

SAFETY DATA SHEETS

According to Globally Harmonized System of Classification and Labelling of Chemicals (GHS) - Sixth revised edition

Version: 1.0

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1. Identification

1.1 GHS Product identifier

Product name butanal

1.2 Other means of identification

Product number -

Other names n-butyl aldehyde

1.3 Recommended use of the chemical and restrictions on use

Identified uses For industry use only. Food additives -> Flavoring Agents

Uses advised against no data available

2. Hazard identification

2.1 Classification of the substance or mixture

Flammable liquids, Category 2

2.2 GHS label elements, including precautionary statements

Pictogram(s)



Signal word

Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour

Precautionary
statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233 Keep container tightly closed.

P240 Ground and bond container and receiving equipment.

P241 Use explosion-proof
[electrical/ventilating/lighting/...] equipment.

P242 Use non-sparking tools.

P243 Take action to prevent static discharges.

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

Response

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P370+P378 In case of fire: Use ... to extinguish.

Storage

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

Disposal

P501 Dispose of contents/container to ...

2.3 Other hazards which do not result in classification

none

3. Composition/information on ingredients

3.1 Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
butanal	butanal	123-72-8	none	100%

4. First-aid measures

4.1 Description of necessary first-aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

Fresh air, rest.

In case of skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower.

In case of eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

If swallowed

Rinse mouth. Rest.

4.2 Most important symptoms/effects, acute and delayed

Inhalation will cause irritation and possibly nausea, vomiting, headache, and loss of consciousness. Contact with eyes causes burns. Skin contact may be irritating. (USCG, 1999)

4.3 Indication of immediate medical attention and special treatment needed, if necessary

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Aldehydes and Related Compounds/

5. Fire-fighting measures

5.1 Extinguishing media

Suitable extinguishing media

If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Solid streams of water may

spread fire. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use foam, dry chemical, or carbon dioxide.

5.2 Specific hazards arising from the chemical

Behavior in Fire: Vapors are heavier than air and may travel considerable distance to a source of ignition and flash back. Fires are difficult to control due to ease of reignition. (USCG, 1999)

5.3 Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.

6.2 Environmental precautions

Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Do NOT let this chemical enter the environment. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

6.3 Methods and materials for containment and cleaning up

Contaminated wastewaters containing butyraldehyde are produced during the MFR of poly(vinyl butyral) and poly(vinyl formal ethylal). On the basis of lab tests, a scheme for treating wastewater is recommended. After neutralization with sodium hydroxide or calcium oxide, the organic fraction is distilled from the wastewater and incinerated.

7. Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use. Provide appropriate exhaust

ventilation at places where dust is formed. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Fireproof. Separated from incompatible materials. See Chemical Dangers. Cool. Keep in the dark. Store in an area without drain or sewer access. On contact with air butyraldehyde is oxidized readily to the butyric acids. Therefore, storage under inert gas is mandatory.

8. Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure limit values

Exposure to acetaldehyde has produced nasal tumors in rats and laryngeal tumors in hamsters, and exposure to malonaldehyde has produced thyroid gland and pancreatic islet cell tumors in rats. NIOSH therefore recommends that acetaldehyde and malonaldehyde be considered potential occupational carcinogens in conformance with the OSHA carcinogen policy. Testing has not been completed to determine the carcinogenicity of ... butyraldehyde, ... /a/ related low-molecular-weight-aldehyde. However, the limited studies to date indicate that ... /this substance has/ chemical reactivity and mutagenicity similar to acetaldehyde and malonaldehyde. Therefore, NIOSH recommends that careful consideration should be given to reducing ... /exposure to this related aldehyde/.

Biological limit values

no data available

8.2 Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

8.3 Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. 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

Wear dust mask when handling large quantities.

Thermal hazards

no data available

9. Physical and chemical properties

Physical state	clear liquid
Colour	Liquid
Odour	Characteristic, pungent, aldehyde odor
Melting point/ freezing point	262°C(lit.)
Boiling point or initial boiling point and boiling range	105°C
Flammability	Highly flammable.
Lower and upper explosion limit / flammability limit	Lower: 1.9% by volume; Upper: 12.5% by volume.
Flash point	-7°C(lit.)
Auto-ignition temperature	230°C (USCG, 1999)
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	0.45 cP at 20°C
Solubility	In water: 7.1 g/100 mL (25 °C)
Partition coefficient n-octanol/water (log	log Kow = 0.88

value)

Vapour pressure 90 mm Hg (20 °C)

Density and/or relative density 0.817

Relative vapour density 2.5 (vs air)

Particle characteristics no data available

10. Stability and reactivity

10.1 Reactivity

no data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Highly flammable liquid. The vapour is heavier than air and may travel along the ground; distant ignition possible. A colorless liquid, BUTYRALDEHYDE can react with oxidizing materials. In contact with strong acids or bases it will undergo an exothermic condensation reaction. The dry aldehyde may undergo some polymerization reaction. Reacts vigorously with chlorosulfonic acid, nitric acid, sulfuric acid (oleum). [Sax, 9th ed., 1996, p. 607].

10.4 Conditions to avoid

no data available

10.5 Incompatible materials

Incompatible with oxidizing materials.

10.6 Hazardous decomposition products

When heated to decomposition it emits acrid smoke and fumes.

11. Toxicological information

Acute toxicity

- Oral: LD50 Rat oral 5.89 g/kg /5,890 mg/kg/
- Inhalation: LC50 Rat inhalation 60,000 ppm/0.5 hr
- 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

no data available

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

no data available

Aspiration hazard

no data available

12. Ecological information

12.1 Toxicity

- Toxicity to fish: LC50; Species: *Pimephales promelas* (Fathead minnow, age 29 days, length 17.2 mm, weight 0.073 g); Conditions: freshwater, flow through, 24.1°C, pH 7.7, hardness 41.2 mg/L CaCO₃, alkalinity 32.0 mg/L CaCO₃, dissolved oxygen 6.8 mg/L; Concentration: 13400 ug/L for 96 hr (95% confidence limit: 13000-13800 ug/L) /99% purity
- Toxicity to daphnia and other aquatic invertebrates: LC50; Species: *Daphnia magna* (Water flea, age < or =24 hr); Conditions: freshwater, static,

20-22°C, pH 7.6-7.7; Concentration: 340000 ug/L for 24 hr; Effect: intoxication, immobilization

- Toxicity to algae: EC50; Species: *Pseudokirchneriella subcapitata* (Green algae, exponential growth phase, 15000 cells/mL, UTEX 1648); Conditions: static, 24°C, dissolved oxygen 1-2 mg/L; Concentration: 23560 ug/L for 48 hr; Effect: decreased population growth rate
- Toxicity to microorganisms: no data available

12.2 Persistence and degradability

AEROBIC: Butyraldehyde, present at 100 mg/L, reached 100% of its theoretical BOD in 2 weeks using an activated sludge inoculum at 30 mg/L and the Japanese MITI test(1). Butyraldehyde had a 5-day theoretical BOD of 28% using the AFNOR T test and an inoculum from 3 polluted surface waters(2). Using a sewage inocula and standard dilution water, butyraldehyde had a 5-day theoretical BOD of 43%(3). Theoretical BODs of 43.4, 59.8, and 68% were measured after 5, 10, and 50 days, respectively, using a sewage seed(4). A 5-day theoretical BOD of 106% was reported for a sewage inocula(5). Using an electrolytic respirometer and an activated sludge inocula, theoretical BODs of 46-57% were observed after 90-135 hr of incubation(6).

12.3 Bioaccumulative potential

An estimated BCF of 3 was calculated in fish for butyraldehyde(SRC), using a log Kow of 0.88(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

12.4 Mobility in soil

The Koc of butyraldehyde is estimated as 72(SRC), using a log Kow of 0.88(1) and a regression-derived equation(2). According to a classification scheme(3), this estimated Koc value suggests that butyraldehyde is expected to have high mobility in soil.

12.5 Other adverse effects

no data available

13. Disposal considerations

13.1 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.

14. Transport information

14.1 UN Number

ADR/RID: UN1129

IMDG: UN1129

IATA: UN1129

14.2 UN Proper Shipping Name

ADR/RID: BUTYRALDEHYDE

IMDG: BUTYRALDEHYDE

IATA: BUTYRALDEHYDE

14.3 Transport hazard class(es)

ADR/RID: 3

IMDG: 3

IATA: 3

14.4 Packing group, if applicable

ADR/RID: II

IMDG: II

IATA: II

14.5 Environmental hazards

ADR/RID: no

IMDG: no

IATA: no

14.6 Special precautions for user

no data available

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

no data available

15. Regulatory information

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

Chemical name	Common names and synonyms	CAS number	EC number
butanal	butanal	123-72-8	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

16. Other information

Information on revision

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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
- 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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