

# I U C L I D

# D a t a s e t

Existing Chemical	Substance ID: 119-61-9
CAS No.	119-61-9
EINECS Name	benzophenone
EINECS No.	204-337-6
Molecular Weight	182.2
Structural Formula	C6H5COC6H5
Molecular Formula	C13H10O

Dataset created by: EUROPEAN COMMISSION - European Chemicals Bureau

This dossier is a compilation based on data reported by the European Chemicals Industry following 'Council Regulation (EEC) No. 793/93 on the Evaluation and Control of the Risks of Existing Substances'. All (non-confidential) information from the single datasets, submitted in the IUCLID/HEDSET format by individual companies, was integrated to create this document.

The data have not undergone any evaluation by the European Commission.

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**1.0.1 OECD and Company Information**

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**Name:** Haarmann & Reimer GmbH  
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**1.0.2 Location of Production Site**

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**1.0.3 Identity of Recipients**

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**1.1 General Substance Information**

**Substance type:** organic  
**Physical status:** liquid

**Substance type:** organic  
**Physical status:** solid

**1.1.1 Spectra**

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**1.2 Synonyms**

alpha-oxoditane

**Source:** IFF Tilburg

Benzene, benzoyl ; Benzoylbenzene ; Diphenyl Ketone ; Diphenylmethanone ;  
Ketone, diphenyl ; alpha-Oxodiphenylmethane ; alpha-Oxoditane ; Phenyl ketone

**Source:** ELF ATOCHEM UK Ltd WIDNESS

benzophenone

**Source:** IFF Tilburg

BENZOPHENONE

**Source:** PROCHIMICA SPA MORTARA (PV)

Diphenyl ketone

**Source:** Haarmann & Reimer GmbH Holzminden

diphenylketone

**Source:** IFF Tilburg

Methanone, diphenyl-

**Source:** Haarmann & Reimer GmbH Holzminden

**1.3 Impurities**

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**1.4 Additives**

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**1.5 Quantity**

**Quantity** 5 000 - 10 000 tonnes

**1.6.1 Labelling**

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**1.6.2 Classification**

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**1.7 Use Pattern**

**Type:** type  
**Category:** Non dispersive use

**Type:** type  
**Category:** Wide dispersive use

**Type:** industrial  
**Category:** Chemical industry: used in synthesis

**Type:** industrial  
**Category:** Paints, lacquers and varnishes industry

**Type:** industrial  
**Category:** Personal and domestic use

**Type:** industrial  
**Category:**

**Type:** use  
**Category:** Cosmetics

**Type:** use  
**Category:** Intermediates

**Type:** use  
**Category:** Odour agents

**1.7.1 Technology Production/Use**

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**1.8 Occupational Exposure Limit Values**

**Type of limit:** TLV (US)  
**Limit value:** 10 mg/m<sup>3</sup>  
**Country:** USA  
**Remark:** Value for dust  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type of limit:** other: VME  
**Limit value:** 10 mg/m<sup>3</sup>  
**Country:** France  
**Remark:** Value for dust  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 1.9 Source of Exposure

**Remark:** Exposure of the general population due to use in consumer products such as: cosmetics, household and laundry cleaning products or airfreshener systems which are fragranced. Such materials may contain low levels of this substance.

**Source:** IFF Tilburg

**Remark:** Additional information:

Consumer use: 0%  
Occupational or professional use: 100%

An indication of measured exposure levels: no data available, but occupational exposure judged of a low order on an 8 hour TWA basis.

An overview of monitoring data in the environment: approximately 12 tonnes discharged to the water course in 1993 as effluent from production. Point source emissions to air are less than 0.5 tonnes/year.

Other information that will help to focus assessment of exposure:

The relatively low solubility of benzophenone is significant for effluent treatment

The UK Authorities have so far judged benzophenone as a "Class B VOC" within the context of Integrated Pollution Control. Maximum permitted mass emissions from point sources (scrubber stacks) have been set at 0.1kg/hour.

Environmental exposure during production and use:

distribution pattern:  
from production: 15% to air  
70% to water  
15% to soil  
0% to sediment.

Primary exposed environment: river; ground water.

Release pattern: point source and diffuse, intermittent  
Professional occupational exposure during production:

Process description: Friedel-Crafts acylation

Number of sites: one

Number of workers: 20

Frequency and duration of such exposure:  
Intermittent exposure on a daily basis to dust in atmosphere.

Protective measures: gloves, goggles, protective suit, helmet, respiratory protective equipment.

**Source:** Industrial hygiene monitoring: no monitoring programme.  
ELF ATOCHEM UK Ltd WIDNESS

**1.10.1 Recommendations/Precautionary Measures**

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**1.10.2 Emergency Measures**

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**1.11 Packaging**

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**1.12 Possib. of Rendering Subst. Harmless**

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**1.13 Statements Concerning Waste**

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**1.14.1 Water Pollution**

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**1.14.2 Major Accident Hazards**

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**1.14.3 Air Pollution**

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**1.15 Additional Remarks**

**Remark:** Transport information: not regulated.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

**1.16 Last Literature Search**

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**1.17 Reviews**

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**1.18 Listings e.g. Chemical Inventories**

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### 2.1 Melting Point

**Value:** > 47.5 degree C  
**Decomposition:** no  
**Method:** other: no data  
**Year:** 1994  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Value:** = 48.5 degree C  
**Method:** other  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 2.2 Boiling Point

**Value:** = 305 degree C at 1013  
**Method:** other: no data  
**Year:** 1994  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Value:** = 305.4 degree C at 1013 hPa  
**Method:** other  
**GLP:** no data  
**Remark:** Boiling point: 276.8 at 400 mmHg  
249.8 at 200 mmHg  
224.4 at 100 mmHg  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 2.3 Density

**Type:** density  
**Value:** = 1111 kg/m3 at 18 degree C  
**Method:** other: no data  
**Year:** 1994  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

**Type:** density  
**Value:** = 1087 kg/m3 at 50 degree C  
**Method:** other: no data  
**Year:** 1994  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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#### 2.3.1 Granulometry

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### 2.4 Vapour Pressure

**Value:** = .004 hPa at 20 degree C  
**Method:** other (calculated)  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

**Value:** = .04 hPa at 50 degree C  
**Method:** other (calculated)  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

**Value:** = 15 hPa at 70 degree C  
**Method:** other (calculated)  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Value:** ca. 1.33 hPa at 108.2 degree C  
**Method:** other (measured)  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 2.5 Partition Coefficient

**log Pow:** = 3.18  
**Method:** other (calculated)  
**Year:**  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**log Pow:** = 3.58  
**Method:**  
**Year:**  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 2.6.1 Water Solubility

**Value:** = 43 mg/l at 20 degree C  
**Qualitative:** not soluble  
**Method:** other  
**Year:** 1994  
**GLP:** no data  
**Remark:** pH not applicable.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 2.6.2 Surface Tension

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**2.7 Flash Point**

**Value:** = 143 degree C  
**Type:**  
**Method:** other  
**Year:** 1994  
**GLP:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**2.8 Auto Flammability**

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**2.9 Flammability**

**Result:** non flammable  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**2.10 Explosive Properties**

**Result:** other: during product manipulation, dust can form explosive mixture with air.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**2.11 Oxidizing Properties**

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**2.12 Additional Remarks**

**Remark:** Henry's law constant estimated to be  $1.9E-6$  atm-m<sup>3</sup>/mole at 25°C.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Remark:** Heat of vaporization: 18.191 J/mol  
Surface Tension: 45.1 dyne/cm at 20°C  
Refractive index (45°C): 1.5975  
Solubility in solvents: soluble in most organic solvents (benzene, acetone, chloroform, ethanol, diethyl ether)

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Remark:** Relative density/air: 6.3  
Thermal decomposition giving toxics products.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 3.1.1 Photodegradation

Type: air  
INDIRECT PHOTOLYSIS  
Sensitizer: OH  
Conc. of sens.: 500000 molecule/cm<sup>3</sup>  
Rate constant: = .000000000000299 cm<sup>3</sup>/(molecule \* sec)  
Degradation: = 50 % after 5.4 day  
Method: other (calculated)  
Year: GLP:  
Test substance:  
Source: ELF ATOCHEM UK Ltd WIDNESS

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Type: water  
Method:  
Year: GLP:  
Test substance:  
Result: The aquatic oxidation rate for benzophenone has been experimentally determined to be 8.8E9 l/mol-s. Based on this rate and a hydroxyl radical concentration of 1E-17 mol/l in water, under continuous sunlight, the halflife for the aquatic oxidation of benzophenone can be estimated to be 91 days (ref 1).

The photolysis halflife in water was determined to be greater than 100 days at a concentration of 2.8E-5 mol/l (ref 2).  
Source: ELF ATOCHEM UK Ltd WIDNESS

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### 3.1.2 Stability in Water

Type: abiotic  
Method:  
Year: GLP:  
Test substance:  
Remark: Ketones are generally resistant to hydrolysis.  
Source: ELF ATOCHEM UK Ltd WIDNESS

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### 3.1.3 Stability in Soil

Type: Radiolabel:  
Concentration:  
Cation exch. capac.  
Microbial biomass:  
Method:  
Year: GLP:  
Test substance:  
Source: ELF ATOCHEM UK Ltd WIDNESS

**3.2 Monitoring Data (Environment)****Type of measurement:****Medium:** air**Result:** Benzophenone was qualitatively identified in air samples from a 45-year-old spruce forest in North Rhine-Westfalia (West Germany) on January 11, 1988 at a height of 1 m.**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type of measurement:****Medium:** surface water**Result:** Benzophenone was qualitatively detected in Baltic sea water (ref 1) and water from Hamilton harbour, Bermuda (ref 2).**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type of measurement:****Medium:** drinking water**Result:** Benzophenone was detected by GC-MS at a level of 8.8 ppb in tap water from Kitakyushu municipal institute in Kitakyushu, Japan.**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type of measurement:****Medium:** ground water**Result:** It was identified at a concentration in the range of 10-100 ng/l in a groundwater well near Zagreb in northern Croatia (ref 1).

It was detected at an average concentration of 0.86 µg/l in 2 groundwater wells adjacent to infiltration basins at Ft Devens, MA during November 1978 and April 1981. The basin influent was measured to contain 5.17 µg/l (ref 2).

Benzophenone concentrations in groundwaters from FT. Devens, MA, Boulder, CO, and Phoenix, AZ were measured to be 1.4, 2.13 and 0.05 µg/l, respectively, in wells adjacent to rapid infiltration sites (ref 3).

Benzophenone was detected in groundwaters from Netherlands; the highest concentration reported was 0.03 µg/l (ref 4).

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type of measurement:****Medium:** other: effluents

**Result:** It was identified at a concentration greater than 1000 ng/l in industrial wastewater discharged into the Sava river in Northern Croatia (ref 1).  
Benzophenone was found at a concentration of 1 ppb in effluent from a New jersey facility (ref 2).  
It has been detected in wastewater from the paint and ink industry at a concentration of 367 ng/µl extract, the pharmaceutical industry at 44 ng/µl extract, and the mechanical products industry at 6 ng/µl (ref 3).

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**3.3.1 Transport between Environmental Compartments****Type:** adsorption**Media:** soil - air**Method:****Year:**

**Result:** The desorption coefficient (Kd) was measured to be 2.71 on a red earth soil (silt loam) from Australia containing 1.09% organic matter and with a pH of 7.5. Therefore, the Koc is about 430.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type:** adsorption**Media:** soil - air**Method:** other**Year:****Source:** ELF ATOCHEM UK Ltd WIDNESS**Test condition:** Three subsoils were used.**Type:** adsorption**Media:** soil - air**Method:** other**Year:****Source:** ELF ATOCHEM UK Ltd WIDNESS**Test condition:** Three subsoils were used:

	pH	organic carbon	Cation exch. cap.	sand/silt/clay %
Dormont	4.2	1.2	129	2/38/60
Apison	4.5	0.11	76	4/10/86
fullerton	4.4	0.05	64	11/21/68

Sorption coefficients were obtained by adding varied amounts of soil to solutions containing the test chemical. The mixture was shaken for 24 h in 20 ml glass vials and then centrifuged for 10 min. Aqueous phase concentration was determined by HPLC and compared with control solution containing the initial organic concentration but no soil.

the values of Koc were:

- 580+-100 for Apison
- 530+-130 for Fullerton
- 440+-30 for Dormont

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**Type:** volatility  
**Media:** water - air

**Method:**

**Year:**

**Remark:** The volatilization halflife of benzophenone from a model river 1 m deep, flowing 1 m/sec, with a wind velocity of 3 m/sec can be estimated to be 26 days, based on the Henry's law constant.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 3.3.2 Distribution

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### 3.4 Mode of Degradation in Actual Use

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### 3.5 Biodegradation

**Type:** aerobic  
**Inoculum:** activated sludge  
**Concentration:** 100 mg/l related to Test substance  
**Degradation:** = 0 %  
**Result:** under test conditions no biodegradation observed  
**Method:** OECD Guide-line 301 C "Ready Biodegradability: Modified MITI Test (I)"  
**Year:** 1981 **GLP:**  
**Test substance:**  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 3.6 BOD5, COD or BOD5/COD Ratio

**Result:** 12% BODT over an incubation period of 5 days in an aerobic screening study using sewage inoculum.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 3.7 Bioaccumulation

**Species:** Cyprinus carpio (Fish, fresh water)  
**Exposure period:** 42 day  
**Concentration:** .3 mg/l  
**BCF:** 3.4 - 9.2  
**Elimination:**  
**Method:** OECD Guide-line 305 C "Bioaccumulation: Test for the Degree of Bioconcentration in Fish"  
**Year:** **GLP:** no data  
**Test substance:** no data  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Species:**  
**Exposure period:**  
**Concentration:**  
**BCF:**  
**Elimination:**  
**Method:**  
**Year:** **GLP:**  
**Test substance:**  
**Remark:** Based on an experimental log Kow of 3.18 and two regression derived equations, the BCF range for benzophenone can be estimated to be 70-90.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### 3.8 Additional Remarks

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**AQUATIC ORGANISMS****4.1 Acute/Prolonged Toxicity to Fish**

**Type:** flow through  
**Species:** Pimephales promelas (Fish, fresh water)  
**Exposure period:** 96 hour(s)  
**Unit:** mg/l **Analytical monitoring:** yes  
**LC50:** = 15.3  
**Method:** other  
**Year:** **GLP:**  
**Test substance:**  
**Remark:** Other value for this test: 14.3 mg/l  
**Source:** ELF ATOCHEM UK Ltd WIDNESS  
**Test condition:** - Temperature: 25+-1 °C  
 - Hardness: 45.5 mg/l CaCO<sub>3</sub>  
 - Alkalinity: 42.2 mg/l CaCO<sub>3</sub>  
 - pH: 7.5  
 - Dissolved oxygen:> 60% of saturation  
 - Fish: 30 day-old, 0.12 g

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**Type:** flow through  
**Species:** Pimephales promelas (Fish, fresh water)  
**Exposure period:** 96 hour(s)  
**Unit:** mg/l **Analytical monitoring:** yes  
**Method:**  
**Year:** **GLP:**  
**Test substance:**  
**Remark:** Growth of 96h-exposed larvae was reduced at 2.62 mg/l.  
 Survival to 96h was only reduced at the highest benzophenone concentration.  
 Larval RNA and protein content were reduced at 5.15 mg/l while DNA content was reduced at 8.28 mg/l.  
 RNA content was the 96h-measurement most responsive to benzophenone exposure. RNA/DNA and protein/DNA were reduced at 5.15 mg/l and RNA/protein was reduced at 8.28 mg/l.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS  
**Test condition:** Species: fish larvae < 24 h post hatching

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**Type:**  
**Species:** Oryzias latipes (Fish, fresh water)  
**Exposure period:** 48 hour(s)  
**Unit:** mg/l **Analytical monitoring:**  
**LC50:** = 27  
**Method:**  
**Year:** **GLP:**  
**Test substance:**  
**Source:** ELF ATOCHEM UK Ltd WIDNESS  
**Test condition:** Method: in accordance with Japanese Industrial standard (JIS) K 0102-1986-71 titled "Testing methods for industrial wastewater".

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**4.2 Acute Toxicity to Aquatic Invertebrates**

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**4.3 Toxicity to Aquatic Plants e.g. Algae**

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**4.4 Toxicity to Microorganisms e.g. Bacteria**

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**4.5 Chronic Toxicity to Aquatic Organisms****4.5.1 Chronic Toxicity to Fish**

**Species:** Pimephales promelas (Fish, fresh water)  
**Endpoint:** other: hatchability, incidence of developmental abnormalities, survival and growth  
**Exposure period:** 32 day  
**Unit:** mg/l **Analytical monitoring:** yes  
**NOEC:** = .54  
**LOEC:** = .99  
**Method:** other  
**Year:** **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Result:** For LOEC of 0.99 mg/l, there was a significant reduction in wet weight.  
Estimated MATC (maximum Acceptable Toxicant Concentration) determined as the geometric mean of highest concentration with no observable effect and the lowest concentration with an observable effect was 0.73 mg/l.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS  
**Test condition:** - Embryos, larvae and juveniles were continuously exposed for a total of 31 to 33 days.  
- Lake Superior water was used in fish culture and in the exposures to test compounds (hardness: 45.2 +- 2, alkalinity: 43.7+-1.2, pH: 7.7+-0.2). Mean water temperatures ranged from 24.4 to 25.7 degree C. Mean dissolved oxygen concentrations ranged from 65.2 to 78.6% of saturation.

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**4.5.2 Chronic Toxicity to Aquatic Invertebrates**

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## **TERRESTRIAL ORGANISMS**

### **4.6.1 Toxicity to Soil Dwelling Organisms**

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### **4.6.2 Toxicity to Terrestrial Plants**

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### **4.6.3 Toxicity to other Non-Mamm. Terrestrial Species**

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### **4.7 Biological Effects Monitoring**

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### **4.8 Biotransformation and Kinetics**

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### **4.9 Additional Remarks**

**Remark:**

Quantitative structure-activity relationship (QSAR) estimates toxicity of narcotic chemicals for 19 species of bacteria, algae, fungi, coelenterates, rotifers, molluscs, crustaceans, insects, fish and amphibian were used to predict no-effect levels (NELs) at the ecosystem level by means of recently developed extrapolation methods. Equilibrium partitioning theory was used to derive NELs for aquatic sediments and internal toxicant concentrations for aquatic organisms. A simple table is given from which NELs for narcotic chemicals for water, sediment, and residues in biota can be predicted on the basis of only the octanol/water partition coefficient and molecular weight. The method can be applied to setting quality criteria for the aquatic environment and to ecotoxicological interpretation of (bio)monitoring data. Calculations were carried out for 102 narcotic compounds.

In order to extrapolate the QSAR estimates of chronic toxicity, a choice had to be made with regard to the level of protection. The level was arbitrarily set at 95%. This implies that a concentration is calculated with 95% of the species in the aquatic community unlikely to be adversely affected, in the sense that the NOEC is not exceeded.

This value will be denoted as the hazardous concentration for 5% of the species, that is, the HC5. This is the level of protection chosen in the extrapolation methods applied in the Netherlands and the United States. This is considered to be an acceptable approach for the protection of the structure and function of aquatic systems.

For benzophenone, it was calculated the following values:  
- for water (dissolved) : HC5 = 0,145 mg/l

- for surface water including suspended matter at a concentration of 30 mg/l : HC5 = 0,145 mg/l
- for sediments with an organic content of 5% : HC5 = 6.77 mg/kg
- for biota with a lipid content of 5% : HC5 = 10.92 mg/kg

**Source:**

ELF ATOCHEM UK Ltd WIDNESS

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## **5.1 Acute Toxicity**

### **5.1.1 Acute Oral Toxicity**

**Type:** LD50  
**Species:** rat  
**Sex:**  
**Number of Animals:**  
**Vehicle:**  
**Value:** > 10000 mg/kg bw  
**Method:** other: no data  
**Year:** 1973 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** Benzophenone was dissolved in 20 % corn oil.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type:** LD50  
**Species:** mouse  
**Sex:**  
**Number of Animals:**  
**Vehicle:**  
**Value:** = 2895 mg/kg bw  
**Method:** other: no data  
**Year:** 1976 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** Fiducial limits are 2441-3433 mg/kg. Symptoms : somnolence - tremor and then respiratory impairment.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### **5.1.2 Acute Inhalation Toxicity**

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### **5.1.3 Acute Dermal Toxicity**

**Type:** LD0  
**Species:** rabbit  
**Sex:**  
**Number of Animals:**  
**Vehicle:**  
**Value:** = 3535 mg/kg bw  
**Method:** other: no data  
**Year:** 1973 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** Benzophenone was dissolved in corn oil.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### **5.1.4 Acute Toxicity, other Routes**

**Type:** LD50  
**Species:** mouse  
**Sex:**  
**Number of Animals:**  
**Vehicle:**  
**Route of admin.:** i.p.  
**Value:** = 727 mg/kg bw  
**Method:** other : no data  
**Year:** 1976 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** Symptoms : somnolence, tremor then respiratory impairment.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### **5.2 Corrosiveness and Irritation**

#### **5.2.1 Skin Irritation**

**Species:** rabbit  
**Concentration:**  
**Exposure:**  
**Exposure Time:**  
**Number of Animals:**  
**PDII:**  
**Result:** slightly irritating  
**EC classificat.:** not irritating  
**Method:** Draize Test  
**Year:** 1977 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** Solution 20% in olive oil for a 24 hour period was applied occluded to the intact and abraded skin.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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#### **5.2.2 Eye Irritation**

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### 5.3 Sensitization

**Type:** Draize Test  
**Species:** guinea pig  
**Number of Animals:**  
**Vehicle:**  
**Result:** not sensitizing  
**Classification:** not sensitizing  
**Method:** other: no data  
**Year:** 1978 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type:** Freund's complete adjuvant test  
**Species:** guinea pig  
**Number of Animals:**  
**Vehicle:**  
**Result:** not sensitizing  
**Classification:** not sensitizing  
**Method:** other: no data  
**Year:** 1977 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** 2 types: Freund's complete adjuvant test, and maximisation test.  
Type : b) Guinea pig maximisation test.  
20 female guinea pig were used. Benzophenone was dissolved 1% in olive oil (introdermal) or 10% in petrolatum (topical).  
Challenge at 1 and 5% in petrolatum.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**Type:** other: maximazation test  
**Species:** human  
**Number of Animals:**  
**Vehicle:**  
**Result:** not sensitizing  
**Classification:** not sensitizing  
**Method:** other  
**Year:** 1970 **GLP:** no  
**Test substance:** no data  
**Remark:** 25 human volunteers  
Dose: 6% in petrolatum  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**5.4 Repeated Dose Toxicity**

**Species:** rat **Sex:** male/female  
**Strain:** Sprague-Dawley  
**Route of admin.:** oral feed  
**Exposure period:** 28/90 days  
**Frequency of treatment:** daily  
**Post. obs. period:** 0 day  
**Doses:** 0 - 20 - (90 days) - 100 - 500 (28 days) mg/kg/d  
**Control Group:** other: diet  
**NOAEL:** = 20 mg/kg bw  
**LOAEL:** = 100 mg/kg bw  
**Method:** other: no data  
**Year:** 1991 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** NOEL : exp. period : 90 days  
 LOEL : exp. period : 28 days  
 The NOEL 20 mg/kg/day is equivalent to an uptake of 1200 mg/day for a 60 kg man.  
**Result:** Body weights and food consumption were measured weekly ; haematology, clinical chemistry and urinalysis values were obtained at 4 weeks and at the end of the study. Gross and microscopic pathologic examinations were conducted and organ weights were recorded. Treatment-related changes occurred in the mid (100mg/kg/day) and high (500 mg/kg/day) dose levels: erythrocyte count, heamoglobin, heamatocrit, bilirubin, total protein and albumin, although all changes did not occur in both groups in both sexes. There were indications of increased absolute and relative liver and kidney weights, but it was not statistically consistent for absolute kidney weights. Histopathology of the liver showed hepatocellular enlargement with an associated clumping of cytoplasmic basophilic material around the central vein. Target organ: liver.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

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**5.5 Genetic Toxicity 'in Vitro'**

**Type:** Ames test  
**System of testing:** Salmonella Typhimurium TA 98, 100, 1535, 1537  
**Concentration:** 3 up to 1000 ug/plate  
**Metabolic activation:** with and without  
**Result:** negative  
**Method:** other: no data  
**Year:** 1986 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Remark:** Rat and Hamster liver S9 were used.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

(39)

**Type:** DNA damage and repair assay  
**System of testing:** Escherichia coli  
**Concentration:** 500 ug/plate  
**Metabolic activation:** without  
**Result:** negative  
**Method:** other: no data  
**Year:** 1976 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

(40)

### 5.6 Genetic Toxicity 'in Vivo'

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### 5.7 Carcinogenicity

**Species:** mouse **Sex:** female  
**Strain:** Swiss  
**Route of admin.:** dermal  
**Exposure period:** life span  
**Frequency of treatment:** Twice a week  
**Post. obs. period:** 0  
**Doses:** (concentrations) 50 % - 25 % - 5 % in acetone  
**Result:**  
**Control Group:** yes, concurrent vehicle  
**Method:** other: no data  
**Year:** 1974 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Result:** No significant increase of the tumor incidence and mortality as compared with controls. Skin lesions, slight inflammation and ulceration were observed, but no persistent cutaneous abnormalities occurred.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

(41)

**Species:** rabbit **Sex:** male  
**Strain:** New Zealand white  
**Route of admin.:** dermal  
**Exposure period:** 160 weeks  
**Frequency of treatment:** twice a week  
**Post. obs. period:** N/A  
**Doses:** (concentration) 50 % - 25 % - 5 % in acetone  
**Result:**  
**Control Group:** yes, concurrent vehicle  
**Method:** other: no data  
**Year:** 1977 **GLP:** no data  
**Test substance:** as prescribed by 1.1 - 1.4  
**Result:** Repeated application to the interior left ear of groups of 5 New Zealand rabbits for 160 weeks, did not significantly increase the tumor incidence and mortality as compared with controls.  
**Source:** ELF ATOCHEM UK Ltd WIDNESS

(42)

### 5.8 Toxicity to Reproduction

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### 5.9 Developmental Toxicity/Teratogenicity

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### 5.10 Other Relevant Information

**Type:** adsorption  
**Remark:** Results :  
The percutaneous absorption of BZP was determined in vivo in monkeys. Absorption through occluded skin was approximately 70 % of the applied dose in 24 h. Under unoccluded conditions skin penetration was reduced to 44 %, presumably because evaporation from the site of application.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

(43)

**Type:** Excretion  
**Remark:** Remark : Type Excretion, Metabolism.  
Results :  
BZP's main metabolic pathway in the rabbit is by reduction to benzhydrol, which is excreted in urine conjugated with glucuronic acid. Small amount (1%) is converted to p-hydroxybenzophenone following oral administration to rats. No p-hydroxybenzohydrol was detected in urine or faeces.

**Source:** ELF ATOCHEM UK Ltd WIDNESS

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### **5.11 Experience with Human Exposure**

**Remark:**

Results :

Following photo sensitivity reaction on workers employed in the manufacture of ultraviolet-cured-inks, some in vitro test were performed.

Benzophenone gave negative results on EHRLICH ascites cells (concentration  $5 \times 10E-5$  M, under 330-380 nm light and 293-325 nm.

Some other components gave positive results in this test, but negative in vivo.

**Source:**

ELF ATOCHEM UK Ltd WIDNESS

(45)

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**7.1 Risk Assessment**

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