

1,4-Dibromobenzene; CASRN 106-37-6

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 1,4-Dibromobenzene

File First On-Line 03/31/1987

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	03/31/1987*
Inhalation RfC (I.B.)	not evaluated	
Carcinogenicity Assessment (II.)	not evaluated	

*A comprehensive review of toxicological studies was completed (2004) - please see section I.A.6 for more information.

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

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

Substance Name — 1,4-Dibromobenzene

CASRN — 106-37-6

Last Revised — 03/31/1987

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk

of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses	UF	MF	RfD
Liver/body weight ratio and hepatic microsomal enzyme induction	NOAEL: 10 mg/kg/day LOAEL: 20 mg/kg/day	1000	1	1E-2 mg/kg/day
Rat Subchronic Oral Study				
Carlson and Tardiff, 1977				

Conversion Factors: none

I.A.2. Principal and Supporting Studies (Oral RfD)

Carlson, G.P. and R.G. Tardiff. 1977. Effect of 1,4-dibromobenzene and 1,2,4-tribromobenzene on xenobiotic metabolism. *Toxicol. Appl. Pharmacol.* 42: 189-196.

1,4-Dibromobenzene (DBB) was administered to adult male Sprague-Dawley rats p.o. in corn oil. Groups of six rats were given 0, 5, 10, or 20 mg DBB/kg for 45 or 90 days. Rats were sacrificed 24 hours or 30 days after the last dose. No overt signs of toxicity were observed. The parameters measured were body weight gain, liver-to-body weight ratio, liver histopathology and hepatic microsomal enzyme activity. No gross or microscopic hepatic lesions were found. Liver-to-body weight ratio and liver enzyme activity were both significantly increased at 20 mg/kg after 45 and 90 days. Both parameters were normal in the animals sacrificed 30 days later. A statistically significant increase in the activity of 1 of 6 microsomal enzymes was found at 10 mg/kg/day, but was not accompanied by an increase in liver-to-body weight ratio.

Increases in both liver-to-body weight ratio and hepatic microsomal enzyme activity are appropriately considered as adverse effects, since high-dose acute effects of DBB include liver damage, probably due to the formation of a toxic metabolite. The formation of this metabolite is enhanced by induction of liver enzymes.

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF — An uncertainty factor of 10, in addition to the usual 100 that accounts for inter- and intraspecies differences, is necessary to allow for the uncertainty in subchronic-to-chronic dose extrapolation.

MF — None

I.A.4. Additional Studies/Comments (Oral RfD)

None.

I.A.5. Confidence in the Oral RfD

Study — Medium

Database — Low

RfD — Low

The study is well-designed and clearly reported, but of short duration with a limited number of animals. The desired range of toxicity parameters is missing, since the study was designed primarily to investigate liver enzyme induction. Medium confidence is assigned. Additional studies pertaining to subchronic or chronic toxicity were not found. However, a great deal of information is available on the metabolism and mechanism of toxicity of brominated benzenes which qualitatively supports this risk assessment. Thus, the database rates low confidence. Low confidence in the RfD follows.

I.A.6. EPA Documentation and Review of the Oral RfD

Source Document — U.S. EPA, 1984

The Health and Environmental Effects Profile for Bromobenzenes received an Agency Review with the help of two outside scientists.

Other EPA Documentation — None

Agency Work Group Review — 10/09/1985, 05/15/1986

Verification Date — 05/15/1986

A comprehensive review of toxicological studies published prior to 2004 was conducted. No new health effects data were identified that would be directly useful in the revision of the existing RfD for 1,4-Dibromobenzene and a change in the RfD is not warranted at this time.

I.A.7. EPA Contacts (Oral RfD)

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).

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

Substance Name — 1,4-Dibromobenzene

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Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — 1,4-Dibromobenzene

CASRN — 106-37-6

This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name — 1,4-Dibromobenzene

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VI.A. Oral RfD References

Carlson, G.P. and R.G. Tardiff. 1977. Effect of 1,4-dibromobenzene and 1,2,4-tribromobenzene on xenobiotic metabolism. *Toxicol. Appl. Pharmacol.* 42: 189-196.

U.S. EPA. 1984. Health and Environmental Effects Profile for Bromobenzenes. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Solid Waste, Washington, DC.

VI.B. Inhalation RfC References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — 1,4-Dibromobenzene

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Date	Section	Description
10/28/2003	I.A.6.	Screening-Level Literature Review Findings message has been added.
09/29/2004	I.A.6.	Screening-Level Literature Review Findings message has been removed and replaced by comprehensive literature review conclusions.

VIII. Synonyms

Substance Name — 1,4-Dibromobenzene

CASRN — 106-37-6

Last Revised — 03/31/1987

- 106-37-6
- BENZENE, 1,4-DIBROMO-
- BENZENE, p-DIBROMO-
- p-BROMOPHENYL BROMIDE
- 1,4-Dibromobenzene
- Dibromobenzene, 1,4-
- p-DIBROMOBENZENE