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Chemical Name: 1,3,5-Trichlorobenzene

CAS: 108-70-3

Synonyms: sym-Trichlorobenzene

The database for 1,3,5-trichlorobenzene (TCB) consists of 2 oral studies (1 short-term oral studies and 1 subchronic). The currently available data for 1,3,5-TCB are insufficient to develop chemical specific health-based guidance for groundwater. The following recommendation represents Risk Assessment Advice.

Health Based Values (HBVs) are available for a related trichlorobenzene (1,2,4-TCB). 1,2,4-TCB and 1,3,5-TCB appear to have similar metabolites and likely share similar metabolic pathways. A comparison of the available toxicity data for 1,2,4-TCB and 1,3,5-TCB suggests similar toxicity and there is no indication that 1,3,5-TCB is more potent than 1,2,4-TCB. EPA IRIS, EPA NCEA, and California OEHHA have all developed oral RfDs or water guidance for 1,2,4-TCB but not for 1,3,5-TCB, likely due to limited information for 1,3,5-TCB. The Minnesota Department of Health (MDH) recommends the use of the HBVs for 1,2,4-TCB to evaluate the potential health risks associated with exposure to 1,3,5-TCB.

The HBV values for 1,2,4-TCB are:

- Acute - Not Derived;
- Short-term – 100 ug/L, Additivity endpoints: Hepatic (liver) system; Adrenal (E); Hematological (blood) system;
- Subchronic – 100* ug/L, Additivity endpoints: Hepatic (liver) system; Adrenal (E); Hematological (blood) system;
- Chronic - 100 µg/L, Additivity endpoints: Hepatic (liver) system; Adrenal (E); Renal (kidney) system; and
- Cancer = 4 ug/L.

* Set at short-term value

For additional information on the derivation of HBVs for 1,2,4-TCB and relevant Additivity Endpoints see: [1,2,4-TCB Chemical Summary Sheet](https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/124tcb.pdf).(https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/124tcb.pdf)

Volatile: Yes (highly volatile)

Summary of Guidance Value History:

The acute, short-term, subchronic, and chronic noncancer HBVs and cancer HBV for 1,2,4-TCB are new values; no 1993/94 non-cancer or cancer HRL values were promulgated for 1,2,4-trichlorobenzene or 1,3,5-trichlorobenzene. Short-term, Subchronic and Chronic non-cancer HBVs of 200, 200, and 100 ug/L and a Cancer HBV of 4 ug/L were derived in 2011 for 1,2,4-trichlorobenzene. MDH reevaluated the non-cancer HBVs for 1,2,4-trichlorobenzene in 2012 to incorporate HED methodology. The resulting Short-term and Subchronic HBVs (100 ug/L) are 2-fold lower than the values derived in 2011 and the Chronic HBV (100 ug/L) is unchanged.

Summary of toxicity testing for health effects identified in the Health Standards Statute:

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity
Tested?	Yes	No	Yes	Yes	No ⁴
Effects?	Yes ¹	-	Yes ²	Yes ³	-

Note: Even if testing for a specific health effect was not conducted for this chemical, information about that effect might be available from studies conducted for other purposes. Most chemicals have been subject to multiple studies in which researchers identify a dose where no effects were observed, and the lowest dose that caused one or more effects. A toxicity value based on the effect observed at the lowest dose across all available studies is considered protective of all other effects that occur at higher doses.

Comments on extent of testing or effects:

¹ 1,3,5-TCB: Histopathological changes in the thyroid - decreased follicular size, increased epithelial height from flattened cuboidal cells to columnar shape, and reduced colloid density - were listed as secondary effects for the subchronic and chronic duration and were observed at 82 mg/kg-day in males and 101 mg/kg-day in females.

For additional information see: [1,2,4-TCB Chemical Summary Sheet](#).

² 1,3,5-TCB: Authors reported observing lesions seen in the eye lenses of offspring following oral exposure to 1,3,5-trichlorobenzene at 150 and 300 mg/kg-day but did not report the incidence of the lesions and therefore these effects were not identified as co-critical effects. This effect is considered a concern, however, the level at which these effects were observed are 2-fold higher than the short-term point of departure (17-fold higher than the subchronic and chronic). At 300 mg/kg-day (4-fold higher than the point of departure for 1,2,4-TCB), offspring also had increased liver weight and 1 fetus had micrognathia (undersized jaw which impacts feeding).

For additional information see: [1,2,4-TCB Chemical Summary Sheet](#).

³ 1,3,5-TCB: There was an increased number of resorptions seen in rats at 300 mg/kg-day, which is 4-fold higher than the 1,2,4-TCB short-term POD.

For additional information see: [1,2,4-TCB Chemical Summary Sheet](#).

⁴ No information for 1,3,5-TCB.

For additional information see: [1,2,4-TCB Chemical Summary Sheet](#).

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