Theoretical Inhaled Dose

To provide information relevant for route-to-route extrapolation, to allow for comparison between two dichlorobenzene isomers, and to normalize data for comparison of internal dose between species, a theoretical inhaled mg/kg/day dose was calculated for each species and exposure group. Information relevant to the calculations are provided below, with the calculated theoretical inhaled doses shown in Table 1.

- Estimates of minute volume (Mv) were based on EPA's *Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry*[1] as well as *Recommendations for and Documentation of Biological Values for Use in Risk Assessment*.[2]
- Study day 0 body weights (BW) were used in the calculations due to the short duration of the study and minimal effects on body weight.
- Target exposure concentrations, rather than actual exposure concentrations, were used for the calculations due to the high degree of congruency.

The inhaled dose over a 6-hour exposure period was calculated as:

$$\text{Dose (mg/kg/day)} = C\ [(\text{mg/m}^3)/1{,}000)] \times \text{Mv (L/min)} \times 360\ \text{min/day exposure} \div \text{BW (kg)}$$

where

$$C\ (\text{mg/m}^3) = 0.0409 \times C\ (\text{ppm}) \times \text{molecular weight of test article}$$

Mv (L/min) is estimated as $\text{LnMv} = b0 + b1 \times \text{Ln(BW)}$ where b0 and b1 are −0.578 and 0.821 for rats and 0.326 and 1.050 for mice, respectively.[1,2]

Table 1. Theoretical Inhaled Daily Dose (mg/kg/day) of 1,4-Dichlorobenzene Following Six-hour Whole-Body Inhalation Exposure

	0 ppm	1 ppm	10 ppm	50 ppm	150 ppm	400 ppm	800 ppm
Rat	0	1.64	16.36	81.58	245.18	653.76	1,305.97
Mouse	0	2.46	24.58	122.86	368.16	982.02	NA

Within each exposure group and species, calculations were performed for the core and internal concentration assessment animals separately, using group mean body weight data. The data presented here and used for internal dose assessment normalization (mg/kg/day) are a mean of the values calculated by the core and internal concentration assessment animals.
NA = not applicable.

[1] U.S. Environmental Protection Agency (USEPA). Methods for derivation of inhalation reference concentrations and application of inhalation dosimetry. Washington, DC: U.S. Environmental Protection Agency, Office of Research and Development; 1994. EPA Report No. EPA/600/8-90/066F. [Accessed: October 21, 2025]. https://www.epa.gov/risk/methods-derivation-inhalation-reference-concentrations-and-application-inhalation-dosimetry

[2] U.S. Environmental Protection Agency (USEPA). Recommendations for and documentation of biological values for use in risk assessment. Cincinnati, OH: U.S. Environmental Protection Agency, Office of Research and Development; 1988. EPA Report No. EPA/600/6-87/008. [Accessed: October 6, 2025]. https://assessments.epa.gov/risk/document/&deid%3D34855