

2-Chlorobutane; CASRN 78-86-4

Human health assessment information on a chemical substance is included in the IRIS database only after a comprehensive review of toxicity data, as outlined in the [IRIS assessment development process](#). Sections I (Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the conclusions that were reached during the assessment development process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the [guidance documents located on the IRIS website](#).

STATUS OF DATA FOR 2-Chlorobutane

File First On-Line 04/01/1990

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	not evaluated	
Inhalation RfC (I.B.)	not evaluated	
Carcinogenicity Assessment (II.)	yes	04/01/1990*

*A comprehensive review of toxicological studies was completed (05/27/05) - please see section II.D.2. for more information.

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name — 2-Chlorobutane
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Not available at this time.

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name — 2-Chlorobutane
CASRN — 78-86-4

Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — 2-Chlorobutane
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Last Revised — 04/01/1990

Section II provides information on three aspects of the carcinogenic assessment for the substance in question; the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and from inhalation exposure. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per ug/L drinking water or risk per ug/cu.m air breathed. The third form in which risk is presented is a drinking water or air concentration providing cancer risks of 1 in 10,000, 1 in 100,000 or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in The Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) and in the IRIS Background Document. IRIS summaries developed since the publication of EPA's more recent Proposed Guidelines for Carcinogen Risk Assessment also utilize those Guidelines where indicated (Federal Register 61(79):17960-18011, April 23, 1996). Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

II.A. Evidence for Human Carcinogenicity

II.A.1. Weight-of-Evidence Characterization

Classification — D; not classifiable as to human carcinogenicity

Basis — Based on no human carcinogenicity data and inadequate animal data.

II.A.2. Human Carcinogenicity Data

None.

II.A.3. Animal Carcinogenicity Data

Inadequate. In a study designed to look only for lung tumors after short-term, high exposure, Poirier et al. (1975) gave groups of 10 male and 10 female strain A/Heston mice a total of 13 intraperitoneal injections (3 injections/ week) of 7, 17.5, or 35 mmol/kg (648, 1620, or 3240 mg/kg) 2-chlorobutane in tricaprylin. Untreated and tricaprylin-treated mice were used as negative controls, and urethane-treated mice were used as positive controls. Survival of animals in the low-, mid-, and high-dose groups was 75, 75, and 50%, respectively. In the untreated and vehicle controls and urethane-treated group, survival was >90%. Remaining animals were sacrificed 24 weeks after the first injection. 2-Chlorobutane induced a dose-related increase in the average number of lung tumors per mouse that was statistically significantly elevated at the 35 mmol/kg (3240 mg/kg) dose level and in the urethane-treated positive control group relative to untreated and vehicle controls. This type of study is generally regarded as a short-term in vivo screening bioassay.

II.A.4. Supporting Data for Carcinogenicity

Simmon (1981) reported that when the cells were exposed to vapors in a desiccator, 2-chlorobutane (4 uL/desiccator) was mutagenic in *Salmonella typhimurium* strain TA100 in the absence of hepatic homogenates; control data were not provided, however.

II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure

None

II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure

None.

II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)

II.D.1. EPA Documentation

Source Document — U.S. EPA, 1988

The 1988 Health and Environmental Effects Document for Monochlorobutanes has received Agency Review.

II.D.2. EPA Review (Carcinogenicity Assessment)

Agency Work Group Review — 09/07/1989

Verification Date — 09/07/1989

A comprehensive review of toxicological studies published through May 2005 was conducted. No new health effects data were identified that would be directly useful in the revision of the existing carcinogenicity assessment for 2-Chlorobutane and a change in the assessment is not warranted at this time. For more information, IRIS users may contact the IRIS Hotline at hotline.iris@epa.gov or (202)566-1676.

II.D.3. EPA Contacts (Carcinogenicity Assessment)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name — 2-Chlorobutane

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VI.A. Oral RfD References

None

VI.B. Inhalation RfD References

None

VI.C. Carcinogenicity Assessment References

Poirier, L.A., G.D. Stoner and M.B. Shimkin. 1975. Bioassay of alkyl halides and nucleotide base analogs by pulmonary tumor response in strain A mice. *Cancer Res.* 35(6): 1411-1415.

Simmon, V.F. 1981. Applications of the Salmonella/microsome assay. In: *Short-term Tests Chemical Carcinogens*, H. Stich and R. San, Ed. Springer-Verlag, New York. p. 120-126.

U.S. EPA. 1988. Health and Environmental Effects Document for Monochlorobutanes. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Solid Waste and Emergency Response, Washington, DC.

VII. Revision History

Substance Name — 2-Chlorobutane
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Date	Section	Description
04/01/1990	II.	Carcinogen assessment on-line
12/03/2002	II.D.2.	Screening-Level Literature Review Findings message has been added.
06/22/2005	II.D.2.	Screening-Level Literature Review Findings message has been removed and replaced by comprehensive literature review conclusions.

VIII. Synonyms

Substance Name — 2-Chlorobutane
CASRN — 78-86-4
Last Revised — 04/01/1990

- 78-86-4
- Butane, 2-chloro-
- sec-Butyl chloride
- 2-CHLOROBUTANE