

Ground Water Quality Standard for 1-Chloro-1,1-Difluoroethane

October 2015

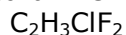
CASRN# 75-68-3

NJDEP

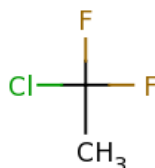
Summary of Decision: In accordance with the New Jersey Ground Water Quality Standards rules at N.J.A.C. 7:9C-1.7, the Department of Environmental Protection (Department) has developed an interim specific ground water quality criterion of 100,000 µg/L and PQL of 500 ppb µg/L (ppb) for 1-chloro-1,1-difluoroethane. The basis for this criterion and PQL are discussed below. Pursuant to N.J.A.C. 7:9C-1.9(c), **the applicable constituent standard is 100,000 µg/L.**

1-Chloro-1,1-Difluoroethane

Molecular Formula:



Molecular Structure:



Background: 1-Chloro-1,1-difluoroethane is used primarily as a refrigerant.

Reference Dose:

The NOAEL (no observed adverse effect level) of 20,000 ppm from the subchronic rat inhalation study (Seckar et al., 1986) is selected as the basis for the Reference Dose. The inhalation NOAEL can be converted to an oral NOAEL by multiplying by the default daily inhalation volume, 20 m³/day and body weight, 70 kg, and adjusting for the fact that exposure occurred for 5 of 7 days per week, 6 of 24 hours per day, as follows:

$$20,000 \text{ ppm} = 82,620 \text{ mg/m}^3$$

$$\frac{82,620 \text{ mg/m}^3 \times 20 \text{ m}^3/\text{day} \times 6 \text{ hrs}/24 \text{ hrs} \times 5/7 \text{ days per week}}{70 \text{ kg}} = 4215 \text{ mg/kg/day}$$

The total uncertainty factor is 300.

$$\text{RfD} = 4215 \text{ mg/kg/day}/300 = 14 \text{ mg/kg/day.}$$

Therefore, the Reference Dose used as the basis of the ground water quality criterion for 1-chloro-1,1-difluoroethane is 14 mg/kg/day.

Derivation of Ground Water Quality Criterion: The ground water quality criterion was derived pursuant to the formula established at N.J.A.C. 7:9C-1.7(c)4, using 14 mg/kg/day as the Reference Dose (as explained above), and standard default assumptions:

$$\frac{14\text{mg/kg/day} \times 70 \text{ kg} \times 0.2}{2 \text{ L/day}} = 100,000 \text{ } \mu\text{g/L}$$

Where:

14 mg/kg/day = the derived RfD
70 kg = the assumed weight of an adult human
0.2 = the assumed relative source contribution
2 L/day = the assumed daily volume of water consumed.

Derivation of PQL: The method detection limit (MDL) and the practical quantitation level (PQL) are performance measures used to estimate the limits of performance of analytical chemistry methods for measuring contaminants. The MDL is defined as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero" (40 CFR Part 136 Appendix B). USEPA recommends that the MDL be multiplied by a factor of five or 10 to account for the variability and uncertainty that can occur at the MDL. The Department uses a value of five as the median upper boundary of the inter-laboratory MDL distribution from the New Jersey certified laboratory community and multiplies the MDL by five to derive the PQL. Establishing the PQL at a level that is five times the MDL provides a reliable quantitation level that most laboratories can be expected to meet during day-to-day operations.

1-Chloro-1,1-difluoroethane appears as a listed parameter in [National Environmental Methods Index \(NEMI\)](#). The limit of detection in the method is specified as 100 ppb. As explained above, a more conservative detection limit is established using a multiplier of five. $100 \text{ ppb} \times 5 = 500 \text{ ppb}$. Therefore, the Department has established a PQL of 500 ppb for 1-chloro-1,1-difluoroethane.

Conclusion: Based on the information provided above (and cited below), the Department has established an interim specific ground water quality criterion of 100,000 $\mu\text{g/L}$ and a PQL of 500 $\mu\text{g/L}$ (ppb) for 1-chloro-1,1-difluoroethane. *Since the ground water quality criterion is higher than the PQL for this constituent, pursuant to N.J.A.C. 7:9C-1.9(c), the applicable constituent standard for 1-chloro-1,1-difluoroethane is 100,000 $\mu\text{g/L}$.*

Technical Support Documents: *Interim Specific Ground Water Quality Criterion Recommendation Report for 1-Chloro-1,1-Difluoroethane*, Gloria Post, Ph.D., D.A.B.T., NJDEP, April 26, 2012; *Procedure for Describing Process for Development of Analytical Practical Quantitation Levels (PQLs) for 1-Chloro-1,1-Difluoroethane*, R. Lee Lippincott, Ph.D., NJDEP, May 1, 2014.

References:

Seckar, J.A., H.J. Trochimowicz, G.K. Hogan. 1986. Toxicological evaluation of hydrochlorofluorocarbon 142b. *Fund. Chem. Toxicol.* 24(3): 237-240.



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