INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.

Mitchell E. Daniels Jr.
Governor

Thomas W. Easterly
Commissioner

100 North Senate Avenue
Indianapolis, Indiana 46204
(317) 232-8603
Toll Free (800) 451-6027
www.idem.IN.gov

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This document is a supplement to IDEM's 2006 *Draft Vapor Intrusion Pilot Program Guidance*. It provides the methodology, equations, attenuation factors and chemical-specific parameters necessary to calculate the screening levels and action levels. This supplement does not include updated methodology or guidance but rather is intended to document the methodology used to calculate the 2006 vapor intrusion numbers.[1] Also provided are action level and screening level tables which include corrections for selected compounds. No changes were made to 30-year residential or 25-year commercial levels,[2] so the impact on site decisions is expected to be minimal.

Specifically, this supplement includes:

- The methodology and equations used to calculate the Indoor Air Action Levels and the Ground Water, Crawl Space, Soil Gas and Sub-Slab Screening Levels.
- A vapor intrusion chemical/physical parameters table.
- Residential and Commercial Indoor Air Action Level tables.
- Screening level tables for Ground Water, Sub-Slab, Crawl Space and Soil Gas for selected compounds.
- A table of Ground Water, Soil Gas and Sub-Slab Screening Levels and OSHA Indoor Air PELs for OSHA-regulated industrial sites for selected compounds.

Compound-Specific updates: A number of corrections were made to the residential and commercial action level and screening level tables; these are noted in the tables with **bold** type.

- 1-year Indoor Air Action Levels for some compounds were corrected to default to the non-carcinogen endpoint level (if lower than the carcinogen endpoint level).
- 1-year Indoor Air Action Levels were added for a number of non-carcinogenic compounds.
- A slight correction was made to the residential 10-year exposure duration action level calculations for carcinogens. There was a calculation error in the inhalation adjustment factor for the 10-year exposure duration.
- 10- and 20-year Indoor Air Action Levels were added for benzene, CAS 71-43-2. Chronic Ground Water Screening Levels were also added, and the presentation of the Crawl Space, Soil Gas and Sub-Slab Screening Levels was changed to match the format of the chlorinated compounds.
- Corrections were made to the residential 1-year exposure duration action levels for aldrin, CAS 309-00-2, and 1,3-dichloropropene, CAS 542-75-6.
- Ten previously published RISC compounds were added to the vapor intrusion tables because they met the criteria for being considered a vapor intrusion compound. In addition, trichlorofluoromethane, CAS 75-69-4, was added to the tables because the

[1] IDEM is in the process of reviewing all vapor intrusion methods for incorporation into revised technical guidance.
[2] With the exception of the addition of 11 compounds

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compound was recently added to the published RISC compound list. It is not anticipated that all of these compounds will be found at all sites.

- Bis(2-chloroisopropyl) ether, CAS 39638-32-9, was removed from the table because IRIS redacted the toxicity data.

Vapor Intrusion Pathway Methodology

- Vapor intrusion levels are calculated for compounds that have a Henry's Law Constant greater than zero and inhalation toxicity values.

- For the vapor intrusion pathway only, IDEM corrects the Henry's Law Constant values assuming an average soil temperature of 12.5 ^{o}C (Henry's Law Constants are generally reported at a reference temperature of 25°C). Corrected Henry's Law Constants are located in the attached Vapor Intrusion Chemical/Physical Table or can be calculated using Equation 12.

- Compounds with a half-life of 28 days or less are considered biodegradable. Compound half-life values are available in the Vapor Intrusion Chemical/Physical Parameters Table. If no half-life value is available, IDEM assumes the compound is non-biodegradable.

- The lower of the carcinogen and non-carcinogen endpoints is used as the default screening level or action level.

Indoor Air Action Levels

Residential

Carcinogens:
Non-biodegradable Carcinogens

- 1- and 5-year exposure durations: Use Equation 1.
- 10-, 20-, and 30-year exposure durations: Use Equation 2.

Biodegradable Carcinogens

- 1- and 5-year exposure durations: Calculate a single action level using Equation 1 and assuming a 3-year exposure duration.
- 10-, 20-, and 30-year exposure durations: Use Equation 2.

Non-carcinogens:
Non-biodegradable Compounds

- 1-year exposure duration: Use Equation 3. Subchronic inhalation reference doses should be used if available. If the 1-year level is less than the 5-, 10-, 20- and 30-year level, the chronic level is used for the 1-year action level.
- 5-, 10-, 20- and 30-year exposure durations: Use Equation 4.

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Biodegradable Compounds

- 1 and 5-year exposure durations: Calculate a single action level using Equation 3 and assuming a 3-year exposure duration. Subchronic inhalation reference doses should be used if available. If the 1- and 5- year level is less than the 10-, 20-, and 30-year level, the chronic level is used instead.
- 10-, 20- and 30-year exposure durations: Use Equation 4.

Commercial

Carcinogens:
Non-biodegradable Carcinogens

- Use Equation 5 for all exposure durations.

Biodegradable Carcinogens

- Use Equation 5 for all exposure durations.
- 1- and 5-year exposure durations: Calculate a single action level assuming a 3-year exposure duration.

Non-carcinogens:
Non-biodegradable Compounds

- 1-year exposure duration: Use Equation 6. Subchronic inhalation reference doses should be used if available. If the 1-year level is less than the 5-, 10-, 20- and 25-year level, the chronic level is used for the 1-year action level.
- 5-, 10-, 20- and 25-year exposure durations: Use Equation 7.

Biodegradable Compounds

- 1 and 5-year exposure durations: Calculate a single action level using Equation 6 and assuming a 3-year exposure duration. Subchronic inhalation reference doses should be used if available. If the 1- and 5- year level is less than the 10-, 20-, and 25-year level, the chronic level is used instead.
- 10-, 20- and 25-year exposure durations: Use Equation 7.

OSHA-Regulated Industrial Sites

The indoor air levels presented in the *Draft Vapor Intrusion Pilot Program Guidance* Appendix V, Table 1 are Time-Weighted Average (TWA) Permissible Exposure Limits (PELs) from the federal Occupational Safety and Health Act of 1970 (OSHA). These values should only be used for compounds that are part of a facility's OSHA hazard communication program.

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Screening Levels

Screening levels for the residential, commercial and OSHA-regulated industrial sites are calculated using Equations 8-11 provided in this document.

Ground Water

- Use Equation 8. Table 1 lists the attenuation factors based on depth to ground water and soil type.

Sub-Slab

- Use Equation 9.

Crawl Space

- Use Equation 10.

Soil Gas

- Use Equation 11.

Soil

Based on new information in the vapor intrusion field, IDEM considers the soil screening levels presented in the *Draft Vapor Intrusion Pilot Program Guidance* Appendix VIII, Table 6 to be highly uncertain. At this time, IDEM is not recommending the use of information in this table, and the methodology for calculating these numbers is not provided here.

Chemical/Physical/Toxicological Information

Many of the chemical/physical properties are available in the 2006 RISC Technical Guide, Appendix A, Table B "Chemical/Physical Properties." However, some additional chemical/physical parameters are needed to calculate the Vapor Intrusion Indoor Air Action Levels. The attached "Vapor Intrusion Chemical/Physical Properties Table" includes the previously unpublished parameters.

Toxicological data for the vapor intrusion levels are available in the 2006 RISC Technical Guidance Document, Appendix A, Table F "Human Health Toxicity Parameters."

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Equations

Eq. 1 – Residential Indoor Air Child (Carcinogen)

$$C_{ia} = \frac{TR \times AT_c \times BW_{ch} \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{res} \times ED \times InhR_{ch} \times SF_i}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
TR	Target Risk	1x10^{-5}	unitless	IDEM
AT_c	Averaging Time – Carcinogen	70	yr	EPA(1989)
BW_{ch}	Body Weight – Child	15	kg	EPA(1989)
EF_{res}	Exposure Frequency – Residential	350	d/yr	EPA(1991b)
ED	Exposure Duration	varies	yr	IDEM
$InhR_{ch}$	Inhalation Rate – Child	10	m^3/d	EPA(1991b)
SF_i	Cancer Potency Slope Factor – Inhalation Exposure	CS	(mg/kg-d)$^{-1}$	IDEM(H)

Eq. 2 – Residential Indoor Air Age-Adjusted (Carcinogen)

$$C_{ia} = \frac{TR \times AT_c \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{res} \times InhF_{adj} \times SF_i}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
TR	Target Risk	1x10^{-5}	unitless	IDEM
AT_c	Averaging Time – Carcinogen	70	yr	EPA(1989)
EF_{res}	Exposure Frequency – Residential	350	d/yr	EPA(1991b)
$InhF_{adj}$	Inhalation Factor – Age-Adjusted	10 year ED: 5.1 20 year ED: 8.0 30 year ED: 10.9	m^3-yr/kg-d	IDEM ref. EPA(1991a)
SF_i	Cancer Potency Slope Factor – Inhalation Exposure	CS	(mg/kg-d)$^{-1}$	IDEM(H)

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Eq. 3 – Residential Indoor Air Child (Non-Carcinogen)

$$C_{ia} = \frac{THQ \times AT \times BW_{ch} \times sRfD_i \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{res} \times ED \times InhR_{ch}}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
THQ	Target Hazard Quotient	1.0	unitless	IDEM
AT	Averaging Time (Equal to Exposure Duration)	varies	yr	IDEM
BW_{ch}	Body Weight – Child	15	kg	EPA(1989)
$sRfD_i$	Inhalation Reference Dose – Subchronic Exposure	CS	mg/kg-d	IDEM(H)
EF_{res}	Exposure Frequency – Residential	350	d/yr	EPA(1991b)
ED	Exposure Duration	varies	yr	IDEM
$InhR_{ch}$	Inhalation Rate – Child	10	m^3/d	EPA(1991b)
Note	The chronic inhalation reference dose can be used if a subchronic value is not available.			

Eq. 4 – Residential Indoor Air Adult (Non-Carcinogen)

$$C_{ia} = \frac{THQ \times AT \times BW_{ad} \times RfD_i \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{res} \times ED \times InhR_{ad}}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
THQ	Target Hazard Quotient	1.0	unitless	IDEM
AT	Averaging Time (Equal to Exposure Duration)	varies	yr	IDEM
BW_{ad}	Body Weight – Adult	70	kg	EPA(1989)
RfD_i	Inhalation Reference Dose – Chronic Exposure	CS	mg/kg-d	IDEM(H)
EF_{res}	Exposure Frequency – Residential	350	d/yr	EPA(1991b)
ED	Exposure Duration	varies	yr	IDEM
$InhR_{ad}$	Inhalation Rate – Adult	20	m^3/d	EPA(1991b)

Eq. 5 – Commercial Indoor Air (Carcinogen)

$$C_{ia} = \frac{TR \times AT_c \times BW_{ad} \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{com} \times ED \times InhR_{ad} \times SF_i}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
TR	Target Risk	1x10^{-5}	unitless	IDEM
AT_c	Averaging Time – Carcinogen	70	yr	EPA(1989)
BW_{ad}	Body Weight – Adult	70	kg	EPA(1989)
EF_{com}	Exposure Frequency – Commercial	250	d/yr	EPA(1991b)
ED	Exposure Duration	varies	yr	IDEM
$InhR_{ad}$	Inhalation Rate – Adult	20	m^3/d	EPA(1991b)
SF_i	Cancer Potency Slope Factor – Inhalation Exposure	CS	(mg/kg-d)$^{-1}$	IDEM(H)

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Eq. 6 – Commercial Indoor Air Subchronic Exposure (Non-Carcinogen)

$$C_{ia} = \frac{THQ \times AT \times BW_{ad} \times sRfD_i \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{com} \times ED \times InhR_{ad}}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
THQ	Target Hazard Quotient	1.0	unitless	IDEM
AT	Averaging Time (Equal to Exposure Duration)	varies	yr	IDEM
BW_{ad}	Body Weight – Adult	70	kg	EPA(1989)
$sRfD_i$	Inhalation Reference Dose – Subchronic Exposure	CS	mg/kg-d	IDEM(H)
EF_{com}	Exposure Frequency – Commercial	250	d/yr	EPA(1991b)
ED	Exposure Duration	varies	yr	IDEM
$InhR_{ad}$	Inhalation Rate – Adult	20	m^3/d	EPA(1991b)
Note	The chronic inhalation reference dose can be used if a subchronic value is not available.			

Eq. 7 – Commercial Indoor Air Chronic Exposure (Non-Carcinogen)

$$C_{ia} = \frac{THQ \times AT \times BW_{ad} \times RfD_i \times 1000\,{}^{\mu g}\!/_{mg} \times 365\,{}^{d}\!/_{yr}}{EF_{com} \times ED \times InhR_{ad}}$$

Symbol	Parameter	Value	Units	Source
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
THQ	Target Hazard Quotient	1.0	unitless	IDEM
AT	Averaging Time (Equal to Exposure Duration)	varies	yr	IDEM
BW_{ad}	Body Weight – Adult	70	kg	EPA(1989)
RfD_i	Inhalation Reference Dose – Chronic Exposure	CS	mg/kg-d	IDEM(H)
EF_{com}	Exposure Frequency – Commercial	250	d/yr	EPA(1991b)
ED	Exposure Duration	varies	yr	IDEM
$InhR_{ad}$	Inhalation Rate – Adult	20	m^3/d	EPA(1991b)

Eq. 8 – VI Ground Water Screening Level

$$C_{sl_gw} = \frac{C_{ia}}{\alpha_{gw} \times H'_{ts} \times 1000\,{}^{L}\!/_{m^3}}$$

Symbol	Parameter	Value	Units	Source
C_{sl_gw}	Screening Level – Vapor Intrusion Ground Water	CS	µg/L	IDEM
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
α_{gw}	Alpha Factor – Ground Water *See Table 1*	SS	unitless	EPA(2002)
H'_{ts}	Dimensionless Henry's Law Constant *See Equation 12*	CS	unitless	IDEM(H)
Note	If a compound specific H'ts could not be calculated, the unitless Henry's Law Constant value can be substituted			

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Eq. 9 – VI Sub-Slab Screening Level

$$C_{sl_sub} = \frac{C_{ia}}{\alpha_{sub}}$$

Symbol	Parameter	Value	Units	Source
C_{sl_sub}	Screening Level – Vapor Intrusion Sub-Slab	CS	µg/m^3	IDEM
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
α_{sub}	Alpha Factor – Sub-Slab	0.1	unitless	EPA(2002)

Eq. 10 – VI Crawl Space Screening Level

$$C_{sl_cs} = \frac{C_{ia}}{\alpha_{cs}}$$

Symbol	Parameter	Value	Units	Source
C_{sl_cs}	Screening Level – Vapor Intrusion Crawl Space	CS	µg/m^3	IDEM
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
α_{cs}	Alpha Factor – Crawl Space	1	unitless	EPA(2002)

Eq. 11 – VI Soil Gas Screening Level

$$C_{sl_sg} = \frac{C_{ia}}{\alpha_{sg}}$$

Symbol	Parameter	Value	Units	Source
C_{sl_sg}	Screening Level – Vapor Intrusion Soil Gas	CS	µg/m^3	IDEM
C_{ia}	Indoor Air Action Level	CS	µg/m^3	IDEM
α_{sg}	Alpha Factor – Soil Gas	0.01	unitless	EPA(2002)

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Eq. 12 – Henry's Law Constant Correction

$$H'_{ts} = \frac{\exp\left[-\frac{\Delta H_{v,b} \times \left[\frac{1 - T_s / T_c}{1 - T_b / T_c}\right]^{n_{exp}}}{R_c} \times \left(\frac{1}{T_s} - \frac{1}{T_{Hr}}\right)\right] \times H_r}{R \times T_s}$$

Symbol	Parameter	Value	Units	Source
H'_{ts}	Henry's Law Constant at the Average Soil Temperature	CS	unitless	EPA(2001)
$\Delta H_{v,b}$	Enthalpy of Vaporization at the Normal Boiling Point	CS	cal/mol	EPA(2001)
T_s	Average Soil Temperature	285.65	K	EPA(2001)
T_c	Critical Temperature	CS	K	IDEM(H)
T_b	Normal Boiling Point Temperature	CS	K	IDEM(H)
n_{exp}	Exponent (n) as a Function of T_b/T_c *See Table 2*	CS	unitless	EPA(2001)
R_c	Gas Constant	1.9872	cal/mol-K	EPA(2001)
T_{Hr}	Henry's Law Constant Reference Temperature	298.15 or CS	K	IDEM(H)
R	Gas Constant	8.205×10^{-5}	atm-m^3/ mol-K	EPA(2001)
H_r	Henry's Law Constant at Reference Temperature	CS	atm-m^3/mol	IDEM(H)
Note	If a compound specific property is not available, the Unitless Henry's Law Constant value can be substituted for the corrected Henry's Law Constant			

Key

CS Compound-Specific
SS Site-Specific

Table 1: Alpha Factors for Ground Water Screening Levels (Unitless) (EPA, 2002)

Soil Type	Depth to Ground Water		
	5 ft	*10 ft*	*15 ft*
Sand	0.0011	0.001	0.00085
Loamy Sand	0.0005	0.00048	0.00045
Sandy Loam	0.00021	0.000205	0.0002
Loam	0.00013	0.000125	0.00012

Table 2: Exponent (n) Values (Unitless) (EPA, 2002)

Ratio T_b/T_c	n_{exp}
< 0.57	0.3
0.57 – 0.71	0.74 x (T_b/T_c) – 0.116
> 0.71	0.41

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References

EPA(1989) Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part A) Interim Final. Office of Emergency and Remedial Response. EPA/540/1-89/002.

EPA(1991a) Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals). Interim. Office of Emergency and Remedial Response. EPA/540/R-92/003.

EPA(1991b) Risk Assessment Guidance for Superfund Volume 1: Human Health Evaluation Manual Supplemental Guidance "Standard Default Exposure Factors." Interim Final. Office of Emergency and Remedial Response Toxics Integration Branch. OSWER Directive 9285.6-03.

EPA (2001) Fact Sheet: Correcting the Henry's Law Constant for Soil Temperature. Office of Solid Waste and Emergency Response.

EPA (2002) OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). Office of Solid Waste and Emergency Response. EPA 530-D-02-004.

IDEM This value was reached through a decision made by IDEM. Please contact IDEM for more information.

IDEM(H) This value was reached through use of the hierarchies set forth earlier in the RISC Technical Guidance Document, Appendix 1. All chemical, physical and toxicological values are the same as those published in the 2006 Appendix 1, with the exception of the properties that are included in this supplement.

IDEM ref. This value was reached through professional judgment by IDEM using methodology described in the referenced EPA document. Please contact IDEM for more information.

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Vapor Intrusion Chemical/Physical Properties

Contaminant		Half Life		Boiling Temp.*	Critical Temp.		Henry's Law Constant*	Corrected Henry's Law Constant**	Enthalpy of Vaporization	
Name	CAS	Days	Source	K	K	Source	atm-m^3/mol	unitless	cal/mol	Source
Acenaphthylene	208-96-8			553.15			0.0015	0.06		
Acetone (2-Propanone)	67-64-1	7	SCDM	329.35			0.000039	0.0016		
Acrolein	107-02-8	28	SCDM	326.15			0.00003	0.0012		
Aldrin	309-00-2	590	SCDM	418.15	839.4	EPA	0.00017	0.0022	15000	calc
Anthracene	120-12-7			613.15	873	EPA	0.000065	0.00075	13121	O
Benzene	71-43-2	6	SCDM	353.25	562.2	EPA	0.0056	0.13	7342	CRC
Bis(2-chloro-1-methylethyl) ether	108-60-1			460.15			0.00011	0.0046		
Bis(2-chloroethyl)ether	111-44-4			451.15	659.8	EPA	0.000018	0.00029	10803	O
Bis(2-chloroisopropyl)ether	39638-32-9									
Bromodichloromethane	75-27-4			363.15	585.9	EPA	0.0016	0.037	7800	calc
Bromoform(tribromomethane)	75-25-2			422.15	696	EPA	0.00053	0.01	9479	CRC
n-Butanol	71-36-3			391.15	563.1	EPA	0.0000088	0.00015	10346	CRC
Carbon disulfide	75-15-0			319.65	552	EPA	0.03	0.8	6391	CRC
Carbon tetrachloride	56-23-5	360	SCDM	349.65	556.6	EPA	0.03	0.74	7127	CRC
Chlordane	12789-03-6	1400	SCDM	448.15			0.000049	0.002		
Chlorobenzene	108-90-7	150	SCDM	404.65	632.4	EPA	0.0037	0.078	8410	CRC
Chloroethane	75-00-3			285.45			0.011	0.46		
Chloroform	67-66-3	180	SCDM	334.65	536.4	EPA	0.0037	0.091	6988	CRC
2-Chloronaphthalene	91-58-7			529.15			0.00032	0.013		
2-Chlorophenol	95-57-8			448.15	675	EPA	0.00039	0.017	9.572	O
Cyclohexane	110-82-7			353.85			0.2	8.2		
DDD	72-54-8	5800	SCDM	466.15	863.8	EPA	0.000004	0.000043	17000	calc
Dibenzofuran	132-64-9			560.15			0.000013	0.00053		
1,2-Dibromoethane	106-93-4	180	SCDM	405.15			0.00082	0.034		
1,4-Dichlorobenzene	106-46-7			447.15	684.8	EPA	0.0024	0.046	9271	O

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Vapor Intrusion Chemical/Physical Properties

Contaminant		Half Life		Boiling Temp.*	Critical Temp.		Henry's Law Constant*	Corrected Henry's Law Constant**	Enthalpy of Vaporization	
Name	CAS	Days	Source	K	K	Source	atm-m^3/mol	unitless	cal/mol	Source
1,2-Dichlorobenzene	95-50-1			453.65	705	EPA	0.0019	0.035	9700	O
1,3-Dichlorobenzene	541-73-1			446.15			0.0019	0.078		
1,1-Dichloroethane	75-34-3			330.45	523	EPA	0.0056	0.14	6895	CRC
1,2-Dichloroethane	107-06-2	150	SCDM	356.65	561	EPA	0.00098	0.023	7643	CRC
1,1-Dichloroethylene	75-35-4	180	SCDM	304.85	576.1	EPA	0.026	0.7	6247	CRC
trans-1,2-Dichloroethylene	156-60-5			328.15	516.5	EPA	0.0094	0.3	3717	O
cis-1,2-Dichloroethylene	156-59-2	180	SCDM	328.15	544	EPA	0.0041	0.1	7192	O
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7			433.15			0.00000001	0.00000041		
1,2-Dichloropropane	78-87-5			369.52	572	EPA	0.0028	0.064	7590	O
1,3-Dichloropropene	542-75-6			385.15	587.4	EPA	0.018	0.39	7900	calc
N,N Dimethylformamide	68-12-2			426.15			0.000000074	0.000003		
Ethyl acetate	141-78-6			350.25			0.00014	0.0057		
Ethylbenzene	100-41-4	20	SCDM	409.65	617.2	EPA	0.0079	0.16	8501	CRC
Fluorene	86-73-7			568.15	790	EPA	0.000064	0.00076	12666	O
beta-HCH(beta-BHC)	319-85-7	120	SCDM	333.15	839.4	EPA	0.00000074	0.0000078	19000	calc
Heptachlor	76-44-8	65	SCDM	408.15	846.3	EPA	0.0011	0.017	13000	calc
Hexachloroethane	67-72-1			460.15	695	EPA	0.0039	0.071	9510	O
n-Hexane	110-54-3			342.15			1.7	69		
Isopropylbenzene (Cumene)	98-82-8			425.15			0.011	0.47		
Methyl bromide (bromomethane)	74-83-9			276.71	467	EPA	0.0062	0.18	5714	CRC
Methyl ethyl ketone (MEK)	78-93-3	7	SCDM	352.75			0.000058	0.0024		
Methyl tertiary butyl ether (MTBE)	1634-04-4	180	SCDM	328.35			0.00059	0.024		
4-Methyl-2-pentanone (MIBK)	108-10-1	7	SCDM	390.15			0.00014	0.0057		
Methylene chloride	75-09-2			312.9	510	EPA	0.0022	0.056	6706	CRC
2-Methylnaphthalene	91-57-6			514.15			0.0005	0.02		
2-Methylphenol(o-cresol)	95-48-7			464.15	697.6	EPA	0.0000012	0.00002	10800	CRC

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Vapor Intrusion Chemical/Physical Properties

Contaminant		Half Life		Boiling Temp.*	Critical Temp.		Henry's Law Constant*	Corrected Henry's Law Constant**	Enthalpy of Vaporization	
Name	CAS	Days	Source	K	K	Source	atm-m^3/mol	unitless	cal/mol	Source
Naphthalene	91-20-3			491.15	748.4	EPA	0.00048	0.0081	10373	O
Nitrobenzene	98-95-3			484.15	719	EPA	0.000024	0.00039	10566	O
Phenanthrene	85-01-8			613.15			0.000026	0.001		
Phenol	108-95-2	0.13	SCDM	455.15	694.2	EPA	0.0000004	0.0000065	10920	CRC
n-Propylbenzene	103-65-1			432.15			0.011	0.43		
Styrene	100-42-5	28	SCDM	418.15	636	EPA	0.0028	0.055	8737	O
1,1,1,2-Tetrachloroethane	630-20-6			403.65			0.00034	0.014		
1,1,2,2-Tetrachloroethane	79-34-5	180	SCDM	419.65	661.2	EPA	0.00034	0.0069	8996	CRC
Tetrachloroethylene (PCE)	127-18-4	360	SCDM	394.15	620.2	EPA	0.018	0.39	8288	CRC
Toluene	108-88-3	9	SCDM	383.75	591.8	EPA	0.0066	0.15	7930	CRC
Toxaphene	8001-35-2			428.15	873.3	EPA	0.000006	0.000079	15000	calc
1,2,4-Trichlorobenzene	120-82-1			486.15	725	EPA	0.0014	0.023	10471	O
1,1,1-Trichloroethane	71-55-6	270	SCDM	347.25	545	EPA	0.017	0.42	7136	CRC
1,1,2-Trichloroethane	79-00-5	370	SCDM	387.15	602	EPA	0.00091	0.02	8322	CRC
Trichloroethylene (TCE)	79-01-6	360	SCDM	359.85	544.2		0.01	0.24	7505	
Trichlorofluoromethane	75-69-4			296.85			0.098	4		
1,3,5-Trimethylbenzene	108-67-8			438.15			0.0078	0.32		
1,2,4-Trimethylbenzene	95-63-6			442.15			0.0056	0.23		
Vinyl acetate	108-05-4			345.85	519.1	EPA	0.00051	0.012	7800	O
Vinyl chloride (chloroethene)	75-01-4	180	SCDM	260.15	432	EPA	0.027	0.81	5250	O
Xylene mixed (total)	1330-20-7	28	SCDM	414.15	630.3	EPA	0.0073	0.15	8661	CRC

* Units converted from data in the 2006 RISC Technical Guidance Document, Appendix A, Table B "Chemical/Physical Properties"
**Corrected Henry's Law Constants are calculated for compounds with all three of the following pieces of information: Boiling temperature, critical temperature and enthalpy of vaporization. If any of these are not available, the uncorrected Unitless Henry's Law Constant is used.

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Vapor Intrusion Chemical/Physical Table References

calc	This value was calculated by IDEM using the equation in EPA, 2001.
CRC	CRC, 1998. CRC Handbook of Chemistry & Physics, 79th Edition. David R. Lide, Editor-in-Chief. CRC Press LLC, United States of America.
EPA	EPA, 2001. Fact Sheet: Correcting the Henry's Law Constant for Soil Temperature. Office of Solid Waste and Emergency Response.
O	This value was located in a source not included in the RISC Tech Guide Appendix A hierarchy. Please contact IDEM for the compound-specific information.
SCDM	EPA, 2004. Superfund Chemical Data Matrix Report. U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response.

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Residential Indoor Air Action Levels

Contaminant			1 Year Exposure Duration[1]		5 Year Exposure Duration[1]		10 Year Exposure Duration[1]		20 Year Exposure Duration[1]		30 Year Exposure Duration[1]	
Name	**CAS**	**Biodeg?**	**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**	
Acenaphthylene	**208-96-8**	**No**	**36 (5.9)**	**NC**	**36 (5.9)**	**NC**	**36 (5.9)**	**NC**	**36 (5.9)**	**NC**	**36 (5.9)**	**NC**
Acetone (2-Propanone)	67-64-1	Yes	**3300 (1400)**	**NC**			3300 (1400)	NC	3300 (1400)	NC	3300 (1400)	NC
Acrolein	107-02-8	Yes	**.021 (.0091)**	**NC**			.021 (.0091)	NC	.021 (.0091)	NC	.021 (.0091)	NC
Aldrin	309-00-2	No	.064 (.0043)	C	.013 (.00086)	C	**.0084 (.00056)**	C	.0054 (.00036)	C	.0039 (.00026)	C
Anthracene	**120-12-7**	**No**	**1100 (150)**	**NC**	**1100 (150)**	**NC**	**1100 (150)**	**NC**	**1100 (150)**	**NC**	**1100 (150)**	**NC**
Benzene	71-43-2	Yes	14 (4.2)	C			**5.3 (1.7)**	**C**	**3.4 (1.1)**	C	2.5 (.78)	C
Bis(2-chloro-1-methylethyl) ether	108-60-1	No	31 (4.5)	C	6.3 (.89)	C	**4.1 (.58)**	C	2.6 (.37)	C	1.9 (.27)	C
Bis(2-chloroethyl)ether	111-44-4	No	.91 (.16)	C	.18 (.031)	C	**.12 (.020)**	C	.076 (.013)	C	.056 (.0095)	C
~~**Bis(2-chloroisopropyl)ether**~~	~~**39638-32-9**~~											
Bromodichloromethane	75-27-4	No	18 (2.6)	C	3.5 (.53)	C	**2.3 (.34)**	C	1.5 (.22)	C	1.1 (.16)	C
Bromoform(tribromomethane)	75-25-2	No	**73 (7.1)**	NC	56 (5.4)	C	**37 (3.5)**	C	23 (2.3)	C	17 (1.7)	C
n-Butanol	71-36-3	No	**9.5 (3.1)**	NC	9.5 (3.1)	NC	9.5 (3.1)	NC	9.5 (3.1)	NC	9.5 (3.1)	NC
Carbon disulfide	75-15-0	No	**730 (230)**	NC	730 (230)	NC	730 (230)	NC	730 (230)	NC	730 (230)	NC
Carbon tetrachloride	56-23-5	No	21 (3.3)	C	2.6 (.41)	NC	**2.6 (.41)**	**NC**	1.7 (.27)	C	1.3 (.2)	C
Chlordane	12789-03-6	No	**.73 (.044)**	NC	.63 (.037)	C	**.41 (.024)**	C	.26 (.016)	C	.19 (.011)	C
Chlorobenzene	108-90-7	No	**62 (13)**	NC	62 (13)	NC	62 (13)	NC	62 (13)	NC	62 (13)	NC
Chloroethane	75-00-3	No	380 (140)	C	76 (29)	C	**49 (19)**	C	31 (12)	C	23 (8.8)	C
Chloroform	67-66-3	No	14 (2.8)	C	2.7 (.55)	C	**1.8 (.36)**	C	1.1 (.23)	C	.83 (.17)	C
2-Chloronaphthalene	**91-58-7**	**No**	**290 (44)**	**NC**	**290 (44)**	**NC**	**290 (44)**	**NC**	**290 (44)**	**NC**	**290 (44)**	**NC**
2-Chlorophenol	95-57-8	No	78 (15)	NC	18 (3.5)	NC	18 (3.5)	NC	18 (3.5)	NC	18 (3.5)	NC
Cyclohexane	110-82-7	No	**6200 (1800)**	NC	6200 (1800)	NC	6200 (1800)	NC	6200 (1800)	NC	6200 (1800)	NC
DDD	72-54-8	No	4.6 (.35)	C	.91 (.07)	C	**.60 (.046)**	C	.38 (.029)	C	.28 (.021)	C
Dibenzofuran	**132-64-9**	**No**	**7.3 (1.1)**	**NC**	**7.3 (1.1)**	**NC**	**7.3 (1.1)**	**NC**	**7.3 (1.1)**	**NC**	**7.3 (1.1)**	**NC**
1,2-Dibromoethane	106-93-4	No	.52 (.068)	C	.1 (.014)	C	**.068 (.0089)**	C	.043 (.0057)	C	.032 (.0041)	C
1,4-Dichlorobenzene	106-46-7	No	50 (8.3)	C	10 (1.7)	C	**6.5(1.1)**	C	4.1 (.69)	C	3 (.51)	C
1,2-Dichlorobenzene	95-50-1	No	**210 (35)**	NC	210 (35)	NC	210 (35)	NC	210 (35)	NC	210 (35)	NC
1,3-Dichlorobenzene	541-73-1	No	**110 (18)**	NC	110 (18)	NC	110 (18)	NC	110 (18)	NC	110 (18)	NC

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Residential Indoor Air Action Levels

Contaminant			1 Year Exposure Duration[1]		5 Year Exposure Duration[1]		10 Year Exposure Duration[1]		20 Year Exposure Duration[1]		30 Year Exposure Duration[1]	
Name	**CAS**	**Biodeg?**	**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**	
1,1-Dichloroethane	75-34-3	No	**510 (130)**	NC	510 (130)	NC	510 (130)	NC	510 (130)	NC	510 (130)	NC
1,2-Dichloroethane	107-06-2	No	**5.1 (1.3)**	NC	2.4 (.59)	C	**1.6 (.39)**	C	1 (.25)	C	.74 (.18)	C
1,1-Dichloroethylene	75-35-4	No	**210 (52)**	NC	210 (52)	NC	210 (52)	NC	210 (52)	NC	210 (52)	NC
trans-1,2-Dichloroethylene	156-60-5	No	**73 (18)**	NC	73 (18)	NC	73 (18)	NC	73 (18)	NC	73 (18)	NC
cis-1,2-Dichloroethylene	156-59-2	No	**37 (9.2)**	NC	37 (9.2)	NC	37 (9.2)	NC	37 (9.2)	NC	37 (9.2)	NC
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	No	**37 (4)**	NC	37 (4)	NC	37 (4)	NC	37 (4)	NC	37 (4)	NC
1,2-Dichloropropane	78-87-5	No	**4 (.87)**	NC	3.2 (.7)	C	**2.1 (.46)**	C	1.3 (.29)	C	.98 (.21)	C
1,3-Dichloropropene	542-75-6	No	**21 (4.6)**	NC	16 (3.5)	C	**10 (2.3)**	C	6.5 (1.4)	C	4.8 (1.1)	C
N,N Dimethylformamide	68-12-2	No	**31 (10)**	NC	31 (10)	NC	31 (10)	NC	31 (10)	NC	31 (10)	NC
Ethyl acetate	141-78-6	No	**3300 (910)**	NC	3300 (910)	NC	3300 (910)	NC	3300 (910)	NC	3300 (910)	NC
Ethylbenzene	100-41-4	Yes	1900 (450) NC				1100 (240)	NC	1100 (240)	NC	1100 (240)	NC
Fluorene	**86-73-7**	**No**	**150 (21)**	**NC**	**150 (21)**	**NC**	**150 (21)**	**NC**	**150 (21)**	**NC**	**150 (21)**	**NC**
beta-HCH(beta-BHC)	319-85-7	No	.58 (.048)	C	.12 (.0097)	C	**.075 (.0063)**	C	.048 (.004)	C	.035 (.003)	C
Heptachlor	76-44-8	No	.24 (.016)	C	.048 (.0031)	C	**.031 (.002)**	C	.02 (.0013)	C	.015 (.00095)	C
Hexachloroethane	67-72-1	No	**3.6 (.38)**	NC	3.6 (.38)	NC	3.6 (.38)	NC	3.6 (.38)	NC	3.6 (.38)	NC
n-Hexane	110-54-3	No	**210 (59)**	NC	210 (59)	NC	210 (59)	NC	210 (59)	NC	210 (59)	NC
Isopropylbenzene (Cumene)	98-82-8	No	**400 (82)**	NC	400 (82)	NC	400 (82)	NC	400 (82)	NC	400 (82)	NC
Methyl bromide (bromomethane)	74-83-9	No	**5.1 (1.3)**	NC	5.1 (1.3)	NC	5.1 (1.3)	NC	5.1 (1.3)	NC	5.1 (1.3)	NC
Methyl ethyl ketone (MEK)	78-93-3	Yes	**5100 (1700) NC**				5100 (1700)	NC	5100 (1700)	NC	5100 (1700)	NC
Methyl tertiary butyl ether (MTBE)	1634-04-4	No	1200 (330)	C	240 (67)	C	**160 (44)**	C	100 (28)	C	74 (20)	C
4-Methyl-2-pentanone (MIBK)	108-10-1	Yes	**3100 (770) NC**				3100 (770)	NC	3100 (770)	NC	3100 (770)	NC
Methylene chloride	75-09-2	No	680 (200)	C	140 (39)	C	**89 (26)**	C	57 (16)	C	42 (12)	C
2-Methylnaphthalene	**91-57-6**	**No**	**15 (2.5)**	**NC**	**15 (2.5)**	**NC**	**15 (2.5)**	**NC**	**15 (2.5)**	**NC**	**15 (2.5)**	**NC**
2-Methylphenol(o-cresol)	95-48-7	No	**180 (41)**	NC	180 (41)	NC	180 (41)	NC	180 (41)	NC	180 (41)	NC
Naphthalene	**91-20-3**	**No**	**3.1 (.6)**	**NC**	**3.1 (.6)**	**NC**	**3.1 (.6)**	**NC**	**3.1 (.6)**	**NC**	**3.1 (.6)**	**NC**
Nitrobenzene	**98-95-3**	**No**	**2.1 (.41)**	**NC**	**2.1 (.41)**	**NC**	**2.1 (.41)**	**NC**	**2.1 (.41)**	**NC**	**2.1 (.41)**	**NC**
Phenanthrene	**85-01-8**	**No**	**11 (1.5)**	**NC**	**11 (1.5)**	**NC**	**11 (1.5)**	**NC**	**11 (1.5)**	**NC**	**11 (1.5)**	**NC**

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Residential Indoor Air Action Levels

Contaminant			1 Year Exposure Duration[1]		5 Year Exposure Duration[1]		10 Year Exposure Duration[1]		20 Year Exposure Duration[1]		30 Year Exposure Duration[1]	
Name	**CAS**	**Biodeg?**	**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**	
Phenol	108-95-2	Yes	**1100 (280)**	**NC**			1100 (280)	NC	1100 (280)	NC	1100 (280)	NC
n-Propylbenzene	103-65-1	No	**150 (30)**	NC	150 (30)	NC	150 (30)	NC	150 (30)	NC	150 (30)	NC
Styrene	100-42-5	Yes	**1100 (250)**	**NC**			1100 (250)	NC	1100 (250)	NC	1100 (250)	NC
1,1,1,2-Tetrachloroethane	630-20-6	No	42 (6.1)	C	8.4 (1.2)	C	**5.5 (.80)**	C	3.5 (.51)	C	2.6 (.38)	C
1,1,2,2-Tetrachloroethane	79-34-5	No	5.5 (.8)	C	1.1 (.16)	C	**.72 (.10)**	C	.46 (.066)	C	.33 (.049)	C
Tetrachloroethylene (PCE)	127-18-4	No	**36 (5.4)**	NC	10 (1.5)	C	**6.8 (1)**	C	4.3 (.64)	C	3.2 (.47)	C
Toluene	108-88-3	Yes	5100 (1400)	NC			5100 (1400)	NC	5100 (1400)	NC	5100 (1400)	NC
Toxaphene	8001-35-2	No	1 (.13)	C	.2 (.027)	C	**.13 (.018)**	C	.083 (.011)	C	.061 (.0082)	C
1,2,4-Trichlorobenzene	**120-82-1**	**No**	**890 (120)**	**NC**	**3.6 (.49)**	**NC**	**3.6 (.49)**	**NC**	**3.6 (.49)**	**NC**	**3.6 (.49)**	**NC**
1,1,1-Trichloroethane	71-55-6	No	**2300 (420)**	NC	2300 (420)	NC	2300 (420)	NC	2300 (420)	NC	2300 (420)	NC
1,1,2-Trichloroethane	79-00-5	No	**15 (2.7)**	NC	3.9 (.72)	C	**2.6 (.47)**	C	1.6 (.3)	C	1.2 (.22)	C
Trichloroethylene (TCE)[2]	79-01-6	No	20 (3.8)	C	4.1 (.75)	C	**2.7 (.49)**	C	1.7 (.31)	C	1.2 (.23)	C
Trichlorofluoromethane	**75-69-4**	**No**	**730 (130)**	**NC**	**730 (130)**	**NC**	**730 (130)**	**NC**	**730 (130)**	**NC**	**730 (130)**	**NC**
1,3,5-Trimethylbenzene	108-67-8	No	**6.2 (1.3)**	NC	6.2 (1.3)	NC	6.2 (1.3)	NC	6.2 (1.3)	NC	6.2 (1.3)	NC
1,2,4-Trimethylbenzene	95-63-6	No	**6.2 (1.3)**	NC	6.2 (1.3)	NC	6.2 (1.3)	NC	6.2 (1.3)	NC	6.2 (1.3)	NC
Vinyl acetate	108-05-4	No	**210 (59)**	NC	210 (59)	NC	210 (59)	NC	210 (59)	NC	210 (59)	NC
Vinyl chloride (chloroethene)[3]	75-01-4	No	35 (14)	C	7.1 (2.8)	C	**4.6 (1.8)**	C	2.9 (1.2)	C	2.2 (.85)	C
Xylene mixed (total)	1330-20-7	Yes	1400 (310)	NC			110 (24)	NC	110 (24)	NC	110 (24)	NC

Footnotes

1. Each action level column in the table has a "C" or "NC" next to the value. This designation indicates whether the numerical value is the result of calculation from a carcinogenic endpoint or a non-carcinogenic endpoint. Knowing the carcinogenic or non-carcinogenic designation is necessary when performing additivity. Sometimes the endpoints may be different for different receptors. Many compounds are calculated using endpoints from both carcinogenic and non-carcinogenic toxicity information, and the system used to calculate the action level selects the lowest endpoint.
2. IDEM developed and adopted default slope factors for TCE of 0.054 $(mg/kg\text{-}day)^{-1}$ as the residential inhalation slope factor and 0.018 $(mg/kg\text{-}day)^{-1}$ as the industrial inhalation slope factor in 2006. Please see the 2006 IDEM document "A Regulatory Approach for Deriving Trichloroethylene Cancer Potency Estimates for Use in the Development of Health Based Remediation Closure Levels" on the RISC website for more information.
3. Vinyl chloride calculations are based on two different sets of slope factors. The commercial levels use 0.016 $(mg/kg\text{-}day)^{-1}$ for the inhalation slope factor. The residential level uses 0.031$(mg/kg\text{-}day)^{-1}$ for the inhalation slope factor. The values derived for commercial levels are recommended for lifetime exposure beginning at adulthood. For exposures beginning at birth an additional twofold safety factor is recommended.

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Commercial Indoor Air Action Levels

Contaminant			1 Year Exposure Duration[1]		5 Year Exposure Duration[1]		10 Year Exposure Duration[1]		20 Year Exposure Duration[1]		25 Year Exposure Duration[1]	
Name	**CAS**	**Biodeg?**	**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**	
Acenaphthylene	**208-96-8**	**No**	**51 (8.2)**	**NC**	**51 (8.2)**	**NC**	**51 (8.2)**	**NC**	**51 (8.2)**	**NC**	**51 (8.2)**	**NC**
Acetone (2-Propanone)	67-64-1	Yes	**4600 (1900)**	**NC**			4600 (1900)	NC	4600 (1900)	NC	4600 (1900)	NC
Acrolein	107-02-8	Yes	**.029 (.013)**	**NC**			.029 (.013)	NC	.029 (.013)	NC	.029 (.013)	NC
Aldrin	309-00-2	No	.15 (.01)	NC	.042 (.0028)	C	.021 (.0014)	C	.011 (.0007)	C	.0084 (.00056)	C
Anthracene	**120-12-7**	**No**	**1500 (210)**	**NC**	**1500 (210)**	**NC**	**1500 (210)**	**NC**	**1500 (210)**	**NC**	**1500 (210)**	**NC**
Benzene	71-43-2	Yes	44 (14)	NC			**13 (4.1)**	**C**	**6.6 (2.1)**	**C**	5.3 (1.7)	C
Bis(2-chloro-1-methylethyl) ether	108-60-1	No	100 (15)	C	20 (2.9)	C	10 (1.5)	C	5.1 (.73)	C	4.1 (.58)	C
Bis(2-chloroethyl)ether	111-44-4	No	3 (.51)	C	.6 (.1)	C	.3 (.051)	C	.15 (.025)	C	.12 (.02)	C
~~**Bis(2-chloroisopropyl)ether**~~	~~**39638-32-9**~~											
Bromodichloromethane	75-27-4	No	58 (8.6)	C	12 (1.7)	C	5.8 (.86)	C	2.9 (.43)	C	2.3 (.34)	C
Bromoform(tribromomethane)	75-25-2	No	**100 (9.9)**	**NC**	100 (9.9)	NC	92 (8.9)	C	46 (4.4)	C	37 (3.5)	C
n-Butanol	71-36-3	No	**13 (4.4)**	NC	13 (4.4)	NC	13 (4.4)	NC	13 (4.4)	NC	13 (4.4)	NC
Carbon disulfide	75-15-0	No	**1000 (330)**	NC	1000 (330)	NC	1000 (330)	NC	1000 (330)	NC	1000 (330)	NC
Carbon tetrachloride	56-23-5	No	67 (11)	C	3.6 (.57)	NC	3.6 (.57)	NC	3.4 (.54)	C	2.7 (.43)	C
Chlordane	12789-03-6	No	**1 (.061)**	**NC**	1 (.061)	NC	1 (.061)	NC	.51 (.03)	C	.41 (.024)	C
Chlorobenzene	108-90-7	No	**87 (19)**	NC	87 (19)	NC	87 (19)	NC	87 (19)	NC	87 (19)	NC
Chloroethane	75-00-3	No	1200 (470)	C	250 (94)	C	120 (47)	C	62 (23)	C	49 (19)	C
Chloroform	67-66-3	No	44 (9)	C	8.8 (1.8)	C	4.4 (.9)	C	2.2 (.45)	C	1.8 (.36)	C
2-Chloronaphthalene	**91-58-7**	**No**	**410 (61)**	**NC**	**410 (61)**	**NC**	**410 (61)**	**NC**	**410 (61)**	**NC**	**410 (61)**	**NC**
2-Chlorophenol	95-57-8	No	260 (48)	NC	26 (4.8)	NC	26 (4.8)	NC	26 (4.8)	NC	26 (4.8)	NC
Cyclohexane	110-82-7	No	**8700 (2500)**	NC	8700 (2500)	NC	8700 (2500)	NC	8700 (2500)	NC	8700 (2500)	NC
DDD	72-54-8	No	15 (1.1)	C	3 (.23)	C	1.5 (.11)	C	.75 (.057)	C	.6 (.046)	C
Dibenzofuran	**132-64-9**	**No**	**10 (1.5)**	**NC**	**10 (1.5)**	**NC**	**10 (1.5)**	**NC**	**10 (1.5)**	**NC**	**10 (1.5)**	**NC**
1,2-Dibromoethane	106-93-4	No	1.7 (.22)	C	.34 (.044)	C	.17 (.022)	C	.085 (.011)	C	.068 (.0089)	C
1,4-Dichlorobenzene	106-46-7	No	160 (27)	C	33 (5.4)	C	16 (2.7)	C	8.1 (1.4)	C	6.5 (1.1)	C
1,2-Dichlorobenzene	95-50-1	No	**290 (49)**	NC	290 (49)	NC	290 (49)	NC	290 (49)	NC	290 (49)	NC
1,3-Dichlorobenzene	541-73-1	No	**150 (25)**	NC	150 (25)	NC	150 (25)	NC	150 (25)	NC	150 (25)	NC

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Commercial Indoor Air Action Levels

Contaminant			1 Year Exposure Duration[1]		5 Year Exposure Duration[1]		10 Year Exposure Duration[1]		20 Year Exposure Duration[1]		25 Year Exposure Duration[1]	
Name	**CAS**	**Biodeg?**	**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**	
1,1-Dichloroethane	75-34-3	No	**720 (180)**	NC	720 (180)	NC	720 (180)	NC	720 (180)	NC	720 (180)	NC
1,2-Dichloroethane	107-06-2	No	**7.2 (1.8)**	**NC**	7.2 (1.8)	NC	3.9 (.97)	C	2 (.49)	C	1.6 (.39)	C
1,1-Dichloroethylene	75-35-4	No	**290 (73)**	NC	290 (73)	NC	290 (73)	NC	290 (73)	NC	290 (73)	NC
trans-1,2-Dichloroethylene	156-60-5	No	**100 (26)**	NC	100 (26)	NC	100 (26)	NC	100 (26)	NC	100 (26)	NC
cis-1,2-Dichloroethylene	156-59-2	No	**51 (13)**	NC	51 (13)	NC	51 (13)	NC	51 (13)	NC	51 (13)	NC
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	No	**51 (5.7)**	NC	51 (5.7)	NC	51 (5.7)	NC	51 (5.7)	NC	51 (5.7)	NC
1,2-Dichloropropane	78-87-5	No	**5.6 (1.2)**	**NC**	5.6 (1.2)	NC	5.3 (1.1)	C	2.6 (.57)	C	2.1 (.46)	C
1,3-Dichloropropene	542-75-6	No	29 (6.5)	NC	29 (6.5)	NC	26 (5.7)	C	13 (2.8)	C	10 (2.3)	C
N,N Dimethylformamide	68-12-2	No	**44 (15)**	NC	44 (15)	NC	44 (15)	NC	44 (15)	NC	44 (15)	NC
Ethyl acetate	141-78-6	No	**4600 (1300)**	NC	4600 (1300)	NC	4600 (1300)	NC	4600 (1300)	NC	4600 (1300)	NC
Ethylbenzene	100-41-4	Yes	6300 (1500) NC				1500 (340)	NC	1500 (340)	NC	1500 (340)	NC
Fluorene	**86-73-7**	**No**	**200 (30)**	**NC**	**200 (30)**	**NC**	**200 (30)**	**NC**	**200 (30)**	**NC**	**200 (30)**	**NC**
beta-HCH(beta-BHC)	319-85-7	No	**1 (.086)**	**NC**	.38 (.032)	C	.19 (.016)	C	.094 (.0079)	C	.075 (.0063)	C
Heptachlor	76-44-8	No	.78 (.051)	C	.16 (.01)	C	.078 (.0051)	C	.039 (.0025)	C	.031 (.002)	C
Hexachloroethane	67-72-1	No	**5.1 (.53)**	**NC**	5.1 (.53)	NC	5.1 (.53)	NC	5.1 (.53)	NC	5.1 (.53)	NC
n-Hexane	110-54-3	No	**290 (83)**	NC	290 (83)	NC	290 (83)	NC	290 (83)	NC	290 (83)	NC
Isopropylbenzene (Cumene)	98-82-8	No	**560 (110)**	NC	560 (110)	NC	560 (110)	NC	560 (110)	NC	560 (110)	NC
Methyl bromide (bromomethane)	74-83-9	No	**7.2 (1.8)**	NC	7.2 (1.8)	NC	7.2 (1.8)	NC	7.2 (1.8)	NC	7.2 (1.8)	NC
Methyl ethyl ketone (MEK)	78-93-3	Yes	**7200 (2400) NC**				7200 (2400)	NC	7200 (2400)	NC	7200 (2400)	NC
Methyl tertiary butyl ether (MTBE)	1634-04-4	No	3900 (1100)	C	790 (220)	C	390 (110)	C	200 (54)	C	160 (44)	C
4-Methyl-2-pentanone (MIBK)	108-10-1	Yes	**4400 (1100) NC**				4400 (1100)	NC	4400 (1100)	NC	4400 (1100)	NC
Methylene chloride	75-09-2	No	2200 (640)	C	450 (130)	C	220 (64)	C	110 (32)	C	89 (26)	C
2-Methylnaphthalene	**91-57-6**	**No**	**20 (3.5)**	**NC**	**20 (3.5)**	**NC**	**20 (3.5)**	**NC**	**20 (3.5)**	**NC**	**20 (3.5)**	**NC**
2-Methylphenol(o-cresol)	95-48-7	No	**260 (58)**	NC	260 (58)	NC	260 (58)	NC	260 (58)	NC	260 (58)	NC
Naphthalene	**91-20-3**	**No**	**4.4 (.84)**	**NC**	**4.4 (.84)**	**NC**	**4.4 (.84)**	**NC**	**4.4 (.84)**	**NC**	**4.4 (.84)**	**NC**
Nitrobenzene	**98-95-3**	**No**	**2.9 (.58)**	**NC**	**2.9 (.58)**	**NC**	**2.9 (.58)**	**NC**	**2.9 (.58)**	**NC**	**2.9 (.58)**	**NC**
Phenanthrene	**85-01-8**	**No**	**15 (2.1)**	**NC**	**15 (2.1)**	**NC**	**15 (2.1)**	**NC**	**15 (2.1)**	**NC**	**15 (2.1)**	**NC**

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Commercial Indoor Air Action Levels

Contaminant			1 Year Exposure Duration[1]		5 Year Exposure Duration[1]		10 Year Exposure Duration[1]		20 Year Exposure Duration[1]		25 Year Exposure Duration[1]	
Name	**CAS**	**Biodeg?**	**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**		**µg/m³ (ppbv)**	
Phenol	108-95-2	Yes	**1500 (400)**	**NC**			1500 (400)	NC	1500 (400)	NC	1500 (400)	NC
n-Propylbenzene	103-65-1	No	**200 (42)**	NC	200 (42)	NC	200 (42)	NC	200 (42)	NC	200 (42)	NC
Styrene	100-42-5	Yes	**1500 (350)**	**NC**			1500 (350)	NC	1500 (350)	NC	1500 (350)	NC
1,1,1,2-Tetrachloroethane	630-20-6	No	140 (20)	C	28 (4)	C	14 (2)	C	6.9 (1)	C	5.5 (.8)	C
1,1,2,2-Tetrachloroethane	79-34-5	No	18 (2.6)	C	3.6 (.52)	C	1.8 (.26)	C	.89 (.13)	C	.72 (.1)	C
Tetrachloroethylene (PCE)	127-18-4	No	**51 (7.5)**	**NC**	34 (5)	C	17 (2.5)	C	8.5 (1.3)	C	6.8 (1)	C
Toluene	108-88-3	Yes	7200 (1900)	NC			7200 (1900)	NC	7200 (1900)	NC	7200 (1900)	NC
Toxaphene	8001-35-2	No	3.3 (.44)	C	.65 (.088)	C	.33 (.044)	C	.16 (.022)	C	.13 (.018)	C
1,2,4-Trichlorobenzene	**120-82-1**	**No**	**2900 (390)**	**NC**	**5.1 (.69)**	**NC**	**5.1 (.69)**	**NC**	**5.1 (.69)**	**NC**	**5.1 (.69)**	**NC**
1,1,1-Trichloroethane	71-55-6	No	**3200 (590)**	NC	3200 (590)	NC	3200 (590)	NC	3200 (590)	NC	3200 (590)	NC
1,1,2-Trichloroethane	79-00-5	No	**20 (3.7)**	**NC**	13 (2.3)	C	6.4 (1.2)	C	3.2 (.59)	C	2.6 (.47)	C
Trichloroethylene (TCE)[2]	79-01-6	No	200 (37)	C	40 (7.4)	C	20 (3.7)	C	9.9 (1.8)	C	7.9 (1.5)	C
Trichlorofluoromethane	**75-69-4**	**No**	**1000 (180)**	**NC**	**1000 (180)**	**NC**	**1000 (180)**	**NC**	**1000 (180)**	**NC**	**1000 (180)**	**NC**
1,3,5-Trimethylbenzene	108-67-8	No	**8.7 (1.8)**	NC	8.7 (1.8)	NC	8.7 (1.8)	NC	8.7 (1.8)	NC	8.7 (1.8)	NC
1,2,4-Trimethylbenzene	95-63-6	No	**8.7 (1.8)**	NC	8.7 (1.8)	NC	8.7 (1.8)	NC	8.7 (1.8)	NC	8.7 (1.8)	NC
Vinyl acetate	108-05-4	No	290 (83)	NC	290 (83)	NC	290 (83)	NC	290 (83)	NC	290 (83)	NC
Vinyl chloride (chloroethene)[3]	75-01-4	No	**150 (58)**	**NC**	45 (18)	C	22 (8.6)	C	11 (4.3)	C	8.9 (3.5)	C
Xylene mixed (total)	1330-20-7	Yes	4400 (1000)	NC			150 (34)	NC	150 (34)	NC	150 (34)	NC

Footnotes

1. Each action level column in the table has a "C" or "NC" next to the value. This designation indicates whether the numerical value is the result of calculation from a carcinogenic endpoint or a non-carcinogenic endpoint. Knowing the carcinogenic or non-carcinogenic designation is necessary when performing additivity. Sometimes the endpoints may be different for different receptors. Many compounds are calculated using endpoints from both carcinogenic and non-carcinogenic toxicity information, and the system used to calculate the action level selects the lowest endpoint.
2. IDEM developed and adopted default slope factors for TCE of 0.054 $(mg/kg\text{-}day)^{-1}$ as the residential inhalation slope factor and 0.018 $(mg/kg\text{-}day)^{-1}$ as the industrial inhalation slope factor in 2006. Please see the 2006 IDEM document "A Regulatory Approach for Deriving Trichloroethylene Cancer Potency Estimates for Use in the Development of Health Based Remediation Closure Levels" on the RISC website for more information.
3. Vinyl chloride calculations are based on two different sets of slope factors. The commercial levels use 0.016 $(mg/kg\text{-}day)^{-1}$ for the inhalation slope factor. The residential level uses 0.031$(mg/kg\text{-}day)^{-1}$ for the inhalation slope factor. The values derived for commercial levels are recommended for lifetime exposure beginning at adulthood. For exposures beginning at birth an additional twofold safety factor is recommended.

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Residential Ground Water Screening Levels for Selected Chlorinated Compounds (µg/L)

Exposure Duration

Tetrachloroethylene (PCE)

PCE	Depth to Ground Water		
1 Year	5 ft	10 ft	15 ft
Soil Type: Sand	**84**	**92**	**110**
Soil Type: Loamy Sand	**180**	**190**	**210**
Soil Type: Sandy Loam	**440**	**450**	**460**
Soil Type: Loam	**710**	**740**	**770**

PCE	Depth to Ground Water		
5 Year	5 ft	10 ft	15 ft
Soil Type: Sand	23	25	30
Soil Type: Loamy Sand	51	53	56
Soil Type: Sandy Loam	120	120	130
Soil Type: Loam	200	200	210

PCE	Depth to Ground Water		
10 Year	5 ft	10 ft	15 ft
Soil Type: Sand	**16**	**17**	**20**
Soil Type: Loamy Sand	**35**	**36**	**38**
Soil Type: Sandy Loam	**82**	**84**	**86**
Soil Type: Loam	**130**	**140**	**140**

PCE	Depth to Ground Water		
20 Year	5 ft	10 ft	15 ft
Soil Type: Sand	9.9	11	13
Soil Type: Loamy Sand	22	23	24
Soil Type: Sandy Loam	52	53	55
Soil Type: Loam	84	87	91

PCE	Depth to Ground Water		
30 Year	5 ft	10 ft	15 ft
Soil Type: Sand	7.4	8.1	9.6
Soil Type: Loamy Sand	16	17	18
Soil Type: Sandy Loam	39	40	41
Soil Type: Loam	62	65	68

Trichloroethylene (TCE)

TCE	Depth to Ground Water		
1 Year	5 ft	10 ft	15 ft
Soil Type: Sand	77	84	99
Soil Type: Loamy Sand	170	180	190
Soil Type: Sandy Loam	400	410	420
Soil Type: Loam	650	680	700

TCE	Depth to Ground Water		
5 Year	5 ft	10 ft	15 ft
Soil Type: Sand	16	17	20
Soil Type: Loamy Sand	35	36	38
Soil Type: Sandy Loam	82	84	86
Soil Type: Loam	130	140	140

TCE	Depth to Ground Water		
10 Year	5 ft	10 ft	15 ft
Soil Type: Sand	**10**	**11**	**13**
Soil Type: Loamy Sand	**22**	**23**	**25**
Soil Type: Sandy Loam	**53**	**54**	**56**
Soil Type: Loam	**86**	**89**	**93**

TCE	Depth to Ground Water		
20 Year	5 ft	10 ft	15 ft
Soil Type: Sand	6.5	7.2	8.4
Soil Type: Loamy Sand	14	15	16
Soil Type: Sandy Loam	34	35	36
Soil Type: Loam	55	57	60

TCE	Depth to Ground Water		
30 Year	5 ft	10 ft	15 ft
Soil Type: Sand	4.6	5.1	6
Soil Type: Loamy Sand	10	11	11
Soil Type: Sandy Loam	24	25	25
Soil Type: Loam	39	41	42

1,2-Dichloroethane (1,2-DCA)

1,2-DCA	Depth to Ground Water		
1 Year	5 ft	10 ft	15 ft
Soil Type: Sand	**210**	**230**	**270**
Soil Type: Loamy Sand	**450**	**470**	**500**
Soil Type: Sandy Loam	**1100**	**1100**	**1100**
Soil Type: Loam	**1700**	**1800**	**1900**

1,2-DCA	Depth to Ground Water		
5 Year	5 ft	10 ft	15 ft
Soil Type: Sand	95	100	120
Soil Type: Loamy Sand	210	220	230
Soil Type: Sandy Loam	500	510	520
Soil Type: Loam	800	830	870

1,2-DCA	Depth to Ground Water		
10 Year	5 ft	10 ft	15 ft
Soil Type: Sand	**63**	**70**	**82**
Soil Type: Loamy Sand	**140**	**140**	**150**
Soil Type: Sandy Loam	**330**	**340**	**350**
Soil Type: Loam	**530**	**560**	**580**

1,2-DCA	Depth to Ground Water		
20 Year	5 ft	10 ft	15 ft
Soil Type: Sand	40	43	51
Soil Type: Loamy Sand	87	91	97
Soil Type: Sandy Loam	210	210	220
Soil Type: Loam	330	350	360

1,2-DCA	Depth to Ground Water		
30 Year	5 ft	10 ft	15 ft
Soil Type: Sand	29	32	38
Soil Type: Loamy Sand	64	67	71
Soil Type: Sandy Loam	150	160	160
Soil Type: Loam	250	260	270

Vinyl Chloride (VC)

VC	Depth to Ground Water		
1 Year	5 ft	10 ft	15 ft
Soil Type: Sand	39	43	51
Soil Type: Loamy Sand	87	90	96
Soil Type: Sandy Loam	210	210	220
Soil Type: Loam	330	350	360

VC	Depth to Ground Water		
5 Year	5 ft	10 ft	15 ft
Soil Type: Sand	8	8.8	10
Soil Type: Loamy Sand	18	18	20
Soil Type: Sandy Loam	42	43	44
Soil Type: Loam	68	70	73

VC	Depth to Ground Water		
10 Year	5 ft	10 ft	15 ft
Soil Type: Sand	**5.2**	**5.7**	**6.7**
Soil Type: Loamy Sand	**11**	**12**	**13**
Soil Type: Sandy Loam	**27**	**28**	**29**
Soil Type: Loam	**44**	**46**	**48**

VC	Depth to Ground Water		
20 Year	5 ft	10 ft	15 ft
Soil Type: Sand	3.3	3.6	4.2
Soil Type: Loamy Sand	7.2	7.5	8
Soil Type: Sandy Loam	17	18	18
Soil Type: Loam	28	29	30

VC	Depth to Ground Water		
30 Year	5 ft	10 ft	15 ft
Soil Type: Sand	2.5	2.7	3.2
Soil Type: Loamy Sand	5.5	5.7	6.1
Soil Type: Sandy Loam	13	13	14
Soil Type: Loam	21	22	23

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Commercial Ground Water Screening Levels for Selected Chlorinated Compounds (µg/L)

Exposure Duration

Tetrachloroethylene (PCE)

PCE 1 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	**120**	**130**	**150**
Loamy Sand	**260**	**270**	**290**
Sandy Loam	**620**	**630**	**650**
Loam	**1000**	**1000**	**1100**

PCE 5 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	78	86	100
Loamy Sand	170	180	190
Sandy Loam	410	420	430
Loam	660	690	720

PCE 10 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	39	43	51
Loamy Sand	86	90	96
Sandy Loam	210	210	220
Loam	330	350	360

PCE 20 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	20	22	25
Loamy Sand	43	45	48
Sandy Loam	100	110	110
Loam	170	170	180

PCE 25 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	16	17	20
Loamy Sand	35	36	38
Sandy Loam	82	84	86
Loam	130	140	140

Trichloroethylene (TCE)

TCE 1 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	770	840	990
Loamy Sand	1700	1800	1900
Sandy Loam	4000	4100	4200
Loam	6500	6800	7000

TCE 5 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	150	170	200
Loamy Sand	340	350	370
Sandy Loam	800	820	840
Loam	1300	1400	1400

TCE 10 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	76	84	99
Loamy Sand	170	180	190
Sandy Loam	400	410	420
Loam	650	680	700

TCE 20 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	38	42	49
Loamy Sand	84	87	93
Sandy Loam	200	200	210
Loam	320	330	350

TCE 25 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	30	33	39
Loamy Sand	67	69	74
Sandy Loam	160	160	170
Loam	260	270	280

1,2-Dichloroethane (1,2-DCA)

1,2-DCA 1 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	**290**	**320**	**370**
Loamy Sand	**630**	**660**	**700**
Sandy Loam	**1500**	**1500**	**1600**
Loam	**2400**	**2500**	**2600**

1,2-DCA 5 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	280	310	370
Loamy Sand	630	650	700
Sandy Loam	1500	1500	1600
Loam	2400	2500	2600

1,2-DCA 10 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	150	170	200
Loamy Sand	340	350	380
Sandy Loam	810	830	850
Loam	1300	1400	1400

1,2-DCA 20 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	79	87	100
Loamy Sand	170	180	190
Sandy Loam	410	420	430
Loam	670	700	720

1,2-DCA 25 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	63	70	82
Loamy Sand	140	140	150
Sandy Loam	330	340	350
Loam	540	560	580

Vinyl Chloride (VC)

VC 1 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	**170**	**180**	**220**
Loamy Sand	**370**	**380**	**410**
Sandy Loam	**880**	**900**	**920**
Loam	**1400**	**1500**	**1500**

VC 5 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	51	56	66
Loamy Sand	110	120	120
Sandy Loam	270	270	280
Loam	430	450	470

VC 10 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	25	27	32
Loamy Sand	55	57	61
Sandy Loam	130	130	140
Loam	210	220	230

VC 20 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	12	14	16
Loamy Sand	27	28	30
Sandy Loam	65	67	68
Loam	100	110	110

VC 25 Year	Depth to Ground Water 5 ft	10 ft	15 ft
Soil Type: Sand	10	11	13
Loamy Sand	22	23	25
Sandy Loam	53	54	55
Loam	85	88	92

Residential Sub-Slab, Crawl Space and Soil Gas Screening Levels for Selected Chlorinated Compounds

Sub-Slab

Prompt Action Level

Prompt Sub-Slab			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	30 yr
Compound	1,2 DCA	µg/m³	**51**	24	**16**	10	7.4
		ppbv	**13**	5.9	**3.9**	2.5	1.8
	PCE	µg/m³	**360**	100	**68**	43	32
		ppbv	**54**	15	**10**	6.4	4.7
	TCE	µg/m³	200	41	**27**	17	12
		ppbv	38	7.5	**4.9**	3.1	2.3
	VC	µg/m³	350	71	**46**	29	22
		ppbv	140	28	**18**	12	8.5

Potential Action Level

Potential Sub-Slab			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	30 yr
Compound	1,2 DCA	µg/m³	**7.4 - 51**	7.4 - 24	**7.4 - 16**	7.4 - 10	7.4
		ppbv	**1.8 - 13**	1.8 - 5.9	**1.8 - 3.9**	1.8 - 2.5	1.8
	PCE	µg/m³	**32 - 360**	32 - 100	**32 - 68**	32 - 43	32
		ppbv	**4.7 - 54**	4.7 - 15	**4.7 - 10**	4.7 - 6.4	4.7
	TCE	µg/m³	12 - 200	12 - 41	**12 - 27**	12 - 17	12
		ppbv	2.3 - 38	2.3 - 7.5	**2.3 - 4.9**	2.3 - 3.1	2.3
	VC	µg/m³	22 - 350	22 - 71	**22 - 46**	22 - 29	22
		ppbv	8.5 - 140	8.5 - 28	**8.5 - 18**	8.5 - 12	8.5

Crawl Space

Prompt Action Level

Prompt Crawl Space			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	30 yr
Compound	1,2 DCA	µg/m³	**5.1**	2.4	**1.6**	1	0.74
		ppbv	**1.3**	0.59	**0.39**	0.25	0.18
	PCE	µg/m³	**36**	10	**6.8**	4.3	3.2
		ppbv	**5.4**	1.5	**1**	0.64	0.47
	TCE	µg/m³	20	4.1	**2.7**	1.7	1.2
		ppbv	3.8	0.75	**0.49**	0.31	0.23
	VC	µg/m³	35	7.1	**4.6**	2.9	2.2
		ppbv	14	2.8	**1.8**	1.2	0.85

Potential Action Level

Potential Crawl Space			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	30 yr
Compound	1,2 DCA	µg/m³	**0.74 - 5.1**	0.74 - 2.4	**0.74 - 1.6**	0.74 - 1	0.74
		ppbv	**0.18 - 1.3**	0.18 - 0.59	**0.18 - 0.39**	0.18 - 0.25	0.18
	PCE	µg/m³	**3.2 - 36**	3.2 - 10	**3.2 - 6.8**	3.2 - 4.3	3.2
		ppbv	**0.47 - 5.4**	0.47 - 1.5	**0.47 - 1**	0.47 - 0.64	0.47
	TCE	µg/m³	1.2 - 20	1.2 - 4.1	**1.2 - 2.7**	1.2 - 1.7	1.2
		ppbv	0.23 - 3.8	0.23 - 0.75	**0.23 - 0.49**	0.23 - 0.31	0.23
	VC	µg/m³	2.2 - 35	2.2 - 7.1	**2.2 - 4.6**	2.2 - 2.9	2.2
		ppbv	0.85 - 14	0.85 - 2.8	**0.85 - 1.8**	0.85 - 1.2	0.85

Soil Gas

Prompt Action Level

Prompt Soil Gas			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	30 yr
Compound	1,2 DCA	µg/m³	**510**	240	**160**	100	74
		ppbv	**130**	59	**39**	25	18
	PCE	µg/m³	**3600**	1000	**680**	430	320
		ppbv	**540**	150	**100**	64	47
	TCE	µg/m³	2000	410	**270**	170	120
		ppbv	380	75	**49**	31	23
	VC	µg/m³	3500	710	**460**	290	220
		ppbv	1400	280	**180**	120	85

Potential Action Level

Potential Soil Gas			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	30 yr
Compound	1,2 DCA	µg/m³	**74 - 510**	74 - 240	**74 - 160**	74 - 100	74
		ppbv	**18 - 130**	18 - 59	**18 - 39**	18 - 25	18
	PCE	µg/m³	**320 - 3600**	320 - 1000	**320 - 680**	320 - 430	320
		ppbv	**47 - 540**	47 - 150	**47 - 100**	47 - 64	47
	TCE	µg/m³	120 - 2000	120 - 410	**120 - 270**	120 - 170	120
		ppbv	23 - 380	23 - 75	**23 - 49**	23 - 31	23
	VC	µg/m³	220 - 3500	220 - 710	**220 - 460**	220 - 290	220
		ppbv	85 - 1400	85 - 280	**85 - 180**	85 - 120	85

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Commercial Sub-Slab, Crawl Space and Soil Gas Screening Levels for Selected Chlorinated Compounds

Sub-Slab

Prompt Action Level

Prompt Sub-Slab			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	25 yr
Compound	1,2 DCA	µg/m³	**72**	72	39	20	16
		ppbv	**18**	18	9.7	4.9	3.9
	PCE	µg/m³	**510**	340	170	85	68
		ppbv	**75**	50	25	13	10
	TCE	µg/m³	2000	400	200	99	79
		ppbv	370	74	37	18	15
	VC	µg/m³	**1500**	450	220	110	89
		ppbv	**580**	180	86	43	35

Potential Action Level

Potential Sub-Slab			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	25 yr
Compound	1,2 DCA	µg/m³	**16 - 72**	16 - 72	16 - 39	16 - 20	16
		ppbv	**3.9 - 18**	3.9 - 18	3.9 - 9.7	3.9 - 4.9	3.9
	PCE	µg/m³	**68 - 510**	68 - 340	68 - 170	68 - 85	68
		ppbv	**10 - 75**	10 - 50	10 - 25	10 - 13	10
	TCE	µg/m³	79 - 2000	79 - 400	79 - 200	79 - 99	79
		ppbv	15 - 370	15 - 74	15 - 37	15 - 18	15
	VC	µg/m³	**89 - 1500**	89 - 450	89 - 220	89 - 110	89
		ppbv	**35 - 580**	35 - 180	35 - 86	35 - 43	35

Crawl Space

Prompt Action Level

Prompt Crawl Space			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	25 yr
Compound	1,2 DCA	µg/m³	**7.2**	7.2	3.9	2	1.6
		ppbv	**1.8**	1.8	0.97	0.49	0.39
	PCE	µg/m³	**51**	34	17	8.5	6.8
		ppbv	**7.5**	5	2.5	1.3	1
	TCE	µg/m³	200	40	20	9.9	7.9
		ppbv	37	7.4	3.7	1.8	1.5
	VC	µg/m³	**150**	45	22	11	8.9
		ppbv	**58**	18	8.6	4.3	3.5

Potential Action Level

Potential Crawl Space			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	25 yr
Compound	1,2 DCA	µg/m³	**1.6 - 7.2**	1.6 - 7.2	1.6 - 3.9	1.6 - 2	1.6
		ppbv	**0.39 - 1.8**	0.39 - 1.8	0.39 - 0.97	0.39 - 0.49	0.39
	PCE	µg/m³	**6.8 - 51**	6.8 - 34	6.8 - 17	6.8 - 8.5	6.8
		ppbv	**1 - 7.5**	1 - 5	1 - 2.5	1 - 1.3	1
	TCE	µg/m³	7.9 - 200	7.9 - 40	7.9 - 20	7.9 - 9.9	7.9
		ppbv	1.5 - 37	1.5 - 7.4	1.5 - 3.7	1.5 - 1.8	1.5
	VC	µg/m³	**8.9 - 150**	8.9 - 45	8.9 - 22	8.9 - 11	8.9
		ppbv	**3.5 - 58**	3.5 - 18	3.5 - 8.6	3.5 - 4.3	3.5

Soil Gas

Prompt Action Level

Prompt Soil Gas			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	25 yr
Compound	1,2 DCA	µg/m³	**720**	720	390	200	160
		ppbv	**180**	180	97	49	39
	PCE	µg/m³	**5100**	3400	1700	850	680
		ppbv	**750**	500	250	130	100
	TCE	µg/m³	20000	4000	2000	990	790
		ppbv	3700	740	370	180	150
	VC	µg/m³	**15000**	4500	2200	1100	890
		ppbv	**5800**	1800	860	430	350

Potential Action Level

Potential Soil Gas			Exposure Duration				
			1 yr	5 yr	10 yr	20 yr	25 yr
Compound	1,2 DCA	µg/m³	**160 - 720**	160 - 720	160 - 390	160 - 200	160
		ppbv	**39 - 180**	39 - 180	39 - 97	39 - 49	39
	PCE	µg/m³	**680 - 5100**	680 - 3400	680 - 1700	680 - 850	680
		ppbv	**100 - 750**	100 - 500	100 - 250	100 - 130	100
	TCE	µg/m³	790 - 20000	790 - 4000	790 - 2000	790 - 990	790
		ppbv	150 - 3700	150 - 740	150 - 370	150 - 180	150
	VC	µg/m³	**890 - 15000**	890 - 4500	890 - 2200	890 - 1100	890
		ppbv	**350 - 5800**	350 - 1800	350 - 860	350 - 430	350

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Screening Levels for Benzene

Ground Water Screening Levels for Benzene (µg/L)

			Residential			Commercial		
Subchronic			Depth to Ground Water			Depth to Ground Water		
			5ft	10ft	15ft	5ft	10ft	15ft
	Soil Type	Sand	95	100	120	300	340	400
		Loamy Sand	200	220	230	670	700	740
		Sandy Loam	490	500	520	1600	1600	1700
		Loam	790	820	850	2600	2700	2800
10 Year			Depth to Ground Water			Depth to Ground Water		
			5ft	10ft	15ft	5ft	10ft	15ft
	Soil Type	Sand	**36**	**40**	**47**	**91**	**100**	**120**
		Loamy Sand	**80**	**83**	**89**	**200**	**210**	**220**
		Sandy Loam	**190**	**200**	**200**	**480**	**490**	**500**
		Loam	**310**	**320**	**330**	**770**	**800**	**830**
20 Year			Depth to Ground Water			Depth to Ground Water		
			5ft	10ft	15ft	5ft	10ft	15ft
	Soil Type	Sand	**23**	**26**	**30**	**46**	**50**	**59**
		Loamy Sand	**51**	**53**	**57**	**100**	**100**	**110**
		Sandy Loam	**120**	**120**	**130**	**240**	**240**	**250**
		Loam	**200**	**200**	**210**	**390**	**400**	**420**
30 / 25 Year			Depth to Ground Water			Depth to Ground Water		
			5ft	10ft	15ft	5ft	10ft	15ft
	Soil Type	Sand	**17**	**19**	**22**	**36**	**40**	**47**
		Loamy Sand	**37**	**39**	**42**	**80**	**83**	**89**
		Sandy Loam	**89**	**91**	**94**	**190**	**200**	**200**
		Loam	**140**	**150**	**160**	**310**	**320**	**330**

Sub-Slab, Crawl Space and Soil Gas Screening Levels for Benzene

			Prompt Action				Potential Action			
			Exposure Duration				Exposure Duration			
			Sub-Chronic	10 Years	20 Years	30 Years	Sub-Chronic	10 Years	20 Years	30 Years
Residential	Sub-Slab	µg/m^3	140	**53**	**34**	25	25 - 140	**25 - 53**	**25 - 34**	25
		ppbv	42	**17**	**11**	7.8	7.8 - 42	**7.8 - 17**	**7.8 - 11**	7.8
	Crawl Space	µg/m^3	14	**5.3**	**3.4**	2.5	2.5 - 14	**2.5 - 5.3**	**2.5 - 3.4**	2.5
		ppbv	4.2	**1.7**	**1.1**	0.78	0.78 - 4.2	**0.78 - 1.7**	**0.78 - 1.1**	0.78
	Soil Gas	µg/m^3	1400	**530**	**340**	250	250 - 1400	**250 - 530**	**250 - 340**	250
		ppbv	420	**170**	**110**	78	78 - 420	**78 - 170**	**78 - 110**	78
			Exposure Duration				Exposure Duration			
			Sub-Chronic	10 Years	20 Years	25 Years	Sub-Chronic	10 Years	20 Years	25 Years
Commercial	Sub-Slab	µg/m^3	440	**130**	**66**	53	53 - 440	**53 - 130**	**53 - 66**	53
		ppbv	140	**41**	**21**	17	17 - 140	**17 - 41**	**17 - 21**	17
	Crawl Space	µg/m^3	44	**13**	**6.6**	5.3	5.3 - 44	**5.3 - 13**	**5.3 - 6.6**	5.3
		ppbv	14	**4.1**	**2.1**	1.7	1.7 - 14	**1.7 - 4.1**	**1.7 - 2.1**	1.7
	Soil Gas	µg/m^3	4400	**1300**	**660**	530	530 - 4400	**530 - 1300**	**530 - 660**	530
		ppbv	1400	**410**	**210**	170	170 - 1400	**170 - 410**	**170 - 210**	170

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Screening Levels for Ground Water, Soil Gas and Sub-Slab Samples and OSHA Indoor Air PELs for OSHA-Regulated Industrial Sites

Contaminant	CAS	Ground Water Screening Levels*	Soil Gas Screening Levels	Sub-Slab Screening Levels	OSHA Indoor Air PELs
Benzene	71-43-2	22 mg/L	320 mg/m^3 100 ppmv	32 mg/m^3 10 ppmv	3.2 mg/m^3 1 ppmv
1,2 DCA	107-06-2	7900 mg/L	20,000 mg/m^3 5,000 ppmv	2,000 mg/m^3 500 ppmv	200 mg/m^3 50 ppmv
PCE	127-18-4	200** mg/L	68,000 mg/m^3 10,000 ppmv	6,800 mg/m^3 1,000 ppmv	680 mg/m^3 100 ppmv
TCE	79-01-6	1100** mg/L	54,000 mg/m^3 10,000 ppmv	5,400 mg/m^3 1,000 ppmv	540 mg/m^3 100 ppmv
VC	75-01-4	3 mg/L	260 mg/m^3 100 ppmv	26 mg/m^3 10 ppmv	2.6 mg/m^3 1 ppmv

*Ground Water Screening Levels in this table were calculated using the attenuation factor for a 5 ft depth to ground water and sandy soil. Ground water screening levels can also be calculated using attenuation factors for other depths to ground water and soil types.

** RISC Solubility Level

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