Minnesota Department of Health

Health Based Guidance for Water
Health Risk Assessment Unit, Environmental Health Division
651-201-4899

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Toxicological Summary for: Chloroethane

CAS**: 75-00-3**

Synonyms: Ethyl chloride, monochloroethane, chlorine, muriatic ether

In 2009 and 2015, MDH conducted a review of the available toxicity data for chloroethane. Studies evaluating the toxicity of chloroethane following oral exposure are not available. A limited number of inhalation toxicity studies exist. MDH staff considered the use of route-to-route extrapolation to generate oral health-based guidance from the inhalation study data. Route-to-route extrapolation requires an understanding of pharmacokinetics (i.e., the absorption, distribution, metabolism, and excretion) of the chemical following oral and inhalation exposure. The available pharmacokinetic data are not sufficient and therefore oral guidance values could not be developed.

Because chloroethane is highly volatile, there is a potential for inhalation exposure through domestic or commercial use of contaminated tap water. The US Environmental Protection Agency (EPA) and MDH have relevant health-based inhalation guidance values for chloroethane. If water containing chloroethane is being used for drinking, washing, or showering, contact MDH for consultation on risks and risk management. Email MDH at health.risk@state.mn.us or call the Health Risk Assessment Unit at 651-201- 4899.

Acute Non-Cancer Risk Assessment Advice ($nRAA_{Acute}$) = Not Derived (Insufficient Data)

Short-term Non-Cancer Risk Assessment Advice ($nRAA_{Short\text{-}term}$) = Not Derived (Insufficient Data)

Subchronic Non-Cancer Risk Assessment Advice ($nRAA_{Subchronic}$) = Not Derived (Insufficient Data)

Chronic Non-Cancer Risk Assessment Advice ($nRAA_{Chronic}$) = Not Derived (Insufficient Data)

Cancer Health Based Value (cRAA) = Not Derived

Cancer classification:	Not Classified
Slope factor (SF):	Not Applicable
Source of cancer slope factor (SF):	Not Applicable
Tumor site(s):	Not Applicable

Volatile: Yes (high)

Summary of Guidance Value History:

A noncancer Chronic HBV of 300 µg/L was derived in 2000 using route-to-route extrapolation methods. In 2009, the 2000 HBV was withdrawn and replaced with an RAA of “Not Derived”,

due to the previously used route-to-route extrapolation methods being deemed inadequate and a lack of new toxicity data. In 2016, MDH evaluated the available toxicity data, which resulted in no changes.

Summary of toxicity testing for health effects identified in the Health Standards Statute (144.0751):

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. MDH has considered the following information in developing health protective guidance.

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity
Tested for specific effect?	Yes	Yes	Yes	Yes	Yes
Effects observed?	Yes[1]	No[2]	Yes[3]	Yes[4]	Yes[5]

Comments on extent of testing or effects:

[1] Endocrine effects were only tested in inhalation studies. In short-term (14-21 day) studies in mice, effects included a significant increase in the duration of the estrous cycle with concomitant hormone treatment-related changes in serum estradiol and progesterone that were not consistent across studies. Investigators did not think the increased duration of the estrous cycle was treatment related. However, direct exposure-related effects on the neuroendocrine function could not be ruled out.

[2] Immunotoxicity was only tested in inhalation studies. A number of inhalation studies did not show immunotoxicological results. However, while investigators examined the neurotoxicity of chloroethane in rats and humans, they observed reduced leukocytic phagocytes in rats and reduced phagocytic activity in humans. These studies did not provide sufficient details or provide validated results.

[3] Developmental effects were only tested in inhalation studies. Effects were observed in a 1-generation inhalation mouse study – delayed ossification in the skull accompanied by a non-significant increase in cervical ribs.

[4] Reproductive effects were only tested in inhalation studies. Following inhalation of 35,000 ppm, absolute and relative uterine weights were decreased in mice by approximately 35% and in a subsequent study, significant decreases in uterine glutathione levels were observed in rats and mice. See footnote one for endocrine effects that may affect the reproductive system.

[5] Neurotoxicity was only tested in inhalation studies. A wide range of effects have been reported in humans and laboratory animals at a wide range of inhalation doses. In humans it can induce anesthesia at higher doses, and at lower doses dizziness, decreased coordination and reaction times, and a feeling of intoxication. Hyperactivity has been reported in mice as well as in 1 dog out of 2 that were evaluated.

Resources Consulted During Review:

ATSDR (Agency for Toxic Substances and Disease Registry). 1998. Toxicological Profile for Chloroethane (update). Division of Toxicology/Toxicology Information Branch.

http://www.atsdr.cdc.gov/toxprofiles/tp105.html

ATSDR (Agency for Toxic Substances and Disease Registry). Minimal Risk Levels. http://www.atsdr.cdc.gov/mrls.html

California Environmental Protection Agency, OEHHA Toxicity Criteria Database. http://www.oehha.ca.gov/risk/ChemicalDB/index.asp and http://www.oehha.ca.gov/risk/pdf/cancerpotalpha81005.pdf

California Environmental Protection Agency. 2001. No significant risk level (NSRL) for the proposition 65 carcinogen, chloroethane. Office of Environmental Health Hazard Assessment (OEHHA). http://www.oehha.org/prop65/law/pdf_zip/chloroethaneNSRL.pdf

California Water Resources Control Board http://www.waterboards.ca.gov/water_issues/programs/water_quality_goals/

EPA. 1999. Toxicological Review of Chloroethane (CAS No. 75-00-3). U.S Environmental Protection Agency.

EPA. 2007. Provisional Peer Reviewed Toxicity Values for Chloroethane (CASRN 75-00-3). National Center for Environmental Assessment (NCEA).

Environmental Protection Agency (EPA). ACToR: Aggregated Computational Toxicology Resource (http://actor.epa.gov/)

EPA Health Effects Assessment Summary Tables (HEAST). July 1997.

EPA Integrated Risk Information System (IRIS) http://www.epa.gov/iris/subst/index.html

EPA National Center for Environmental Assessment http://cfpub.epa.gov/ncea/cfm/archive_whatsnew.cfm

EPA Office of Drinking Water http://www.epa.gov/waterscience/criteria/drinking/dwstandards.pdf

EPA Office of Pesticide Programs http://www.epa.gov/pesticides/reregistration/status.htm

EPA Toxicity and Exposure Assessment for Children's Health (TEACH) http://www.epa.gov/teach/

EPA Voluntary Children's Chemical Evaluation Program (VCCEP) http://www.epa.gov/oppt/vccep/pubs/chemmain.htm

European Union Pesticides Database http://ec.europa.eu/food/plant/protection/evaluation/database_act_subs_en.htm

Health Canada Existing Substances - Priority Substances Assessment Program and Screening Assessment Reports: http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/index-eng.php#existsub

International Agency for Research on Cancer (IARC). Agents Reviewed by the IARC http://monographs.iarc.fr/ENG/Classification/index.php

International Programme on Chemical Safety http://www.who.int/ipcs/assessment/en/

International Toxicity Estimates for Risk (ITER) http://iter.ctcnet.net/publicurl/pub_search_list.cfm

National Toxicology Program http://ntp-server.niehs.nih.gov/

Oak Ridge National Laboratory. Screening Levels for Chemical Contaminants. http://epa-prgs.ornl.gov/chemicals/download.shtml

Syracuse Research PhysProp Database. http://www.syrres.com/esc/physdemo.htm

TOXNET search http://toxnet.nlm.nih.gov/

U.S. Geological Survey http://infotrek.er.usgs.gov/traverse/f?p=HBSL:HOME:0

WHO Recommended Classification of Pesticides by Hazard. 2004. http://www.who.int/ipcs/publications/pesticides_hazard_rev_3.pdf

World Health Organization: http://www.who.int/water_sanitation_health/dwq/gdwq3rev/en/index.html (search Chapter 8 Chemical Aspects and Chapter 12 Chemical Fact Sheets for chemical name)