



CHEMICAL UPDATE WORKSHEET

| | |
|-----------------------|------------------------------------|
| Chemical Name: | 1-Chloro-1,1-difluoroethane |
| CAS #: | 75-68-3 |
| Revised By: | RRD Toxicology Unit |
| Revision Date: | September 24, 2015 |

(A) Chemical-Physical Properties

| | Part 201 Value | Updated Value | Reference Source | Comments |
|--|----------------|---------------|------------------|----------|
| Molecular Weight (g/mol) | 100.5 | 100.50 | EPI | EXP |
| Physical State at ambient temp | Gas | Gas | MDEQ | |
| Melting Point (°C) | -130.8 | -130.80 | EPI | EXP |
| Boiling Point (°C) | 15 | -9.10 | EPI | EXP |
| Solubility (ug/L) | 3.9E+6 | 1.400E+06 | EPI | EXP |
| Vapor Pressure (mmHg at 25°C) | 2438 | 2.54E+03 | EPI | EXP |
| HLC (atm-m³/mol at 25°C) | 6.16E-2 | 5.88E-02 | EPI | EXP |
| Log Kow (log P; octanol-water) | 1.81 | 2.05 | PP | EST |
| Koc (organic carbon; L/Kg) | 32.5 | 43.89 | EPI | EST |
| Ionizing Koc (L/kg) | | NR | NA | NA |
| Diffusivity in Air (Di; cm²/s) | 0.08 | 8.04E-02 | W9 | EST |
| Diffusivity in Water (Dw; cm²/s) | 8.0E-6 | 1.015E-05 | W9 | EST |

| | Part 201 Value | Updated Value | Reference Source | Comments |
|--|----------------|---------------|------------------|----------|
| Soil Water Partition Coefficient (Kd; inorganics) | NR | NR | NA | NA |
| Flash Point (°C) | NA | NA | NA | NA |
| Lower Explosivity Level (LEL; unit less) | 0.06 | 0.06 | CRC | EXP |
| Critical Temperature (K) | | 410.31 | CRC | EXP |
| Enthalpy of Vaporization (cal/mol) | | 5.36E+03 | HSDB | EXP |
| Density (g/mL, g/cm ³) | | 1.107 | CRC | EXP |
| EMSOFT Flux Residential 2 m (mg/day/cm ²) | 2.70E-05 | 2.81E-05 | EMSOFT | EST |
| EMSOFT Flux Residential 5 m (mg/day/cm ²) | 6.61E-05 | 6.91E-05 | EMSOFT | EST |
| EMSOFT Flux Nonresidential 2 m (mg/day/cm ²) | 3.85E-05 | 4.49E-05 | EMSOFT | EST |
| EMSOFT Flux Nonresidential 5 m (mg/day/cm ²) | 9.37E-05 | 1.10E-04 | EMSOFT | EST |

(B) Toxicity Values/Benchmarks

| | Part 201 Value | Updated Value | Source/Reference/Date | Comments/Notes/Issues |
|---|--|--|-----------------------|-----------------------|
| Reference Dose (RfD) (mg/kg/day) | 2.1E+0 | 2.1E+0 | MDEQ, 1988 | |
| RfD details | NOAEL of 300 mg/kg (210 mg/kg/d) in Wistar rats dosed by gavage, 5 days/week for 52 weeks (UF=100) (Longstaff, 1984). CCD/RRD date: 8/01/1988. | <p>Tier 3 Source: MDEQ: Basis: MDEQ was the only value returned in the Tier 3 search. See details below.</p> <p>Tier 1 and 2 Sources: IRIS: Per IRIS (7/01/1995), no value at this time. PPRTV: No PPRTV record available at this time. MRL: No MRL record available at this time.</p> <p>Tier 3 Sources: MDEQ: MDEQ/RRD (1988) RfD = 2.1E+0 mg/kg-day. Critical Study(ies): Longstaff E, Robinson M, Bradbrook C, Styles JA, Purchase IFH (1984) Genotoxicity and carcinogenicity of fluorocarbons: assessment by short-term in vitro tests and chronic exposure in rats. Toxicol Appl Pharmacol 72: 15–31. Method(s): Rats were dosed for 1 year by gavage 5 days a week with either FC22, FC31, FC133a, FC134a, or FC143a dissolved in corn-oil at a single dosage of 300 mg/kg body weight. The animals were then observed until week 125. Critical effect: reproductive tract tumors End point or Point of Departure (POD): NOAEL = 300 mg/kg (210 mg/kg/d) Uncertainty Factors: UF = 100 (10 each for intraspecies variability and interspecies extrapolation. Source and date: MDEQ-CCD/RRD, 8/01/1988</p> <p>Other Tier 3: No value is available at this time from these Tier 3 sources/databases: HEAST, NTP ROC, health and environmental agencies of California, Massachusetts, Minnesota, New Jersey, New York, and Texas, WHO (IARC), WHO (IPCS/INCHEM), Canada, The Netherlands (RIVM), ECHA (REACH) and</p> | Complete | |



| | Part 201 Value | Updated Value | Source/Reference/Date | Comments/Notes/Issues |
|---|---|---|-----------------------|-----------------------|
| | | OECD HPV. | | |
| Oral Cancer Slope Factor (CSF) (mg/kg-day)⁻¹ | -- | NA | MDEQ, 2015 | |
| CSF details | NA | Tier 1 and 2 Sources: IRIS: Per IRIS (7/01/1995), no value at this time. This substance has not been evaluated for evidence of human carcinogenic potential. PPRTV: No PPRTV record available at this time MRL: NA; MRLs are for non-cancer effects only. Tier 3 source: MDEQ: Per DEQ-CCD, no value at this time. | | Complete |
| Reference Concentration (RfC) or Initial Threshold Screening Level (ITSL) (µg/m³) | 5.0E+4 | 5.0E+4 | IRIS, 1995 | |
| RfC/ITSL details | A NOAEL of 20,000 ppm from the highest dose used in the two year rat inhalation study conducted by Seckar et al (1986) was the basis for deriving the RfC by USEPA. CCD/AQD date: 7/01/1995 | Tier 1 Source: IRIS: Basis: IRIS is a Tier 1 source. IRIS RfC = 5.0E+1 mg/m ³ (5.0E+4 µg/m ³): Critical Study: Seckar, J.A., H.J. Trochimowicz, G.K. Hogan. 1986. Toxicological evaluation of hydrochlorofluorocarbon 142b. Fund. Chem. Toxicol. 24(3): 237-240. Method(s): 110 Sprague-Dawley rats/sex were whole-body exposed to 0, 1000, 10,000, or 20,000 ppm 1- chloro-1,1-difluoroethane for 6 hours/day, 5 days/week for 104 weeks. The corresponding duration-adjusted concentrations were 0, 738, 7380, or 14,710 mg/m ³ , respectively Critical effect: no adverse effects End point or Point of Departure (POD): NOAEL = 20,000 ppm (highest dose); NOAEL _{HEC} : 14,710 mg/m ³ Uncertainty Factors: UF = 300 (10 for intraspecies variability; 10 for database | | COMPLETE |



| | Part 201 Value | Updated Value | Source/Reference/Date | Comments/Notes/Issues |
|---|----------------|--|-----------------------|-----------------------|
| | | <p>deficiencies due to lack of reproductive studies and the absence of chronic information on a second species; a partial UF of 3 for interspecies extrapolation.)</p> <p>Source and date: IRIS, Last revision date - 7/01/1995. An USEPA comprehensive review of studies published through 2004 did not identify new significant health effects data pertinent to the RfC.</p> <p>Tier 2 Sources: PPRTV: No PPRTV record available at this time. MRL: No MRL record available at this time.</p> <p>Tier 3 source: MDEQ: Per DEQ-CCD, AQD adopted IRIS value for RfC. = 5E+4 ug/m³ with AT = 24 hours.</p> | | |
| Inhalation Unit Risk Factor (IURF) ((µg/m³)⁻¹) | -- | NA | MDEQ, 2015 | |
| IURF details | NA | <p>Tier 1 and 2 Sources: IRIS: Per IRIS (7/01/1995), no value at this time. This substance has not been evaluated for evidence of human carcinogenic potential. PPRTV: No PPRTV record available at this time MRL: NA; MRLs are for non-cancer effects only.</p> <p>Tier 3 Source: MDEQ: Per DEQ-CCD, no value at this time.</p> | | Complete |
| Mutagenic Mode of Action (MMOA)? (Y/N) | -- | NO | USEPA, 2015 | |
| MMOA Details | -- | <p>NA Not listed as a carcinogen with mutagenic MOA in the USEPA OSWER List.</p> | | |
| Developmental or Reproductive Effector? (Y/N) | No | No, the RfD or RfC/ITSL is not based on a reproductive-developmental effect. | MDEQ, 2015 | |



| | Part 201 Value | Updated Value | Source/Reference/Date | Comments/Notes/Issues |
|--|----------------|---|--------------------------------|-----------------------|
| Developmental or Reproductive Toxicity Details | NA | NA | | |
| State Drinking Water Standard (SDWS) (ug/L) | -- | NO | SDWA, 1976 | |
| SDWS details | NA | MI Safe Drinking Water Act (SDWA) 1976 PA 399 | | |
| Secondary Maximum Contaminant Level (SMCL) (ug/L) | -- | NO | SDWA, 1976 and USEPA SMCL List | |
| SMCL details | NA | SDWA, 1976 and USEPA SMCL List, 2015 | | |
| Is there an aesthetic value for drinking water? (Y/N) | NO | Not evaluated. | NA | |
| Aesthetic value (ug/L) | NA | NA | NA | |
| Aesthetic Value details | NA | NA | | |
| Phytotoxicity Value? (Y/N) | NO | Not evaluated. | NA | |
| Phytotoxicity details | NA | NA | NA | |
| Others | | | | |

(C) Chemical-specific Absorption Factors

| | Part 201 Value | Update | Source/Reference/ Dates | Comments/Notes /Issues |
|---|----------------|----------------------------------|-----------------------------|---------------------------|
| Gastrointestinal absorption efficiency value (ABS _{gi}) | --- | 1.0 | MDEQ, 2015/ USEPA RAGS-E | |
| ABS _{gi} details | | RAGS E (EPA, 2004) Default Value | | |
| Skin absorption efficiency value (AE _d) | --- | 0.1 | MDEQ, 2015 | |
| AE _d details | | | | |
| Ingestion Absorption Efficiency (AE _i) | | 1.0 | MDEQ, 2015 | |
| AE _i Details | | | | |
| Relative Source Contribution for Water (RSC _w) | | 0.2 | MDEQ, 2015 | |
| Relative Source Contribution for Soil (RSC _s) | | 1.0 | MDEQ, 2015 | |
| Relative Source Contribution for Air (RSC _a) | | 1.0 | MDEQ, 2015 | |
| Others | | | | |

(D) Rule 57 Water Quality Values and GSI Criteria

| | |
|--|----|
| Current GSI value (µg/L) | NA |
| Updated GSI value (µg/L) | NA |
| Rule 57 Drinking Water Value (µg/L) | NA |

| | Rule 57 Value (µg/L) | Verification Date |
|--|-----------------------------|--------------------------|
| Human Non-cancer Values- Drinking water source (HNV-drink) | | |
| Human Non-Cancer Values- Non-drinking water sources (HNV-Non-drink) | | |
| Wildlife Value (WV) | | |
| Human Cancer Values for Drinking Water Source (HCV-drink) | | |
| Human Cancer values for non-drinking water source (HCV-Non-drink) | | |
| Final Chronic Value (FCV) | | |
| Aquatic maximum value (AMV) | | |
| Final Acute Value (FAV) | | |

Sources:

1. MDEQ Surface Water Assessment Section Rule 57 [website](#)
2. MDEQ Rule 57 [table](#)



(E) Target Detection Limits (TDL)

| | Value | Source |
|---|--------------|---------------|
| Target Detection Limit – Soil ($\mu\text{g}/\text{kg}$) | NA | MDEQ, 2015 |
| Target Detection Limit – Water ($\mu\text{g}/\text{L}$) | NA | MDEQ, 2015 |
| Target Detection Limit – Air (ppbv) | 1.20E+04 | MDEQ, 2015 |
| Target Detection Limit – Soil Gas (ppbv) | 4.00E+05 | MDEQ, 2015 |

CHEMICAL UPDATE WORKSHEET ABBREVIATIONS:

CAS # - Chemical Abstract Service Number.

Section (A) Chemical-Physical Properties**Reference Source(s):**

| | |
|-----------|---|
| CRC | Chemical Rubber Company Handbook of Chemistry and Physics, 95th edition, 2014-2015 |
| EMSOFT | USEPA Exposure Model for Soil-Organic Fate and Transport (EMSOFT) (EPA, 2002) |
| EPA2001 | USEPA (2001) Fact Sheet, Correcting the Henry's Law Constant for Soil Temperature. Office of Solid Waste and Emergency Response, Washington, D.C. |
| EPA4 | USEPA (2004) User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. February 22, 2004. |
| EPI | USEPA's Estimation Programs Interface SUITE 4.1, Copyright 2000-2012 |
| HSDB | Hazardous Substances Data Bank |
| MDEQ | Michigan Department of Environmental Quality |
| NPG | National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards |
| PC | National Center for Biotechnology Information's PubChem database |
| PP | Syracuse Research Corporation's PhysProp database |
| SCDM | USEPA's Superfund Chemical Data Matrix |
| SSG | USEPA's Soil Screening Guidance: Technical Background Document, Second Edition, 1996 |
| USEPA/EPA | United States environmental protection agency's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). July, 2004. |

| | |
|----|---|
| W9 | USEPA's User Guide for Water9 Software, Version 2.0.0, 2001 |
|----|---|

Basis/Comments:

| | |
|-----|---------------------------------|
| EST | estimated |
| EXP | experimental |
| EXT | extrapolated |
| NA | not available or not applicable |
| NR | not relevant |

Section (B) Toxicity Values/Benchmarks**Sources/References:**

| | |
|-------------|--|
| ATSDR | Agency for Toxic Substances and Disease Registry |
| CALEPA | California Environmental Protection Agency |
| CAL DTSC | California Department of Toxic Substances Control |
| CAL OEHHA | CAEPA Office of Environmental Health Hazard Assessment |
| CCD | MDEQ Chemical Criteria Database |
| ECHA | European Chemicals Agency (REACH) |
| OECD HPV | Organization for Economic Cooperation and Development HPV Database |
| HEAST | USEPA's Health Effects Assessment Summary Tables |
| IRIS | USEPA's Integrated Risk Information System |
| MADEP | Massachusetts Department of Environmental Protection |
| MDEQ/DEQ | Michigan Department of Environmental Quality |
| DEQ-CCD/AQD | MDEQ Air Quality Division |
| DEQ-CCD/RRD | MDEQ Remediation and Redevelopment Division |
| DEQ-CCD/WRD | MDEQ Water Resources Division |
| MNDOH | Minnesota Department of Health |
| NJDEP | New Jersey Department of Environmental Protection |

| | |
|-------------|---|
| NYDEC | New York State Department of Environmental Conservation |
| OPP/OPPT | USEPA's Office of Pesticide Programs |
| PPRTV | USEPA's Provisional Peer Reviewed Toxicity Values |
| RIVM | The Netherlands National Institute of Public Health and the Environment |
| TCEQ | Texas Commission on Environmental Quality |
| USEPA | United States Environmental Protection Agency |
| USEPA OSWER | USEPA Office of Solid Waste and Emergency Response |
| USEPA MCL | USEPA Maximum Contaminant Level |
| WHO | World Health Organization |
| WHO IPCS | International Programme on Chemical Safety (IPCS/INCHEM) |
| WHO IARC | International Agency for Research on Cancers |
| NA | Not Available. |
| NR | Not Relevant. |

Toxicity terms:

| | |
|-------------|---|
| BMC | Benchmark concentration |
| BMCL | Lower bound confidence limit on the BMC |
| BMD | benchmark dose |
| BMDL | Lower bound confidence limit on the BMD |
| CSF | Cancer slope Factor |
| CNS | Central nervous system |
| IURF or IUR | Inhalation unit risk factor |
| LOAEL | Lowest observed adverse effect level |
| LOEL | Lowest observed effect level |
| MRL | Minimal risk level (ATSDR) |
| NOAEL | No observed adverse effect level |
| NOEL | No observed effect level |
| RfC | Reference concentration |
| RfD | Reference dose |
| p-RfD | Provisional RfD |

| | |
|------|--------------------|
| aRfD | Acute RfD |
| UF | Uncertainty factor |
| WOE | Weight of evidence |

Section (C) Chemical-specific Absorption Factors

| | |
|--------------|---|
| MDEQ | Michigan Department of Environmental Quality |
| USEPA RAGS-E | United States Environmental Protection Agency's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). July, 2004. |

Section (D) Rule 57 Water Quality Values and GSI Criteria

| | |
|-----|---|
| GSI | Groundwater-surface water interface |
| NA | A value is not available or not applicable. |
| ID | Insufficient data to derive value |
| NLS | No literature search has been conducted |