

## Furmecyclox; CASRN 60568-05-0

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 Furmecyclox

**File First On-Line 09/07/1988**

Category (section)	Assessment Available?	Last Revised
<b>Oral RfD (I.A.)</b>	not evaluated	
<b>Inhalation RfC (I.B.)</b>	not evaluated	
<b>Carcinogenicity Assessment (II.)</b>	yes	09/07/1988

## I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

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

Substance Name — Furmecyclox  
CASRN — 60568-05-0

Not available at this time.

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

Substance Name — Furmecyclox  
CASRN — 60568-05-0

Not available at this time.

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## **II. Carcinogenicity Assessment for Lifetime Exposure**

Substance Name — Furfurecyclohexane

CASRN — 60568-05-0

Last Revised — 09/07/1988

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 — B2; probable human carcinogen.

Basis — Dose-related increased incidence of neoplastic nodules, carcinomas and combined neoplastic nodules/carcinomas in the liver of female rats and increased incidence of liver nodules and carcinomas and urothelial tumors of the bladder in male rats.

#### **II.A.2. Human Carcinogenicity Data**

None

### **II.A.3. Animal Carcinogenicity Data**

Sufficient. Sprague-Dawley rats, strain OF-A from WIGAS, were fed furemecyclox in the diet at 0, 500, 2000 and 10,000 ppm for 2 years (BASF Wyandotte, 1984a). There were 75 rats/sex/dose including 10 rats/sex/group for interim sacrifice and 15 rats/sex/group for blood sampling. At termination, 65 rats/sex/group were examined for liver and bladder tumors. No increased mortality occurred in treated animals. A pronounced increasing dose-response trend for liver tumors (hepatocellular carcinomas alone and combined with nodules), which was significant by Cochran Armitage test, was observed in females. Both sexes showed neoplastic changes (liver tumors) to different degrees. Neoplastic changes in the female livers clearly progressed to malignancy with increasing dosage. Preneoplastic changes were observed in treated animals and were consistent with the observation of neoplastic effects. Males showed significantly increased incidences of urothelial tumors of the bladder in the two highest dose groups relative to concurrent controls.

Charles River CD-1 mice (64 mice/sex/group) were fed furemecyclox in the diet at 0, 500, 1500, or 10,000 ppm for 102 (males) or 104 (females) weeks (BASF Wyandotte, 1984b). There was no effect on mortality in any group. The highest dose produced an acceptable maximum tolerated dose, as evidenced by reduced body weight and food consumption for both sexes. No oncogenic effects were noted.

### **II.A.4. Supporting Data for Carcinogenicity**

Two acceptable genotoxicity assays on furemecyclox are available, an unscheduled DNA synthesis assay in marmoset hepatocytes (BASF Wyandotte, 1984c) and a test for reverse mutation in Salmonella with and without exogenous mammalian metabolizing enzymes (BASF Wyandotte, 1978). Both assays were negative.

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

### **II.B.1. Summary of Risk Estimates**

Oral Slope Factor —  $3.0E-2/\text{mg}/\text{kg}/\text{day}$

Drinking Water Unit Risk —  $8.6E-7/\text{ug}/\text{L}$

Extrapolation Method — Linearized multistage procedure, extra risk

<b>Risk Level</b>	<b>Concentration</b>
<b>E-4 (1 in 10,000)</b>	1E+2 ug/L
<b>E-5 (1 in 100,000)</b>	1E+1 ug/L
<b>E-6 (1 in 1,000,000)</b>	1 ug/L

### II.B.2. Dose-Response Data (Carcinogenicity, Oral Exposure)

Tumor Type — combined liver nodules and carcinomas

Test animals — rat/Sprague-Dawley OF-A, female

Route — diet

Reference — BASF Wyandotte, 1984a

<b>Administered Dose (ppm)</b>	<b>Human Equivalent Dose (mg/kg)/day</b>	<b>Tumor Incidence</b>
<b>0</b>	0	4/45
<b>500</b>	5	10/65
<b>2000</b>	20	25/65
<b>10000</b>	100	62/65

### II.B.3. Additional Comments (Carcinogenicity, Oral Exposure)

Conversion of animal dietary doses to human equivalent doses was based on values in Lehman (1959) using the relationship 20 ppm = 1 mg/kg/day. A body weight of 500 g was assumed for the female rats.

The unit risk should not be used if the water concentration exceeds 1E+4 ug/L, since above this concentration the slope factor may differ from that stated.

#### **II.B.4. Discussion of Confidence (Carcinogenicity, Oral Exposure)**

Adequate numbers of rats were treated and observed for their lifetime. Three non-zero dose levels were used, and the highest dose represented a maximum tolerated dose. Tumor incidence was significantly elevated above concurrent controls at all doses and rose with a significant trend. The incidence of nodules and carcinomas combined was 95% among females in the highest dose group compared with 6.2% in female controls. If urothelial tumors and liver tumors in males are combined, then the slope factor is about one half of that above.

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

Not available.

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

##### **II.D.1. EPA Documentation**

Source Document — U.S. EPA, 1985

The Toxicology Branch Peer Review Committee reviewed data on fume cyclohexane.

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

Agency Work Group Review — 06/24/1987, 08/05/1987

Verification Date — 08/05/1987

Screening-Level Literature Review Findings — A screening-level review conducted by an EPA contractor of the more recent toxicology literature pertinent to the cancer assessment for Fume cyclohexane conducted in September 2002 did not identify any critical new studies. IRIS users who know of important new studies may provide that information to the IRIS Hotline at [hotline.iris@epa.gov](mailto: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](mailto:hotline.iris@epa.gov) (internet address).

**III. [reserved]**

**IV. [reserved]**

**V. [reserved]**

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## **VI. Bibliography**

Substance Name — Furfmecycloz  
CASRN — 60568-05-0

### **VI.A. Oral RfD References**

None

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### **VI.B. Inhalation RfC References**

None

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### **VI.C. Carcinogenicity Assessment References**

BASF Wyandotte Corporation. 1978. Accession No. 245304. Available from EPA. Write to FOI, EPA, Washington DC 20460.

BASF Wyandotte Corporation. 1984a. MRID No. 00142519. Available from EPA. Write to FOI, EPA, Washington DC 20460.

BASF Wyandotte Corporation. 1984b. MRID No. 00137839. Available from EPA. Write to FOI, EPA, Washington DC 20460.

BASF Wyandotte Corporation. 1984c. MRID No. 00142518. Available from EPA. Write to FOI, EPA, Washington DC 20460.

Lehman, A.J. 1959. Appraisal of safety of chemical in food, drugs, and cosmetics. Assoc. Food and Drug Officials of the U.S. p. 1-107.

U.S. EPA. 1985. Memorandum on furmecyclox dated April 11. Toxicology Branch Peer Review Committee, Office of Pesticide Programs, Office of Pesticides and Toxic Substances, Washington, DC.

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## VII. Revision History

Substance Name — Furmecyclox  
CASRN — 60568-05-0

Date	Section	Description
09/07/1988	II.	Carcinogen summary on-line
12/03/2002	II.D.2.	Screening-Level Literature Review Findings message has been added.

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## VIII. Synonyms

Substance Name — Furmecyclox  
CASRN — 60568-05-0  
Last Revised — 09/07/1988

- 60568-05-0
- BAS 389
- CAMPOGRAN
- 3-FURANCARBOXAMIDE, N-CYCLOHEXYL-N-METHOXY-2,5-DIMETHYL-
- Furmecyclox
- FURMETAMIDE
- GUS 215
- N-CYCLOHEXYL-N-METHOXY-2,5-DIMETHYL-3-FURANCARBOXAMIDE
- XYLIGEN B