

## Chemical Safety Data Sheet MSDS / SDS

**2,3-Butanedione**

Revision Date:2025-06-14 Revision Number:1

**SECTION 1: Identification of the substance/mixture and of the company/undertaking****Product identifier**

Product name : 2,3-Butanedione  
CBnumber : CB3853625  
CAS : 431-03-8  
EINECS Number : 207-069-8  
Synonyms : 2,3-Butanedione,Diacetyl

**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 : 010-86108875

**SECTION 2: Hazards identification****GHS Label elements, including precautionary statements**

Symbol(GHS)



Signal word

Danger

**Precautionary statements**

P501 Dispose of contents/container to.....

P405 Store locked up.

P403+P235 Store in a well-ventilated place. Keep cool.

P370+P378 In case of fire: Use ... for extinction.

P311 Call a POISON CENTER or doctor/physician.

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

Continuerinsing.

P303+P361+P353 IF ON SKIN (or hair): Remove/Take off Immediately all contaminated clothing. Rinse SKIN with water/shower.

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

P270 Do not eat, drink or smoke when using this product.

P264 Wash skin thoroughly after handling.  
P264 Wash hands thoroughly after handling.  
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.  
P240 Ground/bond container and receiving equipment.  
P233 Keep container tightly closed.  
P210 Keep away from heat/sparks/open flames/hot surfaces. — No smoking.

#### **Hazard statements**

H302 Harmful if swallowed  
H315 Causes skin irritation  
H318 Causes serious eye damage  
H335 May cause respiratory irritation  
H331 Toxic if inhaled  
H319 Causes serious eye irritation  
H225 Highly Flammable liquid and vapour

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## SECTION 3: Composition/information on ingredients

### **Substance**

Product name	: 2,3-Butanedione
Synonyms	: 2,3-Butanedione, Diacetyl
CAS	: 431-03-8
EC number	: 207-069-8
MF	: C <sub>4</sub> H <sub>6</sub> O <sub>2</sub>
MW	: 86.09

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## SECTION 4: First aid measures

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

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

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

No data available

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## SECTION 5: Firefighting measures

### **Extinguishing media**

#### **Suitable extinguishing media**

Carbon dioxide (CO<sub>2</sub>) Foam Dry powder

#### **Unsuitable extinguishing media**

For this substance/mixture no limitations of extinguishing agents are given.

## Special hazards arising from the substance or mixture

Carbon oxides Combustible.

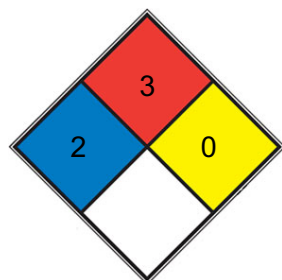
## Advice for firefighters

No data available

## Further information

No data available

## NFPA 704



**HEALTH 2** Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. [diethyl ether](#), ammonium phosphate, iodine)

**FIRE 3** Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions . Liquids having a flash point below 22.8 °C (73 °F) and having a boiling point at or above 37.8 °C (100 °F) or having a flash point between 22.8 and 37.8 °C (73 and 100 °F). (e.g. gasoline, [acetone](#))

**REACT 0** Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium, [N2](#))

**SPEC.**

**HAZ.**

## SECTION 6: Accidental release measures

### Personal precautions, protective equipment and emergency procedures

For personal protection see section 8.

### Environmental precautions

No data available

### Methods and materials for containment and cleaning up

No data available

### Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

## Precautions for safe handling

### Advice on safe handling

Use with local exhaust ventilation. **Advice on safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. For precautions see section 2.2.

### Conditions for safe storage, including any incompatibilities

No data available

### Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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## SECTION 8: Exposure controls/personal protection

### control parameter

#### Hazard composition and occupational exposure limits

Does not contain substances with occupational exposure limits.

### Exposure controls

#### Personal protective equipment

##### Skin protection

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: [www.kcl.de](http://www.kcl.de)).

Splash contact Material: butyl-rubber

Minimum layer thickness: 0,7 mm

Break through time: 240 min Material tested: Butoject? (KCL 898)

##### Body Protection

Long sleeved clothing, Preventive skin protection

##### Control of environmental exposure

Prevent product from entering drains.

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## SECTION 9: Physical and chemical properties

### Information on basic physicochemical properties

Appearance	liquid
Odour	Stench.
Odour Threshold	0,0086 ppm
pH	No data available
Melting point/freezing point	Melting point: -2 °C
Initial boiling point and boiling range	88 °C - lit.
Flash point	7 °C - closed cup

Evaporation rate	No data available
Flammability (solid, gas)	No data available
Upper/lower flammability or explosive limits	Upper explosion limit: 13,0 %(V) Lower explosion limit: 2,4 %(V)
Vapour pressure	229 hPa at 50 °C 69,6 hPa at 20 °C
Vapour density	3 (vs air)
Relative density	No data available
Water solubility	200 g/l at 25 °C
Partition coefficient: n-octanol/water	log Pow: -1,34 - (Lit.), Bioaccumulation is not expected.
Autoignition temperature	345 °C
Decomposition temperature	No data available
Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
Explosive properties	No data available
Oxidizing properties	No data available

### Other safety information

No data available

## SECTION 10: Stability and reactivity

### Reactivity

No data available

### Chemical stability

No data available

### Possibility of hazardous reactions

Violent reactions possible with:

alkalines Acids

Risk of ignition or formation of inflammable gases or vapours with: strong oxidising agents

### Conditions to avoid

No data available

### Incompatible materials

various plastics

### Hazardous decomposition products

In the event of fire: see section 5

## SECTION 11: Toxicological information

## Information on toxicological effects

### Acute toxicity

LD50 Oral - Rat - 1.580 mg/kg Remarks: (RTECS)

LC50 Inhalation - Rat - 4 h - 2,25 - 5,2 mg/l Remarks: (External MSDS)

Symptoms: Possible damages:, Irritation symptoms in the respiratory tract. LD50 Dermal - Rabbit - > 5.000 mg/kg

Remarks: (RTECS)

### Skin corrosion/irritation

Skin - Rabbit Result: Irritations

Remarks: (External MSDS)

### Serious eye damage/eye irritation

No data available

### Respiratory or skin sensitization

No data available

### Germ cell mutagenicity

Test Type: Mutagenicity (mammal cell test): micronucleus.

Result: negative

Remarks: (National Toxicology Program)

### Carcinogenicity

No data available

### Reproductive toxicity

No data available

### Specific target organ toxicity - single exposure

No data available

### Specific target organ toxicity - repeated exposure

Inhalation - May cause damage to organs through prolonged or repeated exposure. - Respiratory system

### Aspiration hazard

No data available

### Toxicity

LD50 orally in rats: 1580 mg/kg (Jenner)

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## SECTION 12: Ecological information

### Toxicity

#### Toxicity to fish

LC50 - Leuciscus idus (Golden orfe) - 46 - 100 mg/l - 96 h Remarks: (External MSDS)

#### Toxicity to bacteria

Remarks: (Hommel)

(butanedione)

#### Persistence and degradability

Biodegradability Result: - Readily biodegradable.

### **Bioaccumulative potential**

No data available

### **Mobility in soil**

No data available

### **Results of PBT and vPvB assessment**

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

### **Toxics Screening Level**

The Initial Threshold Screening Level (ITSL) for diacetyl (also known as butane-2,3-dione) is 0.2 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) with an 8-hour averaging time.

### **Other adverse effects**

Discharge into the environment must be avoided.

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## **SECTION 13: Disposal considerations**

### **Waste treatment methods**

### **Product**

No data available

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## **SECTION 14: Transport information**

### **UN number**

ADR/RID: 2346 IMDG: 2346

### **UN proper shipping name**

ADR/RID: BUTANEDIONE IMDG: BUTANEDIONE IATA: Butanedione

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

ADR/RID: 3 IMDG: 3 IATA: 3

### **Packaging group**

ADR/RID: II IMDG: II IATA: II

### **Environmental hazards**

ADR/RID: no IMDG Marine pollutant: no IATA: no

### **Special precautions for user**

No data available

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## SECTION 15: Regulatory information

### Safety, health and environmental regulations/legislation specific for the substance or mixture

#### Regulations on the Safety Management of Hazardous Chemicals

China Catalog of Hazardous chemicals 2015:Listed. website: <https://www.mem.gov.cn/>

#### Measures for Environmental Management of New Chemical Substances

Vietnam National Chemical Inventory:Listed. website: <https://chemicaldata.gov.vn/>

United States Toxic Substances Control Act (TSCA) Inventory:Listed. website: <https://www.epa.gov/>

Philippines Inventory of Chemicals and Chemical Substances (PICCS):Listed. website: <https://emb.gov.ph/>

New Zealand Inventory of Chemicals (NZIoC):Listed. website: <https://www.epa.govt.nz/>

Korea Existing Chemicals List (KECL):Listed. website: <http://ncis.nier.go.kr>

European Inventory of Existing Commercial Chemical Substances (EINECS):Listed. website: <https://echa.europa.eu/>

EC Inventory:Listed.

Chinese Chemical Inventory of Existing Chemical Substances (China IECSC):Listed. website: <https://www.mee.gov.cn/>

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## SECTION 16: Other information

### Abbreviations and acronyms

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

CAS: Chemical Abstracts Service

EC50: Effective Concentration 50%

IATA: International Air Transportation Association

IMDG: International Maritime Dangerous Goods

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

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

STEL: Short term exposure limit

TWA: Time Weighted Average

### References

**[1]** CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>

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

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

**[4]** 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)

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

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

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

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

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

**[10]** Sigma-Aldrich, website: <https://www.sigmaaldrich.com/>



## Other Information

Irreversible obstructive lung disease has been documented among workers exposed in a variety of settings. These include 2,3-butanedione (diacetyl) production in the chemical industry, production of 2,3-butanedione (diacetyl)-containing flavorings, and production of diacetyl-containing, butter-flavored food products such as microwave popcorn. Many cases have been confirmed to have severe clinical bronchiolitis obliterans. Do NOT take working clothes home.

### Disclaimer:

The information in this MSDS is only applicable to the specified product, unless otherwise specified, it is not applicable to the mixture of this product and other substances. This MSDS only provides information on the safety of the product for those who have received the appropriate professional training for the user of the product. Users of this MSDS must make independent judgments on the applicability of this SDS. The authors of this MSDS will not be held responsible for any harm caused by the use of this MSDS.