

## Chemical Safety Data Sheet MSDS / SDS

## Benfluralin

Revision Date:2023-11-18 Revision Number:1

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

**Product identifier**

Product name : Benfluralin  
CBnumber : CB0688574  
CAS : 1861-40-1  
EINECS Number : 217-465-2  
Synonyms : Benfluralin,TEAM

**Relevant identified uses of the substance or mixture and uses advised against**

Relevant identified uses : For R&D use only. Not for medicinal, household or other use.  
Uses advised against : none

**Company Identification**

Company : Chemicalbook  
Address : Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing  
Telephone : 400-158-6606

## SECTION 2: Hazards identification

**Classification of the substance or mixture**

Skin irritation, Category 2  
Skin sensitization, Sub-category 1B  
Eye irritation, Category 2  
Hazardous to the aquatic environment, short-term (Acute) - Category Acute 1  
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 1

**Label elements****Pictogram(s)**

□

Signal word : Warning

**Hazard statement(s)**

H410 Very toxic to aquatic life with long lasting effects

**Precautionary statement(s)**

P273 Avoid release to the environment.  
P501 Dispose of contents/container to.....

### Prevention

P264 Wash ... thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

### Response

P302+P352 IF ON SKIN: Wash with plenty of water/...

P321 Specific treatment (see ... on this label).

P332+P317 If skin irritation occurs: Get medical help.

P362+P364 Take off contaminated clothing and wash it before reuse.

P333+P317 If skin irritation or rash occurs: Get medical help.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P391 Collect spillage.

### Storage

none

### Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

### Other hazards

no data available

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## SECTION 3: Composition/information on ingredients

### Substance

|              |                    |
|--------------|--------------------|
| Product name | : Benfluralin      |
| Synonyms     | : Benfluralin,TEAM |
| CAS          | : 1861-40-1        |
| EC number    | : 217-465-2        |
| MF           | : C13H16F3N3O4     |
| MW           | : 335.28           |

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## SECTION 4: First aid measures

### Description of first aid measures

#### If inhaled

Move the victim into fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and consult a doctor immediately.

Do not use mouth to mouth resuscitation if the victim ingested or inhaled the chemical.

#### Following skin contact

Take off contaminated clothing immediately. Wash off with soap and plenty of water. Consult a doctor.

#### **Following eye contact**

Rinse with pure water for at least 15 minutes. Consult a doctor.

#### **Following ingestion**

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

#### **Most important symptoms and effects, both acute and delayed**

Excerpt from ERG Guide 171 [Substances (Low to Moderate Hazard)]: Inhalation of material may be harmful. Contact may cause burns to skin and eyes. Inhalation of Asbestos dust may have a damaging effect on the lungs. Fire may produce irritating, corrosive and/or toxic gases. Some liquids produce vapors that may cause dizziness or suffocation. Runoff from fire control may cause pollution. (ERG, 2016)

#### **Indication of any immediate medical attention and special treatment needed**

Skin decontamination. Skin contamination should be treated promptly by washing with soap and water. Contamination of the eyes should be treated immediately by prolonged flushing of the eyes with large amounts of clean water. If dermal or ocular irritation persists, medical attention should be obtained without delay. Other herbicides

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## SECTION 5: Firefighting measures

### **Extinguishing media**

Excerpt from ERG Guide 171 [Substances (Low to Moderate Hazard)]: SMALL FIRE: Dry chemical, CO<sub>2</sub>, water spray or regular foam. LARGE FIRE: Water spray, fog or regular foam. Do not scatter spilled material with high-pressure water streams. Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal. FIRE INVOLVING TANKS: Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. (ERG, 2016)

### **Specific Hazards Arising from the Chemical**

Excerpt from ERG Guide 171 [Substances (Low to Moderate Hazard)]: Some may burn but none ignite readily. Containers may explode when heated. Some may be transported hot. For UN3508, be aware of possible short circuiting as this product is transported in a charged state. (ERG, 2016)

### **Advice for firefighters**

Wear self-contained breathing apparatus for firefighting if necessary.

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## SECTION 6: Accidental release measures

### **Personal precautions, protective equipment and emergency procedures**

Avoid dust formation. Avoid breathing mist, gas or vapours. Avoid contacting with skin and eye. Use personal protective equipment. Wear chemical impermeable gloves. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

### **Environmental precautions**

Prevent further spillage or leakage if it is safe to do so. Do not let the chemical enter drains. Discharge into the environment must be avoided.

## Methods and materials for containment and cleaning up

Collect and arrange disposal. Keep the chemical in suitable and closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

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## SECTION 7: Handling and storage

### Precautions for safe handling

Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

### Conditions for safe storage, including any incompatibilities

Avoid freezing; store above 40 deg F. Do not store near heat or open flame.

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## SECTION 8: Exposure controls/personal protection

### Control parameters

#### Occupational Exposure limit values

no data available

#### Biological limit values

no data available

### Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

### Individual protection measures

#### Eye/face protection

Wear tightly fitting safety goggles with side-shields conforming to EN 166(EU) or NIOSH (US).

#### Skin protection

Wear fire/flare resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

#### Respiratory protection

If the exposure limits are exceeded, irritation or other symptoms are experienced, use a full-face respirator.

#### Thermal hazards

no data available

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## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

|  |  |
|--|--|
| Physical state   | Crystalline Solid  |
| Colour   | Yellow-orange  |
| Odour  | NO APPRECIABLE ODOR  |
| Melting point/freezing point                             | 65 - 67°C  |
| Boiling point or initial boiling point and boiling range | 369.1°C at 760 mmHg  |
| Flammability   | no data available  |
| Lower and upper explosion limit/flammability limit       | no data available  |
| Flash point  | 177°C  |
| Auto-ignition temperature                                | no data available  |
| Decomposition temperature                                | no data available  |
| pH   | no data available  |
| Kinematic viscosity                                      | no data available  |
| Solubility   | G/100 ML AT 25 DEG C: >50 IN ACETONE; >25 IN ACETONITRILE; >50 IN CHLOROFORM; 45 IN DIMETHYLFORMAMIDE; 60 IN DIOXANE; 4 IN METHANOL; 58 IN METHYL ETHYL KETONE; 45 IN XYLENE |
| Partition coefficient n-octanol/water                    | log Kow = 5.29   |
| Vapour pressure  | 1.21E-05mmHg at 25°C   |
| Density and/or relative density                          | 1.337 g/cm <sup>3</sup>  |
| Relative vapour density                                  | no data available  |
| Particle characteristics                                 | no data available  |

## SECTION 10: Stability and reactivity

### Reactivity

Slightly water soluble.

### Chemical stability

Shelf life of the emulsifiable concentrates is more than two yr .

### Possibility of hazardous reactions

TECHNICAL MATERIAL IS NOT FLAMMABLE. FOR THE EMULSIFIABLE CONCENTRATES, USE ORDINARY PRECAUTIONS FOR VOLATILE SOLVENTS.A dinitroaniline derivative.

### Conditions to avoid

no data available

### Incompatible materials

no data available

### Hazardous decomposition products

no data available

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## SECTION 11: Toxicological information

### Acute toxicity

- Oral: LD50 Rat oral >10,000 mg/kg
- Inhalation: no data available
- Dermal: no data available

### Skin corrosion/irritation

no data available

### Serious eye damage/irritation

no data available

### Respiratory or skin sensitization

no data available

### Germ cell mutagenicity

no data available

### Carcinogenicity

Cancer Classification: Suggestive Evidence of Carcinogenicity, but Not Sufficient to Assess Human Carcinogenic Potential

### Reproductive toxicity

no data available

### STOT-single exposure

no data available

### STOT-repeated exposure

no data available

### Aspiration hazard

no data available

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## SECTION 12: Ecological information

### Toxicity

Toxicity to fish: LC50 *Pimephales promelas* (Fathead minnow, weight 0.9 g) <1.0 mg/L/96 hr; static bioassay without aeration, pH 7.2-7.5, hardness 40-50 mg/L as CaCO<sub>3</sub>, alkalinity 30-35 mg/L, 18 deg C

Toxicity to daphnia and other aquatic invertebrates: EC50; Species: *Daphnia magna* (Water flea, 1st instar larvae); Conditions: freshwater, renewal; Concentration: >100 ug/L for 48 hr; Effect: intoxication, immobilization /97.3% purity

Toxicity to algae: EC50; Species: *Pseudokirchneriella subcapitata* (Green algae); Conditions: freshwater, static; Concentration: 2500 ug/L for 5 days; Effect: population abundance /95.88% purity

Toxicity to microorganisms: no data available

### **Persistence and degradability**

AEROBIC: Benfluralin is metabolized with a half-life of 20 to 86 days under aerobic soil conditions(5). Biodegradation of benfluralin in soil occurs via oxidative and reductive pathways(1). Oxidation classically occurs in aerobic soils and reduction in anaerobic soils. However, in flooded field soils, both oxidation and reduction products have been observed(1). In field soil, oxidative biodegradation of benfluralin leads to dealkylation products followed by reduction of nitro group to amino products(1,4). Rates of biodegradation of benfluralin is dependent on soil temperature and moisture content and the rate is faster at 30 deg C compared to 4 deg C, and in dry soil compared to water-saturated field soils(2-3). The biodegradation is faster in soils containing higher organic carbon contents(3,5). The biodegradation half-lives of benfluralin in a loam and a sandy loam soil were 0.7 month and 1.5 months, respectively, at 30 deg C(3).

### **Bioaccumulative potential**

The whole body BCF value measured in fish was 1,580(1). According to a classification scheme(2), this BCF value suggests the potential for bioconcentration of benfluralin in aquatic organisms is very high(SRC).

### **Mobility in soil**

Soil adsorption (Kd) coefficients for benfluralin in 10 Wisconsin soils ranged from 4.2-30.3, with a mean value of 16.7 (1). Other investigators have reported Koc values of 10,700(2), 10,715(4), and 9,000(3). Benfluralin was much more highly adsorbed to soil than other dinitroaniline herbicides(5). In soil thin layer chromatography experiments, the Rf (retention factor) range was 0-0.03 for benfluralin(6). Therefore, it was concluded that benfluralin was immobile in soil(6). In the EPA Registration Eligibility Decision document for benfluralin, it was reported that the Koc ranged from 9,840-11,660(7). According to a classification scheme(8), this range of Koc values indicates that benfluralin is expected to have no mobility in soil(SRC).

### **Other adverse effects**

no data available

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## SECTION 13: Disposal considerations

### **Disposal methods**

#### **Product**

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

#### **Contaminated packaging**

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

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## SECTION 14: Transport information

### **UN Number**

ADR/RID: UN3077 (For reference only, please check.)

IMDG: UN3077 (For reference only, please check.)

IATA: UN3077 (For reference only, please check.)

### **UN Proper Shipping Name**

ADR/RID: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (For reference only, please check.)

IMDG: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (For reference only, please check.)

IATA: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (For reference only, please check.)

### **Transport hazard class(es)**

ADR/RID: 9 (For reference only, please check.)

IMDG: 9 (For reference only, please check.)

IATA: 9 (For reference only, please check.)

### **Packing group, if applicable**

ADR/RID: III (For reference only, please check.)

IMDG: III (For reference only, please check.)

IATA: III (For reference only, please check.)

### **Environmental hazards**

ADR/RID: Yes

IMDG: Yes

IATA: Yes

### **Special precautions for user**

no data available

### **Transport in bulk according to IMO instruments**

no data available

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## SECTION 15: Regulatory information

### **Safety, health and environmental regulations specific for the product in question**

#### **European Inventory of Existing Commercial Chemical Substances (EINECS)**

Listed.

#### **EC Inventory**

Listed.

#### **United States Toxic Substances Control Act (TSCA) Inventory**

Not Listed.

#### **China Catalog of Hazardous chemicals 2015**

Not Listed.

#### **New Zealand Inventory of Chemicals (NZIoC)**

Not Listed.

#### **PICCS**

Not Listed.

#### **Vietnam National Chemical Inventory**

Listed.

#### **IECSC**

Not Listed.

#### **Korea Existing Chemicals List (KECL)**

Listed.

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## SECTION 16: Other information

### **Abbreviations and acronyms**

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

### **References**

IPCS - The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>

HSDB - Hazardous Substances Data Bank, website: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>

IARC - International Agency for Research on Cancer, website: <http://www.iarc.fr/>

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: [http://www.echemportal.org/echemportal/index?pageID=0&request\\_locale=en](http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en)

CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>

ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: <http://www.phmsa.dot.gov/hazmat/library/erg>

Germany GESTIS-database on hazard substance, website: <http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp>

ECHA - European Chemicals Agency, website: <https://echa.europa.eu/>

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