**Section 742.APPENDIX C Tier 2 Illustrations and Tables**

**Section 742.TABLE D RBCA Parameters**

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| Symbol | Parameter | Units | Source | Parameter Value(s) |
| ATc | Averaging Time for Carcinogens | yr | RBCA | 70 |
| ATn | Averaging Time for Noncarcinogens | yr | RBCA | Residential = 30  Industrial/Commercial = 25  Construction Worker = 0.115 |
| BW | Adult Body Weight | kg | RBCA | 70 |
| Csource | The greatest potential concentration of the contaminant of concern in the groundwater at the source of the contamination, based on the concentrations of contaminants in groundwater due to the release and the projected concentration of the contaminant migrating from the soil to the groundwater. | mg/L | Field Measurement | Site-Specific |
| C(x) | Concentration of Contaminant in Groundwater at Distance X form the source | mg/L | Equation R26 in Appendix C, Table C | Calculated Value |
| C(x)/Csource | Steady-State Attenuation Along the Centerline of a Dissolved Plume | unitless | Equation R15 in Appendix C, Table C | Calculated Value |
| d | Lower Depth of Surficial Soil Zone | cm | Field Measurement | 100 or Site-Specific (not to exceed 100) |
| Dair | Diffusion Coefficient in Air | cm2/s | Appendix C, Table E | Chemical-Specific |
| Dwater | Diffusion Coefficient in Water | cm2/s | Appendix C, Table E | Chemical-Specific |

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| Symbol | Parameter | Units | Source | Parameter Value(s) |
| Dseff | Effective Diffusion Coefficient in Soil Based on Vapor-Phase Concentration | cm2/s | Equation R6 in Appendix C, Table C | Calculated Value |
| ED | Exposure Duration | yr | RBCA | Residential = 30  Industrial/Commercial = 25  Construction Worker = 1 |
| EF | Exposure Frequency | d/yr | RBCA | Residential = 350  Industrial/Commercial = 250  Construction Worker = 30 |
| erf | Error Function | unitless | Appendix C, Table G | Mathematical Function |
| foc | Organic Carbon Content of Soil | g/g | RBCA or Field Measurement (See Appendix C, Table F) | Surface Soil = 0.006  Subsurface Soil = 0.002 or  Site-Specific |
| GWcomp | Groundwater Objective at the Compliance Point | mg/L | Appendix B, Table E, 35 IAC 620.Subpart F, or Equation R25 in Appendix C, Table C | Site-Specific |
| GWsource | Groundwater Concentration at the Source | mg/L | Equation R13 in Appendix C, Table C | Calculated Value |
| H' | Henry's Law Constant | cm3water/cm3air | Appendix C, Table E | Chemical-Specific |
| i | Hydraulic Gradient | cm/cm (unitless) | Field Measurement (See Appendix C, Table F) | Site-Specific |
| I | Infiltration Rate | cm/yr | RBCA | 30 |
| IRair | Daily Outdoor Inhalation Rate | m3/d | RBCA | 20 |
| IRsoil | Soil Ingestion Rate | mg/d | RBCA | Residential = 100  Industrial/Commercial = 50  Construction Worker = 480 |
| IRw | Daily Water Ingestion Rate | L/d | RBCA | Residential = 2  Industrial/Commercial = 1 |
| K | Aquifer Hydraulic Conductivity | cm/d for Equations R15, R19 and R26 cm/yr for Equation R24 | Field Measurement (See Appendix C, Table F) | Site-Specific |
| Koc | Organic Carbon Partition Coefficient | cm3/g or L/kg | Appendix C, Table E or Appendix C, Table I | Chemical-Specific |

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| Symbol | Parameter | Units | Source | Parameter Value(s) |
| ks (non-ionizing organics) | Soil Water Sorption Coefficient | cm3water/gsoil | Equation R20 in Appendix C, Table C | Calculated Value |
| ks (ionizing organics) | Soil Water Sorption Coefficient | cm3water/gsoil | Equation R20 in Appendix C, Table C | Chemical and pH-Specific (See Appendix C, Table I) |
| ks (inorganics) | Soil Water Sorption Coefficient | cm3water/gsoil | Appendix C, Table J | Chemical and pH-Specific |
| Ls | Depth to Subsurface Soil Sources | cm | RBCA | 100 |
| LFsw | Leaching Factor | (mg/Lwater)/ (mg/kgsoil) | Equation R14 in Appendix C, Table C | Calculated Value |
| M | Soil to Skin Adherence Factor | mg/cm2 | RBCA | 0.5 |
| Pe | Particulate Emission Rate | g/cm2-s | RBCA | 6.9 • 10-14 |
| RAFd | Dermal Relative Absorption Factor | unitless | RBCA | 0.5 |
| RAFd (PNAs) | Dermal Relative Absorption Factor | unitless | RBCA | 0.05 |
| RAFd (inorganics) | Dermal Relative Absorption Factor | unitless | RBCA | 0 |
| RAFo | Oral Relative Absorption Factor | unitless | RBCA | 1.0 |
| RBSLair | Carcinogenic Risk-Based Screening Level for Air | μg/m3 | Equation R9 in Appendix C, Table C | Chemical-, Media-, and Exposure Route-Specific |
| RBSLair | Noncarcinogenic Risk-Based Screening Level for Air | μg/m3 | Equations R10 in Appendix C, Table C | Chemical-, Media-, and Exposure Route-Specific |
| RfDi | Inhalation Reference Dose | mg/kg-d | IEPA (IRIS/HEASTa) | Toxicological-Specific |
| RfDo | Oral Reference Dose | mg/(kg-d) | IEPA (IRIS/HEASTa) | Toxicological-Specific (Note: for Construction Worker use subchronic reference doses) |
| SA | Skin Surface Area | cm2/d | RBCA | 3,160 |

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| Symbol | Parameter | Units | Source | Parameter Value(s) |
| Sd | Source Width Perpendicular to Groundwater Flow Direction in Vertical Plane | cm | Field Measurement | For Migration to Groundwater Route: Use 200 or Site-Specific  For Groundwater remediation objective: Use Site-Specific |
| Sw | Source Width Perpendicular to Groundwater Flow Direction in Horizontal Plane | cm | Field Measurement | Site-Specific |
| SFi | Inhalation Cancer Slope Factor | (mg/kg-d)-1 | IEPA (IRIS/HEASTa) | Toxicological-Specific |
| SFo | Oral Slope Factor | (mg/kg-d)-1 | IEPA (IRIS/HEASTa) | Toxicological-Specific |
| THQ | Target Hazard Quotient | unitless | RBCA | 1 |
| TR | Target Cancer Risk | unitless | RBCA | Residential = 10-6 at the point of human exposure  Industrial/Commercial = 10-6 at the point of human exposure  Construction Worker = 10-6 at the point of human exposure |
| U | Specific Discharge | cm/d | Equation R19 in Appendix C, Table C | Calculated Value |
| Uair | Average Wind Speed Above Ground Surface in Ambient Mixing zone | cm/s | RBCA | 225 |
| Μgw | Groundwater Darcy Velocity | cm/yr | Equation R24 in Appendix C, Table C | Calculated Value |
| VFp | Volatilization Factor for Surficial Soils Regarding Particulates | kg/m3 | Equation R5 in Appendix C, Table C | Calculated Value |
| VFsamb | Volatilization Factor (Subsurface Soils to Ambient Air) | (mg/m3air)/(mg/kgsoil) or kg/m3 | Equation R11 in Appendix C, Table C | Calculated Value |

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| --- | --- | --- | --- | --- |
| Symbol | Parameter | Units | Source | Parameter Value(s) |
| VFss | Volatilization Factor for Surficial Soils | kg/m3 | Use Equations R3 and R4 in Appendix C, Table C | Calculated Value from Equation R3 or R4 (whichever is less) |
| W | Width of Source Area Parallel to Direction to Wind or Groundwater Movement | cm | Field Measurement | Site-Specific |
| w | Average Soil Moisture Content | gwater/gsoil | RBCA or Field Measurement (See Appendix C, Table F) | 0.1, or  Surface Soil (top 1 meter) = 0.1  Subsurface Soil (below 1 meter) = 0.2, or  Site-Specific |
| X | Distance along the Centerline of the Groundwater Plume Emanating from a Source. The x direction is the direction of groundwater flow | cm | Field Measurement | Site-Specific |
| αx | Longitudinal Dispersivity | cm | Equation R16 in Appendix C, Table C | Calculated Value |
| αy | Transverse Dispersivity | cm | Equation R17 in Appendix C, Table C | Calculated Value |
| αz | Vertical Dispersivity | cm | Equation R18 in Appendix C, Table C | Calculated Value |
| δair | Ambient Air Mixing Zone Heights | cm | RBCA | 200 |
| δgw | Groundwater Mixing Zone Thickness | cm | RBCA | 200 |
| θas | Volumetric Air Content in Vadose Zone Soils | cm3air/cm3soil | RBCA or Equation R21 in Appendix C, Table C | Surface Soil (top 1 meter) = 0.28  Subsurface Soil (below 1 meter) = 0.13, o r  Gravel = 0.05  Sand = 0.14  Silt = 0.16  Clay = 0.17, or  Calculate Value |

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| Symbol | Parameter | Units | Source | Parameter Value(s) |
| θws | Volumetric Water Content in Vadose Zone Soils | cm3water/cm3soil | RBCA or Equation R22 in Appendix C, Table C | Surface Soil (top 1 meter) = 0.15  Subsurface Soil (below 1 meter) = 0.30, or  Gravel = 0.20  Sand = 0.18  Silt = 0.16  Clay = 0.17, or  Calculated Value |
| θT | Total Soil Porosity | cm3/cm3soil | RBCA or Equation R23 in Appendix C, Table C | 0.43, or  Gravel = 0.25  Sand = 0.32  Silt = 0.40  Clay = 0.36, or  Calculated Value |
| λ | First Order Degradation Constant | d-1 | Appendix C, Table E | Chemical-Specific |
| π | pi |  |  | 3.1416 |
| ρs | Soil Bulk Density | g/cm3 | RBCA or Field Measurement (See Appendix C, Table F) | 1.5, or  Gravel = 2.0  Sand = 1.8  Silt = 1.6  Clay = 1.7, or  Site-Specific |
| ρw | Water Density | g/cm3 | RBCA | 1 |
| τ | Averaging Time for Vapor Flux | s | RBCA | 9.46 • 108 |

(Source: Amended at 31 Ill. Reg. 4063, effective February 23, 2007)