

SAFETY DATA SHEET

Version 3.10
Revision Date 07/16/2015
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1. PRODUCT AND COMPANY IDENTIFICATION

| | | | |
|--|---|--|---|
| Product name | : | 1-Butanol | |
| Product Number | : | B7906 | |
| Brand | : | Sigma | |
| Product Use | : | For laboratory research purposes. | |
| Supplier | : | Sigma-Aldrich Canada Co. 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA | Manufacturer : Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA |
| Telephone | : | +1 9058299500 | |
| Fax | : | +1 9058299292 | |
| Emergency Phone # (For both supplier and manufacturer) | : | +1-703-527-3887 (CHEMTREC) | |
| Preparation Information | : | Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956 | |

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Central nervous system, ears, Liver, Kidney, Blood

WHMIS Classification

| | | |
|-----|--|--|
| B2 | Flammable liquid | Flammable liquid |
| D2B | Toxic Material Causing Other Toxic Effects | Specific target organ toxicity - single exposure |
| | | Moderate skin irritant |
| | | Moderate respiratory irritant |
| | | Moderate eye irritant |

GHS Classification

Flammable liquids (Category 3)
Acute toxicity, Oral (Category 4)
Acute toxicity, Inhalation (Category 5)
Acute toxicity, Dermal (Category 5)
Skin corrosion/irritation (Category 2)
Serious eye damage/eye irritation (Category 1)
Specific target organ toxicity - single exposure (Category 3), Respiratory system, Central nervous system

GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

| | |
|-------------|--|
| H226 | Flammable liquid and vapour. |
| H302 | Harmful if swallowed. |
| H313 + H333 | May be harmful in contact with skin or if inhaled. |
| H315 | Causes skin irritation. |

| | |
|----------------------------|---|
| H318 | Causes serious eye damage. |
| H335 | May cause respiratory irritation. |
| H336 | May cause drowsiness or dizziness. |
| Precautionary statement(s) | |
| 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. |
| P261 | Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. |
| P264 | Wash skin thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P280 | Wear protective gloves/ eye protection/ face protection. |
| P301 + P312 + P330 | IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth. |
| P303 + P361 + P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. |
| P304 + P340 + P312 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell. |
| P305 + P351 + P338 + P310 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician. |
| P312 | Call a POISON CENTER or doctor/ physician if you feel unwell. |
| P332 + P313 | If skin irritation occurs: Get medical advice/ attention. |
| P370 + P378 | In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish. |
| P403 + P233 | Store in a well-ventilated place. Keep container tightly closed. |
| P403 + P235 | Store in a well-ventilated place. Keep cool. |
| P405 | Store locked up. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

HMIS Classification

| | |
|------------------------|---|
| Health hazard: | 2 |
| Chronic Health Hazard: | * |
| Flammability: | 3 |
| Physical hazards: | 0 |

Potential Health Effects

| | |
|-------------------|--|
| Inhalation | May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness. |
| Skin | Harmful if absorbed through skin. May cause skin irritation. |
| Eyes | May cause eye irritation. |
| Ingestion | Harmful if swallowed. |

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Butyl alcohol
n-Butanol

Formula : C₄H₁₀O
Molecular weight : 74.12 g/mol

| CAS-No. | EC-No. | Index-No. | Concentration |
|------------------|-----------|--------------|---------------|
| n-Butanol | | | |
| 71-36-3 | 200-751-6 | 603-004-00-6 | <=100% |

4. FIRST AID MEASURES

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES**Conditions of flammability**

Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Specific hazards arising from the chemical

Flash back possible over considerable distance.

Special protective equipment for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Explosion data - sensitivity to mechanical impact

No data available

Explosion data - sensitivity to static discharge

No data available

Further information

In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions**

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

7. HANDLING AND STORAGE**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas. hygroscopic

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

| Components | CAS-No. | Value | Control parameters | Basis |
|------------|--|-------|-----------------------------------|---|
| n-Butanol | 71-36-3 | TWA | 15.000000 ppm | Canada. British Columbia OEL |
| | | C | 30.000000 ppm | Canada. British Columbia OEL |
| | | TWAEV | 20 ppm | Canada. Ontario OELs |
| | | TWAEV | 20.000000 ppm | Canada. Ontario OELs |
| | | C | 50 ppm 152 mg/m3 | Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants |
| Remarks | A substance which may not be recirculated in accordance with section 108 Skin (percutaneous) | | | |
| | | C | 50.000000 ppm 152.000000 mg/m3 | Québec. Regulation respecting occupational health and safety, Schedule 1, Part 1: Permissible exposure values for airborne contaminants |
| | A substance which may not be recirculated in accordance with section 108 Skin (percutaneous) | | | |
| | | TWA | 20 ppm 60 mg/m3 | Canada. Alberta, Occupational Health and Safety Code (table 2: OEL) |
| | Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required | | | |
| | | TWA | 20.000000 ppm 60.000000 mg/m3 | Canada. Alberta, Occupational Health and Safety Code (table 2: OEL) |
| | Occupational exposure limit is based on irritation effects and its adjustment to compensate for unusual work schedules is not required | | | |
| | | TWA | 20.000000 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | | TWA | 20 ppm | USA. ACGIH Threshold Limit Values (TLV) |

Personal protective equipment

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection

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.

Full contact

Material: Nitrile rubber

Minimum layer thickness: 0.4 mm

Break through time: 480 min

Material tested: Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 58 min
Material tested: Dermatrill® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures

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

Specific engineering controls

Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

| | |
|--------|---------------|
| Form | liquid, clear |
| Colour | colourless |

Safety data

| | |
|--|---------------------------------------|
| pH | No data available |
| Melting point/freezing point | Melting point/range: -90 °C (-130 °F) |
| Boiling point | 116 - 118 °C (241 - 244 °F) |
| Flash point | 35 °C (95 °F) - closed cup |
| Ignition temperature | 343 °C (649 °F) |
| Auto-ignition temperature | No data available |
| Lower explosion limit | 1.4 %(V) |
| Upper explosion limit | 11.2 %(V) |
| Vapour pressure | 5 hPa (4 mmHg) at 20 °C (68 °F) |
| Density | 0.81 g/mL at 25 °C (77 °F) |
| Water solubility | soluble |
| Partition coefficient: n-octanol/water | No data available |
| Relative vapour density | 2.56 - (Air = 1.0) |
| Odour | No data available |
| Odour Threshold | No data available |
| Evaporation rate | No data available |

10. STABILITY AND REACTIVITY

Chemical stability

Stable under recommended storage conditions.

Possibility of hazardous reactions

Vapours may form explosive mixture with air.

Conditions to avoid

Exposure to moisture
Heat, flames and sparks.

Materials to avoid

Oxidizing agents, Alkali metals, Bases, Strong acids, Halogens

Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50

LD50 Oral - Rat - 790 mg/kg

Remarks: Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes. Blood:Other changes.

Inhalation LC50

LC50 Inhalation - Rat - 4 h - 8000 ppm

Dermal LD50

LD50 Dermal - Rabbit - 3,400 mg/kg

Other information on acute toxicity

No data available

Skin corrosion/irritation

Skin - Rabbit - Skin irritation - 24 h

Serious eye damage/eye irritation

Eyes - Rabbit - Blindness - OECD Test Guideline 405

Respiratory or skin sensitisation

No data available

Germ cell mutagenicity

No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

No data available

Teratogenicity

No data available

Specific target organ toxicity - single exposure (Globally Harmonized System)

May cause respiratory irritation.

May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)

No data available

Aspiration hazard

No data available

Potential health effects

| | |
|-------------------|--|
| Inhalation | May be harmful if inhaled. May cause respiratory tract irritation. Vapours may cause drowsiness and dizziness. |
| Ingestion | Harmful if swallowed. |
| Skin | Harmful if absorbed through skin. May cause skin irritation. |
| Eyes | May cause eye irritation. |

Signs and Symptoms of Exposure

drying, cracking of the skin, Skin irritation

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects

No data available

Additional Information

RTECS: EO1400000

12. ECOLOGICAL INFORMATION

Toxicity

| | |
|---|---|
| Toxicity to fish | LC50 - Pimephales promelas (fathead minnow) - 1,840 mg/l - 96 h |
| Toxicity to daphnia and other aquatic invertebrates | EC50 - Daphnia magna (Water flea) - 1,983 mg/l - 48 h |

Persistence and degradability

No data available

Bioaccumulative potential

| | |
|-----------------|---|
| Bioaccumulation | Oncorhynchus mykiss (rainbow trout) - 24 h Bioconcentration factor (BCF): 0.38 |
|-----------------|---|

Mobility in soil

No data available

PBT and vPvB assessment

No data available

Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1120 Class: 3 Packing group: III
Proper shipping name: Butanols
Reportable Quantity (RQ): 5000 lbs

Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN number: 1120 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTANOLS
Marine pollutant: No

IATA

UN number: 1120 Class: 3 Packing group: III
Proper shipping name: Butanols

15. REGULATORY INFORMATION

WHMIS Classification

| | | |
|-----|--|--|
| B2 | Flammable liquid | Flammable liquid |
| D2B | Toxic Material Causing Other Toxic Effects | Specific target organ toxicity - single exposure |
| | | Moderate skin irritant |
| | | Moderate respiratory irritant |
| | | Moderate eye irritant |

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Text of H-code(s) and R-phrases(s) mentioned in Section 3

Further information

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