

Classified as hazardous in accordance with the criteria of EPA New Zealand

Section 1 - Identification

Product Identifier

| | |
|-----------------------------|----------------------------------|
| Product Name | <u>sec-Butanol (Certified)</u> |
| CAS No | 78-92-2 |
| Synonyms | sec-Butyl alcohol, 2-Butanol |
| Molecular Formula | C ₄ H ₁₀ O |
| Molecular Weight | 74.12 |
| Recommended Use | Laboratory chemicals. |
| Uses advised against | No Information available |

| | |
|--------------------------------|---|
| Product Code | O1664-1; O1664-4; O1664FB-19; O1664FB-50; O1664FB-115; O1664FB-200; O1664RB-50; O1664RB-200; O1664RS-50; O1664RS-200; O1664SS-28; O1664SS-50; O1664SS-115; O1664SS-200 |
| Address | Thermo Fisher Scientific New Zealand Ltd 244 Bush Road, Albany, Auckland, New Zealand |
| Emergency Tel. | CHEMTREC® 09 980 6780 or +64 9 980 6780 |
| Telephone / Fax Numbers | Tel: 09 980 6700 Fax: 09 980 6788 |
| E-mail address | <u>ANZinfo@thermofisher.com</u> |

Section 2 - Hazard(s) Identification

Classification under Work Safe New Zealand

Classified as hazardous in accordance with the criteria of EPA New Zealand

HSNO Approval Number **HSR001098**

GHS Classification

Physical hazards

Flammable liquids

Category 3

Health hazards

Serious Eye Damage/Eye Irritation
Specific target organ toxicity - (single exposure)

Category 2
Category 3

Environmental hazards

Based on available data, the classification criteria are not met

Label Elements**Signal Word****Warning****Hazard Statements**

H226 - Flammable liquid and vapor
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation
H336 - May cause drowsiness or dizziness

Precautionary Statements**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
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P264 - Wash face, hands and any exposed skin thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area
P280 - Wear protective gloves/protective clothing/eye protection/face protection

Response

P312 - Call a POISON CENTER or doctor if you feel unwell
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Storage

P403 + P233 - Store in a well-ventilated place. Keep container tightly closed

Disposal

P501 - Dispose of contents/ container to an approved waste disposal plant

Other hazards which do not result in classification

Section 3 - Composition and Information on Ingredients

| Component | CAS No | Weight % |
|-------------------|---------|----------|
| sec-Butyl alcohol | 78-92-2 | >95 |

Section 4 - First Aid Measures

Description of first aid measures

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Inhalation

Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention.

| | |
|--|--|
| Eye Contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention. |
| Skin Contact | Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur. |
| Ingestion | Do NOT induce vomiting. Get medical attention. |
| Self-Protection of the First Aider | Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. |
| First Aid Facilities | Eyewash, safety shower and washroom. |
| Most important symptoms and effects | Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting |
| Notes to Physician | Treat symptomatically. Symptoms may be delayed. |

Section 5 - Fire Fighting Measures

Suitable Extinguishing Media

Water spray, carbon dioxide (CO₂), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

Extinguishing media which must not be used for safety reasons

No information available.

Specific Hazards Arising from the Chemical

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO), Carbon dioxide (CO₂), peroxides.

Special protective equipment and precautions for fire fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Section 6 - Accidental Release Measures

Personal Precautions, Protective Equipment and Emergency Procedures

Emergency procedures

Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions

Avoid release to the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up

Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment.

Precautions to prevent secondary hazards

Clean contaminated objects and areas thoroughly observing environmental regulations

Reference to Other Sections

Refer to protective measures listed in Sections 8 and 13.

Section 7 - Handling and Storage

Precautions for Safe Handling**Advice on safe handling**

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

Conditions for Safe Storage, Including any Incompatibilities**Storage Conditions**

Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat, sparks and flame. May form explosive peroxides on prolonged storage.

Incompatible Materials

Strong oxidizing agents. Acid chlorides. Acid anhydrides.

AS/NZS 2243.10:2004, Safety in laboratories - Storage of chemicals

AS 1940-2004 - The storage and handling of flammable and combustible liquids

Section 8 - Exposure Controls and Personal Protection

Control parameters**Exposure limits**

NZ - Workplace Exposure Standards and Biological Exposure Indices (6th edition). New Zealand Department of Labor

UK - EH40/2005 Work Exposure Limits, Fourth edition. Published 2020.

ACGIH - Threshold Limit Values - Ceiling (TLV-C) guidelines by the American Conference of Governmental Industrial Hygienists (ACGIH) for controlling worker exposure to airborne chemical concentrations in the workplace.

AUS - Exposure Standards for Atmospheric Contaminants in the Occupational Environment - Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:3008(1995)]

Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)] updated in August, 2005. Safe Work Australia

| Component | New Zealand WEL | Australia | ACGIH TLV | The United Kingdom |
|-------------------|--|--|--------------|--|
| sec-Butyl alcohol | TWA: 100 ppm TWA: 303 mg/m ³ | TWA: 100 ppm TWA: 303 mg/m ³ | TWA: 100 ppm | STEL: 150 ppm 15 min STEL: 462 mg/m ³ 15 min TWA: 100 ppm 8 hr TWA: 308 mg/m ³ 8 hr |

Biological limit values

This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Appropriate engineering controls**Engineering Measures**

Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Individual protection measures, such as personal protective equipment**Eye Protection**

Goggles (Australian/New Zealand Standard AS/NZS 1337 - Eye protectors for Industrial applications)

Hand Protection

Protective gloves

| Glove material | Breakthrough time | Glove thickness | AUS/NZ Standard | Glove comments |
|--------------------------------|-------------------|-----------------|-----------------|--|
| Butyl rubber, Neoprene gloves. | > 480 minutes | 0.38 mm | AS/NZS 2161 | As tested under EN374-3 Determination of Resistance to Permeation by Chemicals |
| Viton (R) | > 480 minutes | 0.45 mm | | |
| | > 480 minutes | 0.3 mm | | |

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.

(Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

| | |
|---------------------------------|---|
| Skin and body protection | Wear appropriate protective gloves and clothing to prevent skin exposure |
| Respiratory Protection | Use an AS/NZS 1716 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained in line with AS/NZS 1715 on the use and maintenance of respiratory protective devices |
| Recommended Filter type: | Organic gases and vapours filter Type A Brown conforming to EN14387 (or AUS/NZ equivalent) |
| Recommended half mask:- | Valve filtering: EN405 or Half mask: EN140 plus filter, EN 141 (or AUS/NZ equivalent) When RPE is used a face piece Fit Test should be conducted |

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls No information available.

Section 9 - Physical and Chemical Properties

Information on basic physical and chemical properties

| | | |
|--|--|--|
| Physical State | Liquid | |
| Appearance | Colorless | |
| Odor | sweet | |
| Odor Threshold | No data available | |
| pH | No information available | |
| Melting Point/Range | -115 °C / -175 °F | |
| Softening Point | No data available | |
| Boiling Point/Range | 99 °C / 210.2 °F | @ 760 mmHg |
| Flammability (liquid) | Flammable | On basis of test data |
| Flammability (solid,gas) | Not applicable | Liquid |
| Explosion Limits | Lower 1.7 vol% Upper 9.8 vol% | |
| Flash Point | 24 °C / 75.2 °F | Method - No information available |
| Autoignition Temperature | 390 °C / 734 °F | |
| Decomposition Temperature | No data available | |
| Viscosity | 4.2 mPa.s @ 20 °C | |
| Water Solubility | 125 g/L (20°C) | |
| Solubility in other solvents | No information available | |
| Partition Coefficient (n-octanol/water) | | |
| Component | log Pow | |
| sec-Butyl alcohol | 0.6 | |
| Vapor Pressure | 17 mbar @ 20 °C | |
| Density / Specific Gravity | 0.800 | |
| Bulk Density | Not applicable | Liquid |
| Vapor Density | 2.6 | (Air = 1.0) |
| Particle characteristics | Not applicable (liquid) | |

Other information

| | |
|-----------------------------|--|
| Molecular Formula | C4 H10 O |
| Molecular Weight | 74.12 |
| Explosive Properties | explosive air/vapour mixtures possible |

Section 10 - Stability and Reactivity

| | |
|---|--|
| Reactivity | None known, based on information available |
| Stability | Stable under normal conditions. May form explosive peroxides on prolonged storage. |
| Sensitivity to Mechanical Impact | No information available |
| Sensitivity to Static Discharge | No information available |
| Hazardous Polymerization | Hazardous polymerization does not occur. |
| Hazardous Reactions | None under normal processing. |
| Conditions to Avoid | Keep away from open flames, hot surfaces and sources of ignition, Incompatible products, Exposure to light, Exposure to air. |
| Incompatible Materials | Strong oxidizing agents, Acid chlorides, Acid anhydrides. |
| Hazardous Decomposition Products | Carbon monoxide (CO). Carbon dioxide (CO ₂). peroxides. |

Section 11 - Toxicological Information

Acute Effects

Information on likely routes of exposure

Product Information

| | |
|-------------------|--|
| Inhalation | Irritating to respiratory system. May be harmful if inhaled. May cause drowsiness and dizziness. |
| Eyes | Irritating to eyes. |
| Skin | Irritating to skin. May be harmful in contact with skin. |
| Ingestion | May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. |

Numerical measures of toxicity

(a) acute toxicity;

| | |
|-------------------|--|
| Oral | Based on available data, the classification criteria are not met |
| Dermal | Based on available data, the classification criteria are not met |
| Inhalation | Based on available data, the classification criteria are not met |

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|-------------------|--|------------------|------------------------------|
| sec-Butyl alcohol | 2200 mg/kg (Rat) 2193 mg/kg (Rat) | > 2 g/kg (Rat) | 49 mg/L (Rat) 4 h (vapour) |

(b) skin corrosion/irritation;

| | |
|-------------------------------|--|
| Test method | Based on available data, the classification criteria are not met OECD 404 |
| Test species | rabbit |
| Observational endpoint | No skin irritation |

(c) serious eye damage/irritation;

| | |
|---------------------|------------------------|
| Test method | Category 2 OECD 405 |
| Test species | rabbit |

Observation end point Irritating to eyes

(d) respiratory or skin sensitization;**Respiratory**

No data available

Skin

Based on available data, the classification criteria are not met

| Component | Test method | Test species | Study result |
|--------------------------------------|-------------------------|--------------|-----------------|
| sec-Butyl alcohol 78-92-2 (>95) | OECD Test Guideline 406 | guinea pig | non-sensitising |

(e) germ cell mutagenicity;

No data available

Not mutagenic in AMES Test

(f) carcinogenicity;

No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity;

No data available

(h) STOT-single exposure;

Category 3

Results / Target organsRespiratory system
Central nervous system (CNS)**(i) STOT-repeated exposure;**

No data available

Target Organs

No information available.

(j) aspiration hazard;

No data available

Symptoms / effects, both acute and delayed

Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting.

Section 12 - Ecological Information

Ecotoxicity**Aquatic ecotoxicity**

| Component | Freshwater Fish | Water Flea | Freshwater Algae | Microtox |
|-------------------|---|---------------------|------------------|-------------------------------------|
| sec-Butyl alcohol | Pimephales promelas: LC50: 3670 mg/L/96h | EC50: 3750 mg/L/24h | | Pseudomonas putida: 500 mg/L/16h |

Terrestrial ecotoxicity

There is no data for this product

Persistence and Degradability

Readily biodegradable

Persistence

Soluble in water, Persistence is unlikely, based on information available.

Bioaccumulative Potential

Bioaccumulation is unlikely

| Component | log Pow | Bioconcentration factor (BCF) |
|-------------------|---------|-------------------------------|
| sec-Butyl alcohol | 0.6 | No data available |

Mobility

The product is water soluble, and may spread in water systems. . Will likely be mobile in the environment due to its water solubility. Highly mobile in soils

Other adverse effects**Endocrine Disruptor Information**
Persistent Organic Pollutant
Ozone Depletion Potential

This product does not contain any known or suspected endocrine disruptors

This product does not contain any known or suspected substance

This product does not contain any known or suspected substance

Section 13 - Disposal Considerations

Waste treatment methods**Waste from Residues/Unused Products**

Do not allow into drains or watercourses or dispose of where ground or surface waters may be affected. Wastes, including emptied containers, are controlled wastes and should be disposed of in accordance with all federal, E.P.A., state and local regulations. Assure conformity with all applicable regulations.

Contaminated Packaging

Dispose of this container to hazardous or special waste collection point. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep product and empty container away from heat and sources of ignition.

Other Information

Disposal agencies or waste contractors must comply with the New Zealand Hazardous Substances (Disposal) Regulations . Waste codes should be assigned by the user based on the application for which the product was used. Do not flush to sewer. Can be landfilled or incinerated, when in compliance with local regulations.

Section 14 - Transport Information

NZS 5433:2020

| | |
|-----------------------------|----------|
| UN-No | UN1120 |
| Proper Shipping Name | Butanols |
| Hazard Class | 3 |
| Packing Group | III |

IATA

| | |
|-----------------------------|----------|
| UN-No | UN1120 |
| Proper Shipping Name | Butanols |
| Hazard Class | 3 |
| Packing Group | III |

IMDG/IMO

| | |
|-----------------------------|----------|
| UN-No | UN1120 |
| Proper Shipping Name | Butanols |
| Hazard Class | 3 |
| Packing Group | III |

| | |
|------------------------------|-----------------------|
| Environmental hazards | No hazards identified |
|------------------------------|-----------------------|

| | |
|---|--------------------------------|
| Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code | Not applicable, packaged goods |
|---|--------------------------------|

| | |
|----------------------------|---|
| Special Precautions | No special precautions required. Please refer to the applicable dangerous goods regulations for additional information. |
|----------------------------|---|

Additional information None known

Section 15 - Regulatory Information

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

| | |
|----------------------|-----------|
| HSNO Approval Number | HSR001098 |
|----------------------|-----------|

National Regulations

There are no applicable tolerable exposure limits or environmental exposure limits according to the EPA Controls for Hazardous Substances

Certified handlers, tracking and controlled substance license requirements

Certified handlers are required for some substances. This includes substances requiring a controlled substance license, and most explosives, vertebrates toxic agents, and certain fumigants. Acutely toxic substances which are a Category 1 or 2, such as pesticides also require Certified handlers. Please check the Health and Safety at Work Act 2015 for further information. Tracking is required for some highly hazardous substances. These substances need to be under the control of an appropriately trained person or appropriately secured. Please check the Health and Safety at Work Act 2015 for further information.

Prohibition or notification/licensing requirements

Shown below are details of specific prohibition/notifications or licensing requirements when they apply.

International Regulations

Ozone Depletion Potential This product does not contain any known or suspected substance

Persistent Organic Pollutant This product does not contain any known or suspected substance

Rotterdam Convention (PIC) Not applicable

Authorisation/Restrictions according to EU REACH

| Component | REACH (1907/2006) - Annex XIV - Substances Subject to Authorization | REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances | REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC) |
|-------------------|---|---|---|
| sec-Butyl alcohol | - | Use restricted. See item 75. (see link for restriction details) | - |

<https://echa.europa.eu/substances-restricted-under-reach>

International Inventories

New Zealand (NZIoC), Australia (AICS), Europe (EINECS/ELINCS/NLP), Korea (KECL), China (IECSC), Taiwan (TCSI), Japan (ENCS), Japan (ISHL), Canada (DSL/NDL), Philippines (PICCS). US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

| Component | CAS No | NZIoC | AICS | EINECS | ELINCS | NLP | KECL | IECSC | TCSI |
|-------------------|---------|-------|------|-----------|--------|-----|----------|-------|------|
| sec-Butyl alcohol | 78-92-2 | X | X | 201-158-5 | - | - | KE-03868 | X | X |

| Component | CAS No | TSCA | TSCA Inventory notification - Active-Inactive | DSL | NDL | PICCS | ISHL | ENCS |
|-------------------|---------|------|---|-----|-----|-------|------|------|
| sec-Butyl alcohol | 78-92-2 | X | ACTIVE | X | - | X | X | X |

Legend: X - Listed '-' - Not Listed

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

Section 16 - Other Information

This safety data sheet complies with the requirements of the EPA Hazardous Substances (Hazard Classification) Notice 2020 and WorkSafe New Zealand Regulations

Legend

NZIoC - New Zealand Inventory of Chemicals
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

IECSC - Chinese Inventory of Existing Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

TWA - Time Weighted Average

IARC - International Agency for Research on Cancer

NZS 5433:2020 - Transport of Dangerous Goods on Land

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from Ships

LD50 - Lethal Dose 50%

EC50 - Effective Concentration 50%

WEL - Workplace Exposure Limit

DNEL - Derived No Effect Level

POW - Partition coefficient Octanol:Water

vPvB - very Persistent, very Bioaccumulative

VOC - (Volatile Organic Compound)

AICS - Australian Inventory of Chemical Substances

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

ENCS - Japanese Existing and New Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

CAS - Chemical Abstracts Service

ACGIH - American Conference of Governmental Industrial Hygienists

PNEC - Predicted No Effect Concentration

OECD - Organisation for Economic Co-operation and Development

IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

ADG - Australian Code for the Transport of Dangerous Goods by Road and Rail

LC50 - Lethal Concentration 50%

ATE - Acute Toxicity Estimate

RPE - Respiratory Protective Equipment

NOEC - No Observed Effect Concentration

BCF - Bioconcentration factor

PBT - Persistent, Bioaccumulative, Toxic

Key literature references and sources for data

HSNO classifications provided in the New Zealand Chemical Classification Information Database (CCID).

<https://echa.europa.eu/information-on-chemicals>

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

EPA Guide to classifying hazardous substances in New Zealand

EPA - Assigning a product to an existing HSNO approval guide

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Chemical incident response training.

Fire prevention and fighting, identifying hazards and risks, static electricity, explosive atmospheres posed by vapours and dusts.

Revision Date 10-Mar-2023
Revision Summary Not applicable

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet