



InterTrade(Singapore)Chemicals Pte Ltd

Product Name	N-Butanol
MSDS Prepared by	InterTrade Product Safety and Health
Chemical Name	Normal-butanol
Molecular Formula	C4H10O
Molecular Weight	74.12
Product Use	solvent
OSHA Status	

1. COMPOSITION INFORMATION ON INGREDIENTS

(Typical composition is given, and it may vary. A certificate of analysis can be provided, if available.)

<u>Weight %</u>	<u>Component</u>	<u>CAS Registry No.</u>
100%	1-butanol	71-36-3

2. HAZARDS IDENTIFICATION

**FLAMMABLE LIQUID AND VAPOR
CAUSES EYE IRRITATION
HIGH VAPOR CONCENTRATIONS MAY CAUSE DROWSINESS AND IRRITATION OF
THE EYES OR RESPIRATORY TRACT
PROLONGED OR REPEATED SKIN CONTACT MAY CAUSE DRYING, CRACKING, OR
IRRITATION**

HMIS® Hazard Ratings: Health - 2, Flammability -3, Chemical Reactivity - 0

HMIS® rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

3. FIRST-AID MEASURES

Inhalation: Move to fresh air. Treat symptomatically. Get medical attention if symptoms persist.

Eyes: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin: Wash with soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention if symptoms occur.

Ingestion: Seek medical advice.



InterTrade(Singapore)Chemicals Pte Ltd

4. FIRE FIGHTING MEASURES

Extinguishing Media: water spray, dry chemical, carbon dioxide, alcohol foam

Special Fire-Fighting Procedures: Wear self-contained breathing apparatus and protective clothing. Use water spray to keep fire-exposed containers cool.

Hazardous Combustion Products: carbon dioxide, carbon monoxide

Unusual Fire and Explosion Hazards: Vapors may cause a flash fire or ignite explosively.

Vapors may travel considerable distance to a source of ignition and flash back. Prevent buildup of vapors or gases to explosive concentrations.

5. ACCIDENTAL RELEASE MEASURES

Use personal protective equipment. Eliminate all ignition sources. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste.

For Large Spills: Use water spray to disperse vapors and dilute spill to a nonflammable mixture. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

6. HANDLING AND STORAGE

Personal Precautionary Measures: Avoid breathing high vapor concentrations. Avoid contact with eyes and prolonged or repeated contact with skin. Use only with adequate ventilation. Wash thoroughly after handling.

Prevention of Fire and Explosion: Keep away from heat, sparks, and flame. Keep from contact with oxidizing materials. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.

Storage: Keep container tightly closed and in a well-ventilated place.

7. EXPOSURE CONTROLS/PERSONAL PROTECTION

Country specific exposure limits have not been established or are not applicable unless listed below.

N-BUTANOL

Singapore. OELs. (Factories (Permissible Exposure Levels of Toxic Substances) Order)
Short Term Exposure Limit (STEL): 50 ppm, 152 mg/m³

Ventilation: Good general ventilation (typically 10 air changes per hour) should be used.

Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Eye Protection: Wear safety glasses with side shields (or goggles). Wear a full-face respirator, if needed.

Skin Protection: For operations where prolonged or repeated skin contact may occur, chemical-resistant gloves should be worn. Contact health and safety professional or manufacturer for specific information.

Recommended Decontamination Facilities: eye bath, washing facilities



InterTrade(Singapore)Chemicals Pte Ltd

8. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form: liquid
Color: colorless
Odor: alcohol
Odor Threshold: 0.83 ppm
Specific Gravity: 0.81 (25 °C)
Vapor Pressure: 20 °C; 7.3 mbar
Vapor Density: 2.6
Freezing Point: -89 °C
Boiling Point: 118 °C
Evaporation Rate: 0.5 (n-butyl acetate = 1)
Viscosity: 3 mPa.s (20 °C) ,
Solubility in Water: moderate
Octanol/Water Partition Coefficient: P: 7.6; log P: 0.88
Flash Point: 36 °C (Tag closed cup)
Lower Flammable Limit: 1.5 %(V)
Upper Flammable Limit: 11.3 %(V)
Autoignition Temperature: 343 °C
Thermal Decomposition Temperature: (DTA) No exotherm to boiling

9. STABILITY AND REACTIVITY

Stability: Stable.
Incompatibility: Material reacts violently with strong oxidizing agents
Hazardous Polymerization: Will not occur.

10. TOXICOLOGICAL INFORMATION

Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

Oral LD-50:(rat)	2,500 mg/kg
Oral LD-50:(rabbit)	3,400 mg/kg
Inhalation LC-50: (rat)	4 h: > 8000 ppm
Dermal LD-50: (rabbit)	5,300 mg/kg
Skin Irritation (rabbit)	slight
Eye Irritation (rabbit)	strong

11. ECOLOGICAL INFORMATION

Acute toxicity data, if available, are listed below. Additional toxicity data may be available on request.

Oxygen Demand Data:

BOD-5: 1,710 mg/g
BOD-20: 1,890 mg/g

COD: 2,460 mg/g

Acute Aquatic Effects Data:

24 h LC-50 (goldfish): 1000 - 1400 mg/l
48 h LC-50 (golden orfe): 1770 mg/l
24 h LC-50 (daphnid): 1855 mg/l



InterTrade(Singapore)Chemicals Pte Ltd

12. DISPOSAL CONSIDERATIONS

Discharge, treatment, or disposal may be subject to national, state, or local laws. Incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied. Residual vapors may explode on ignition; do not cut, drill, grind, or weld on or near this container.

13. TRANSPORT INFORMATION

Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.

ADR/RID:

Possible Shipping Description(s):

UN 1120 BUTANOLS
3 III

Sea - IMDG (International Maritime Dangerous Goods)

Possible Shipping Description(s):

BUTANOLS
3 UN 1120 III

Air - ICAO (International Civil Aviation Organization)

Possible Shipping Description(s):

Butanols
3 UN 1120 III

14. REGULATORY INFORMATION

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.

WHMIS (Canada) Status: controlled

WHMIS (Canada) Hazard Classification: B/2, D/2/B

SARA 311-312 Hazard Classification(s):
immediate (acute) health hazard
fire hazard

SARA 313: none, unless listed below
n-butanol



InterTrade(Singapore)Chemicals Pte Ltd

Carcinogenicity Classification (components present at 0.1% or more): none, unless listed below:

TSCA (US Toxic Substances Control Act): This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act): This product is listed on the DSL or otherwise complies with CEPA new substance notification requirements.

EINECS (European Inventory of Existing Commercial Chemical Substances): This product is listed on EINECS or otherwise complies with EINECS requirements.
EINECS Number: 200-751-6

AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme): This product is listed on AICS or otherwise complies with NICNAS.

MITI (Japanese Handbook of Existing and New Chemical Substances): This product is listed in the Handbook or has been approved in Japan by new substance notification.

ECL (Korean Toxic Substances Control Act): This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.

Phillipines Inventory (PICCS) : This product is listed on the Phillipine Inventory or otherwise complies with PICCS.

15. OTHER INFORMATION

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment.

Highlighted areas indicate new or changed information.