.34E+03	0.10	1.99E+01	4.79E-04	3.35E+02	#NUM!	5.64E-05	NA	3.5E-02

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.50E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL
DOWN
TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER ENTER
Initial groundwater conc.,
C_w (µg/L)

156592 7.60E+01

Chemical

cis-1,2-Dichloroethylene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T _s (°C)	Depth below grade of enclosed space floor, L _f (cm)	Depth below grade to water table, L _{wr} (cm)	Thickness of soil stratum A, h _A (cm)	Thickness of soil stratum B, h _B (cm)	Thickness of soil stratum C, h _C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k _v (cm ²)
15	15	246	246			A	S	S	

MORE ↓

ENTER ENTER
Soil-bldg. pressure differential, ΔP (g/cm-s²)

1.5 0.375 0.253258113

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L _{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm-s ²)	Enclosed space floor length, L _B (cm)	Enclosed space floor width, W _B (cm)	Enclosed space height, H _B (cm)	Enclosed space width, W _B (cm)	Soil stratum B soil dry bulk density, P _B (g/cm ³)	Soil stratum B soil total porosity, n _B (unitless)	Soil stratum B soil water-filled porosity, θ _{wB} (cm ³ /cm ³)	Soil stratum C soil dry bulk density, P _C (g/cm ³)
15	40	915	762	274	0.1	0.375	0.253258113	0.253258113	0.45

MORE ↓

ENTER ENTER
Averaging time for carcinogens, AT_C (yrs)

70 30 30 320 1.0E-06 1

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT _C (yrs)	Averaging time for noncarcinogens, AT _{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Indoor air exchange rate, ER (1/h)	Soil stratum C soil total porosity, n _C (unitless)	Soil stratum C soil water-filled porosity, θ _{wC} (cm ³ /cm ³)	Soil stratum C soil water-filled porosity, θ _{wC} (cm ³ /cm ³)
70	30	30	320	1.0E-06	1	0.45	0.1	0.1	0.45

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, ΔH_{vp} (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot d^{-1}$)	Reference conc., RfC (mg/m^3)
7.36E-02	1.13E-05	4.07E-03	25	7,192	333.65	544.00	3.55E+01	3.50E+03	0.0E+00	3.5E-02

END

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A air-filled porosity, $\theta_{a,A}$ (cm^3/cm^3)	Stratum B air-filled porosity, $\theta_{a,B}$ (cm^3/cm^3)	Stratum C air-filled porosity, $\theta_{a,C}$ (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{se} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_b (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,gs}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H^*_{gs} (unitless)	Henry's law constant at ave. groundwater temperature, H^*_{gs} (unitless)	Vapor viscosity at ave. soil temperature, μ^*_{gs} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff} (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	7,684	1.10E-01	1.77E-04	1.77E-04	4.79E-04	0.00E+00	0.00E+00	4.79E-04	4.79E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A^{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Unit risk factor, URF ($\mu g/m^3$) ⁻¹	Reference conc., RIC (mg/m ³)
15	8.34E+03	0.10	1.99E+01	4.79E-04	3.35E+02	#NUM!	5.64E-05	NA	3.5E-02

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc. (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)
NA	NA	NA	3.50E+06	NA

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based groundwater concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-02

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CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

75343 1.00E+01

Chemical

1,1-Dichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wr} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	
1.5	0.375	0.253258113							

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP ($\text{g/cm}\cdot\text{s}^2$)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)			
15	40	915	762	274	0.1	0.45			

END

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_C (yrs)	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, THQ (unitless)	Target hazard quotient for THQ (unitless)
70	12	12	300	1.0E-06	1	

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot s^{-1}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	0.0E+00	5.0E-01

END

Exposure duration, τ (sec)	231	3.78E+08	Source-building separation, L_T (cm)	0.122	4.81E-04	Stratum A air-filled porosity, θ_a^A (cm^3/cm^3)	0.122	ERROR	Stratum B air-filled porosity, θ_a^B (cm^3/cm^3)	0.122	ERROR	Stratum C air-filled porosity, θ_a^C (cm^3/cm^3)	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Bldg. ventilation rate, $Q_{building}$ (cm^2/s)	6.97E+05	4.81E-04	Area of enclosed space below grade, A_B (cm^2)	4.81E-04	15	7,395	3,64E-03	1.54E-01	1.77E-04	4.80E-04	0.00E+00	0.00E+00	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	231	

Convection path length, L_p (cm)	15	7,395	3,64E-03	1.54E-01	1.77E-04	4.80E-04	0.00E+00	0.00E+00	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	4.80E-04	231	

Source vapor conc., C_{source} ($\mu g/m^3$)	1.54E+03	0.10	1.99E+01	4.80E-04	3.35E+02	#NUM!	5.66E-05	8.70E-02	NA	5.0E-01

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	5.06E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.4E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
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CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

75343 1.00E+01

Chemical

1,1-Dichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth of enclosed space floor, L_f (cm)	Depth below grade to bottom of enclosed space floor, L_{wr} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Totals must add up to value of L_{wr} (cell D28)		Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	15	246	246					A	S

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Soil dry bulk density, ρ_b^A (g/cm^3)	Soil total porosity, n^A (unitless)	Soil water-filled porosity, θ_w^A (cm^3/cm^3)	Soil dry bulk density, ρ_b^B (g/cm^3)	Soil total porosity, n^B (unitless)	Soil water-filled porosity, θ_w^B (cm^3/cm^3)	Soil dry bulk density, ρ_b^C (g/cm^3)	Soil total porosity, n^C (unitless)	Soil water-filled porosity, θ_w^C (cm^3/cm^3)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
1.5	0.375	0.253258113							S

MORE ↓

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Enclosed crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)
15	40	915	762	274	0.1	0.45			S

END

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_c (yrs)	Averaging time for noncarcinogens, AT_{nc} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Used to calculate risk-based groundwater concentration.
70	6	6	350	1.0E-06	1	1	

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_b ($^{\circ}K$)	Critical temperature, T_c ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.05E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	0.0E+00	5.0E-01

END

Exposure duration, τ (sec)	1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354
Source-building separation, L_T (cm)	Stratum A	Stratum B	Stratum C	Stratum A	Stratum A	Stratum A	Stratum A	Stratum A	Stratum A	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
	soil air-filled porosity, θ_a^A (cm^3/cm^3)	soil air-filled porosity, θ_a^B (cm^3/cm^3)	soil air-filled porosity, θ_a^C (cm^3/cm^3)	effective total fluid saturation, S_{se} (cm^3/cm^3)	soil intrinsic permeability, k_i (cm^2)	soil relative air permeability, k_{rg} (cm^2)	soil effective vapor permeability, k_v (cm^2)	soil effective vapor permeability, k_v (cm^2)	soil effective vapor permeability, k_v (cm^2)					

Bldg ventilation rate, $Q_{building}$ (cm^3/s)	6.97E+05	4.81E-04	15	7,395	3.64E-03	1.54E-01	1.77E-04	4.80E-04	0.00E+00	0.00E+00	0.00E+00	4.80E-04	4.80E-04	231
Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Crack vaporization at ave. groundwater temperature, $\Delta H_{v,Ts}$ (cal/mol)	Enthalpy of vaporization at ave. groundwater temperature, H_{Ts} (atm- m^3 /mol)	Henry's law constant at ave. groundwater temperature, H_{Ts} (unitless)	Henry's law constant at ave. groundwater temperature, H_{Ts} (unitless)	Vapor viscosity at ave. soil temperature, μ_{Ts} (g/cm-s)	Stratum A effective diffusion coefficient, D_{A}^{eff} (cm^2/s)	Stratum B effective diffusion coefficient, D_{B}^{eff} (cm^2/s)	Stratum C effective diffusion coefficient, D_{C}^{eff} (cm^2/s)	Capillary zone effective diffusion coefficient, D_{cz}^{eff} (cm^2/s)	Total overall effective diffusion coefficient, D_T^{eff} (cm^2/s)	Diffusion path length, L_d (cm)	

Convection path length, L_p (cm)	1.54E+03	0.10	1.99E+01	4.80E-04	3.35E+02	#NUM!	5.66E-05	8.70E-02	NA	5.0E-01
Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg, Q_{aveil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack}^{eff} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Pecllet number, exp(Pe)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3$) ⁻¹	Reference conc., RfC (mg/m ³)	

15	1.54E+03	0.10	1.99E+01	4.80E-04	3.35E+02	#NUM!	5.66E-05	8.70E-02	NA	5.0E-01
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END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc. (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)
NA	NA	NA	5.06E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.7E-04

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)
75343 1.00E+01

Chemical

1,1-Dichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum SCS soil type (used to estimate soil vapor permeability, k_v)	Soil stratum SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.375	0.253258113							

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)	Indoor air exchange rate, ER (1/h)
15	40	915	762	274	0.1	0.45	0.45	0.45	0.45

MORE ↓

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_c (yrs)	Averaging time for noncarcinogens, AT_{nc} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target risk for noncarcinogens, TR (unitless)	Target hazard quotient for carcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	Target hazard quotient for carcinogens, THQ (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	320	1.0E-06	1	1	1	1	1

MORE ↓

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^\circ\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^\circ\text{K}$)	Critical temperature, T_C ($^\circ\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{y}$)	Reference conc., RfC (mg/m^3)
7.42E-02	1.06E-05	5.61E-03	25	6,895	330.55	523.00	3.16E+01	5.06E+03	0.0E+00	5.0E-01

END

Exposure duration, τ (sec)	Source-separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_w (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
9.46E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H^{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ^{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D_{eff}^A (cm^2/s)	Stratum B effective diffusion coefficient, D_{eff}^B (cm^2/s)	Stratum C effective diffusion coefficient, D_{eff}^C (cm^2/s)	Total overall effective diffusion coefficient, D_{eff}^{Total} (cm^2/s)	Diffusion path length, L_d (cm)	
2.39E+04	6.97E+05	4.81E-04	15	7,395	1.54E-01	1.77E-04	4.80E-04	0.00E+00	0.00E+00	4.80E-04	4.80E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D_{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3 \cdot y^{-1}$)	Reference conc., RIC (mg/m ³)
15	1.54E+03	0.10	1.99E+01	4.80E-04	3.35E+02	#NUM!	5.66E-05	8.70E-02	NA	5.0E-01

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (ug/L)	Indoor exposure groundwater conc., noncarcinogen (ug/L)	Risk-based indoor exposure groundwater conc., (ug/L)	Pure component water solubility, S (ug/L)	Final indoor exposure groundwater conc., (ug/L)
NA	NA	NA	5.06E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.5E-04

MESSAGE AND ERROR SUMMARY BELOW. (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR

YES X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER
Initial groundwater conc.,
CAS No. C_w
(numbers only, no dashes) ($\mu\text{g/L}$)

71556 5.20E+01

Chemical

1,1,1-Trichloroethane

ENTER
Average soil/groundwater temperature, T_s ($^{\circ}\text{C}$)

ENTER
Depth below grade of enclosed space floor, L_F (cm)

ENTER
Depth to bottom of water table, L_{wt} (cm)

15 15 246 246

ENTER
Thickness of soil stratum A, h_A (cm)

ENTER
Thickness of soil stratum B, h_B (cm)

ENTER
Thickness of soil stratum C, h_C (cm)

ENTER
Totals must add up to value of L_{wt} (Cell D28)

246

ENTER
Soil stratum directly above water table, (Enter A, B, or C)

ENTER
Soil stratum SCS soil type directly above water table

ENTER
Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v) (cm^2)

A S S

MORE

ENTER
Soil dry bulk density, P_b^A (g/cm^3)

ENTER
Soil total porosity, n^A (unitless)

ENTER
Soil water-filled porosity, θ_w^A (cm^3/cm^3)

1.5 0.375 0.253258113

ENTER
Soil dry bulk density, P_b^B (g/cm^3)

ENTER
Soil total porosity, n^B (unitless)

ENTER
Soil water-filled porosity, θ_w^B (cm^3/cm^3)

ENTER
Soil dry bulk density, P_b^C (g/cm^3)

ENTER
Soil total porosity, n^C (unitless)

ENTER
Soil water-filled porosity, θ_w^C (cm^3/cm^3)

MORE

ENTER
Enclosed space floor thickness, L_{CRACK} (cm)

ENTER
Soil-bldg. pressure differential, ΔP ($\text{g/cm} \cdot \text{s}^2$)

ENTER
Enclosed space floor length, L_B (cm)

ENTER
Enclosed space floor width, W_B (cm)

15 40 915 762 274

ENTER
Enclosed space height, H_B (cm)

ENTER
Enclosed space height, H_B (cm)

ENTER
Floor-wall seam crack width, w (cm)

ENTER
Indoor air exchange rate, ER (1/h)

MORE

ENTER
Averaging time for carcinogens, AT_C (yrs)

ENTER
Averaging time for noncarcinogens, AT_{NC} (yrs)

ENTER
Exposure duration, ED (yrs)

ENTER
Exposure frequency, EF (days/yr)

70 12 12 300

ENTER
Target hazard quotient for carcinogens, TR (unitless)

ENTER
Target hazard quotient for noncarcinogens, THQ (unitless)

1.0E-06 1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3)^{-1}$)	Reference conc., RIC (mg/m^3)
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7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00
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END

Exposure duration, τ (sec)	3.78E+08	231	0.122	ERROR	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3.354
Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{le} (cm^3/cm^3)	Stratum A soil intrinsic permeability, K_i (cm^2)	Stratum A soil relative air permeability, K_{rg} (cm^2)	Stratum A soil effective vapor permeability, K_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)				

Area of enclosed space below grade, A_B (cm^2)	2.39E+04	6.97E+05	4.81E-04	15	7.831	1.09E-02	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231
Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H^*_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ^*_{TS} (g/cm-s)	Henry's law constant at ave. groundwater temperature, H^*_{TS} (unitless)	Exponent of equivalent foundation Pelet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	

Convection path length, L_p (cm)	2.39E+04	1.99E+01	0.10	1.99E+01	3.35E+02	#NUM!	5.88E-05	1.41E+00	1.0E+00
Source vapor conc., C_{source} ($\mu g/m^3$)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack radius, r_{crack} (cm)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Pelet number, $exp(Pe^f)$ (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3$) ⁻¹	Reference conc., RfC (mg/m ³)	

15
END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.33E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3; 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES OR X

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER Initial groundwater conc., C_w ($\mu\text{g/L}$)

Chemical

71556 5.20E+01

1,1,1-Trichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth below grade to bottom of enclosed space floor, L_f (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246			A	S	S	

MORE

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)

ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)

ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)

ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)

ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)

ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)

1.5 0.375 0.253258113

ENTER Enclosed space floor thickness, L_{crack} (cm)

ENTER Enclosed space floor length, L_B (cm)

ENTER Enclosed space height, H_B (cm)

ENTER Floor-wall seam crack width, w (cm)

ENTER Indoor air exchange rate, ER (1/h)

15 40 915 762 274 0.1 0.45

ENTER Averaging time for carcinogens, AT_C (yrs)

ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)

ENTER Exposure duration, ED (yrs)

ENTER Exposure frequency, EF (days/yr)

ENTER Target hazard quotient for carcinogens, TR (unitless)

ENTER Target hazard quotient for noncarcinogens, THQ (unitless)

70 6 6 350 1.0E-06 1

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($\text{atm}\cdot\text{m}^3/\text{mol}$)	Henry's law constant reference temperature, T_R ($^\circ\text{C}$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,p}$ (cal/mol)	Normal boiling point, T_B ($^\circ\text{K}$)	Critical temperature, T_C ($^\circ\text{K}$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\cdot\text{1}$)	Reference conc., RIC (mg/m^3)
7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00

END

Exposure duration, τ (sec)	1.89E+08	231	0.122	ERROR	ERROR	0.622	1.00E-07	0.238	2.38E-08	17.05	0.375	0.122	0.253	3,354

Area of enclosed space below grade, A_B (cm^2)	6.97E+05	4.81E-04	15	7.831	1.09E-02	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	5.01E-04	231

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	2.39E+04	6.97E+05	4.81E-04	15	7.831	1.09E-02	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231

Convection path length, L_p (cm)	2.39E+04	6.97E+05	4.81E-04	15	7.831	1.09E-02	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231

END

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E-03

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater noncarcinogen (µg/L)	Risk-based indoor groundwater conc. (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc. (µg/L)
NA	NA	NA	1.33E+06	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

GW-ADV
Version 2.3: 03/01

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

YES

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

ENTER
Initial groundwater conc., C_w ($\mu\text{g/L}$)

71556 5.20E+01

Chemical

1,1,1-Trichloroethane

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Average groundwater temperature, T_s ($^{\circ}\text{C}$)	Depth of enclosed space floor, L_f (cm)	Depth below grade to bottom of enclosed space floor, L_{wr} (cm)	Depth below grade to water table, L_{wt} (cm)	Thickness of soil stratum A, h_a (cm)	Thickness of soil stratum B, h_b (cm)	Thickness of soil stratum C, h_c (cm)	Soil stratum directly above water table, (Enter A, B, or C)	Soil stratum A SCS soil type (used to estimate soil vapor permeability, k_v)	User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	246	246	246			A	S	S

MORE ↓

ENTER
Soil dry bulk density, ρ_s (g/cm^3)

1.5 0.375 0.253258113

ENTER
Soil porosity, n^A (unitless)

ENTER
Soil porosity, n^B (unitless)

ENTER
Soil porosity, n^C (unitless)

ENTER
Soil bulk density, ρ_b (g/cm^3)

ENTER
Soil bulk density, ρ_b (g/cm^3)

ENTER
Soil porosity, θ_w (cm^3/cm^3)

MORE ↓

ENTER
Enclosed space floor thickness, L_{crack} (cm)

15 40 915 762 274 0.1

ENTER
Enclosed space floor width, W_b (cm)

ENTER
Enclosed space height, H_b (cm)

ENTER
Enclosed space length, L_b (cm)

ENTER
Floor-seam crack width, w (cm)

MORE ↓

ENTER
Averaging time for carcinogens, AT_c (yrs)

70 30 30 320 1.0E-06 1

ENTER
Averaging time for noncarcinogens, AT_{nc} (yrs)

ENTER
Exposure duration, ED (yrs)

ENTER
Exposure frequency, EF (days/yr)

ENTER
Target risk for carcinogens, TR (unitless)

ENTER
Target hazard quotient for noncarcinogens, THQ (unitless)

END

Used to calculate risk-based groundwater concentration.

Diffusivity in air, D_a (cm^2/s)	Diffusivity in water, D_w (cm^2/s)	Henry's law constant at reference temperature, H ($atm \cdot m^3/mol$)	Henry's law constant reference temperature, T_R ($^{\circ}C$)	Enthalpy of vaporization at the normal boiling point, $\Delta H_{v,b}$ (cal/mol)	Normal boiling point, T_B ($^{\circ}K$)	Critical temperature, T_C ($^{\circ}K$)	Organic carbon partition coefficient, K_{oc} (cm^3/g)	Pure component water solubility, S (mg/L)	Unit risk factor, URF ($\mu g/m^3 \cdot y$)	Reference conc., RIC (mg/m^3)
---	---	---	--	---	---	--	--	--	---	--

7.80E-02	8.80E-06	1.72E-02	25	7,136	347.24	545.00	1.10E+02	1.33E+03	0.0E+00	1.0E+00
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END

Exposure duration, τ (sec)	231	9.46E+08	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	0.122	ERROR	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	ERROR	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	ERROR	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	0.622	Stratum A soil intrinsic permeability, K_i (cm^2)	1.00E-07	Stratum A soil relative air permeability, K_{rg} (cm^2)	0.238	Stratum A soil effective vapor permeability, K_v (cm^2)	2.38E-08	Thickness of capillary zone, L_{cz} (cm)	17.05	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	0.375	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	0.122	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	0.253	Floor-wall seam perimeter, X_{crack} (cm)	3,354
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Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,gs}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H^*_{1S} (unitless)	Henry's law constant at ave. groundwater temperature, H^*_{1S} (unitless)	Vapor viscosity at ave. soil temperature, μ_{1S} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
2.39E+04	6.97E+05	4.81E-04	15	7,831	1.09E-02	4.60E-01	1.77E-04	5.01E-04	0.00E+00	0.00E+00	5.01E-04	5.01E-04	231

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu\text{g}/\text{m}^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Exponent of equivalent foundation Pecllet number, exp(Pe) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu\text{g}/\text{m}^3$)	Unit risk factor, URF ($\mu\text{g}/\text{m}^3\text{-}1$)	Reference conc., RfC (mg/m^3)
15	2.39E+04	0.10	1.99E+01	5.01E-04	3.35E+02	5.88E-05	1.41E+00	NA	1.0E+00

END

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.33E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E-03

MESSAGE AND ERROR SUMMARY BELOW (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END