

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File for 2,6-dichlorophenol (CAS # 87-65-0)

FROM: Doreen Lehner, Toxics Unit, Air Quality Division

SUBJECT: Screening Level for 2,6-dichlorophenol (CAS # 87-65-0)

DATE: January 13, 2015

The initial threshold screening level (ITSL) for 2,6-dichlorophenol is 3.8 µg/m³ based on an annual averaging time.

2,6-Dichlorophenol is also known as 2,6-DCP and dichloro-2,6-phenol is a white or light purple crystal with a pungent odor. The odor threshold concentration is 0.003 mg/L. 2,6-DCP easily sublimates having a melting point of 68.5°C and a molecular weight of 163.0 g/mol. It is insoluble in water. 2,6-DCP is found in nature as a sex pheromone in the lone star tick (*Amblyomma americanum*), an attractant in the immature stages of the American dog tick (*Dermacentor variabilis*), and in the acorn worm (*Balanoglossus biminensis*). In industry, 2,6-DCP is used: as a solvent; as a chemical intermediate for the synthesis of 2,4,6-trichlorophenol; and for the manufacture of plant protection agents, preservatives, deodorants, and disinfectants.

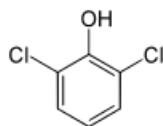


Figure 1. Structure of 2,6-dichlorophenol.

A literature review was conducted to determine an initial threshold screening level (ITSL) for 2,6-dichlorophenol. The following references and databases were searched to derive the above screening level: Chemical Criteria Database (CCD), United States Environmental Protection Agency (USEPA) Integrated Risk Information System (IRIS), National Institute for Occupational Safety and Health (NIOSH), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values and Biological Exposure Indices (TLV/BEI) 2012 Guide, National Toxicology Program (NTP) Study Database, International Agency for Research on Cancer (IARC), Chemical Abstract Service (CAS) Online (searched 7/29/14), National Library of Medicine (NLM)-online, EPA Aggregated Computational Toxicology Resource (ACToR) Database, and EPA Toxic Substance Control Act Test Submission Database (TSCATS).

The literature review did not reveal any occupational exposure limits or repeated-dose human or animal studies suitable for ITSL derivation. The ITSL is based on a study by Borzellec et al., (1985) of an oral mouse LD₅₀ of 2,120 mg/kg 2,6-DCP. Rule 232(1)(h) can be used to calculate an ITSL using the following equation:

$$ITSL = \frac{1}{500} \times \frac{1}{40} \times \frac{1}{100} \times \frac{LD_{50} \left(\frac{mg}{kg} \right) \times W_A}{0.167 \times I_A}$$

Where:

W_A = the body weight of a mouse in kg.

I_A = the daily inhalation rate of a mouse in m^3/day .

The weight of a non-gender, non-species mouse is 0.030 kg (MDEQ, 1996). The daily inhalation rate of a non-gender, non-species mouse is determined using the equation below from EPA (1988):

$$I_A = 1.99 W^{1.0496} = 1.99 \times 0.030^{1.0496} = 0.050169474 \text{ m}^3/day$$

The values for I_A , W_A , and the LD_{50} are entered into the ITSL equation above:

$$\begin{aligned} ITSL &= \frac{1}{500} \times \frac{1}{40} \times \frac{1}{100} \times \frac{2,120 \text{ mg/kg} \times 0.030 \text{ kg}}{0.167 \times 0.050169474 \text{ m}^3/day} = 0.003795518 \text{ mg/m}^3 \\ &= 3.795518 \text{ } \mu\text{g/m}^3 \end{aligned}$$

Based on Rule 232(2)(c) the averaging time is annual. Based on the above data, the ITSL for 2,6-dichlorophenol is $3.8 \mu\text{g/m}^3$ based on an annual averaging time.

References:

Act 451 of 1994, Natural Resources and Environmental Protection Act and Air Pollution Control Rules, MDEQ.

Borzellec JF, Hayes JR, Condie LW, Egle JL, Jr. 1985. Acute toxicity of monochlorophenols, dichlorophenols and pentachlorophenol in the mouse. Toxicology Letters 29(1):39-42.

USEPA. 1988. Recommendation for and documentation of biological values for use in risk assessment. PB 88-179874.

MDEQ. 1996. Default animal biological values, revised Jan 27, 1993 memo. Interoffice communication based on MDNR. October 1991. Default biological values for use in risk assessment, hazard assessment and dose conversion. With revised Tables 2 and A-2 of April 1996.

DL:lh