2-Butanol

19440-1L

SECTION 1. IDENTIFICATION

Product name	:	2-Butanol
Number	:	000000020836
Product Use Description	:	Laboratory chemicals
Manufacturer or supplier's details	:	Honeywell International Inc. 1953 South Harvey Street Muskegon, MI 49442
For more information call	:	1-800-368-0050 +1-231-726-3171(Monday-Friday, 9:00am-5:00pm)
In case of emergency call	:	**Medical: 1-800-498-5701 or +1-303-389-1414**
	:	**Transportation (CHEMTREC): 1-800-424-9300 or +1-703-527-3887**
	:	
	:	(24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Form	:	liquid
Color	:	colourless
Odor	:	characteristic

Classification of the substance or mixture

Classification of the substance or mixture	:	Flammable liquids, Category 3 Eye irritation, Category 2A Specific target organ toxicity - single exposure, Category 3, Respiratory system, Central nervous system

GHS Label elements, including precautionary statements

Symbol(s) :

Signal word : Warning

Hazard statements : Flammable liquid and vapour.
Causes serious eye irritation.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary statements : **Prevention:**
Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

Response:
IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Call a POISON CENTER/ doctor if you feel unwell.
If eye irritation persists: Get medical advice/ attention.
In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:
Store in a well-ventilated place. Keep container tightly closed.
Keep cool.
Store locked up.

Disposal:

Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP, IARC, or OSHA.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C4H10O

Chemical nature : Substance

Chemical name	CAS-No.	Concentration
Butan-2-ol	78-92-2	100.00 %

SECTION 4. FIRST AID MEASURES

General advice : First aider needs to protect himself. Move out of dangerous area. Take off all contaminated clothing immediately.

Inhalation : When inhaled remove to fresh air and seek medical aid.

Skin contact : After contact with skin, wash immediately with plenty of water. Call a physician if irritation develops or persists.

Eye contact : Rinse thoroughly with plenty of water, also under the eyelids. Protect unharmed eye. Remove contact lenses. Call a physician immediately.

Ingestion : When swallowed, allow water to be drunk. Do NOT induce vomiting. Call a physician immediately.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Water spray Carbon dioxide (CO2) Dry powder Alcohol-resistant foam
Unsuitable extinguishing media	:	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards during firefighting	:	Flammable. Vapours may form explosive mixtures with air. Vapours are heavier than air and may spread along floors. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Fire may cause evolution of: carbon oxides (CO, CO2).
Special protective equipment for firefighters	:	Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear.
Further information	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Evacuate personnel to safe areas. Wear personal protective equipment. Unprotected persons must be kept away. Ensure adequate ventilation. Remove all sources of ignition. Avoid inhalation of vapour or mist. Avoid contact with skin, eyes and clothing.
Environmental precautions	:	Prevent further leakage or spillage if safe to do so. Should not be released into the environment.
Methods and materials for containment and cleaning up	:	Ventilate the area. Do not use sparking tools. Use explosion-proof equipment.

Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Handling

Precautions for safe handling	:	Wear personal protective equipment. Use only in well-ventilated areas. Avoid inhalation, ingestion and contact with skin and eyes.
Advice on protection against fire and explosion	:	Keep product and empty container away from heat and sources of ignition. No smoking. Take precautionary measures against static discharges. Vapours may form explosive mixtures with air.

Storage

Conditions for safe storage, including any incompatibilities	:	Store in area designed for storage of flammable liquids. Protect from physical damage. Store in original container. Keep containers tightly closed in a dry, cool and well-ventilated place.
Advice on common storage	:	Do not store together with: Oxidizing agents

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Protective measures	:	Ensure that eyewash stations and safety showers are close to the workstation location. Legal requirements are to be considered in regard of the selection, use and care of personal protective equipment. Avoid inhalation of vapour or mist. Avoid contact with skin, eyes and clothing.
Engineering measures	:	Use with local exhaust ventilation. Prevent vapour buildup by providing adequate ventilation during

and after use.

Eye protection : Safety goggles

Hand protection : Wear nitrile rubber gloves to avoid contact with the skin.
Gloves must be inspected prior to use.
Replace when worn.

Skin and body protection : Protective suit

Respiratory protection : In case of insufficient ventilation, wear suitable respiratory equipment.

Hygiene measures : General industrial hygiene practice.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Butan-2-ol	78-92-2	TWA : Time weighted average	(100 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values, as amended
Butan-2-ol	78-92-2	STEL : Short term exposure limit	455 mg/m3 (150 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Butan-2-ol	78-92-2	REL : Recommended exposure limit (REL):	305 mg/m3 (100 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards, as amended
Butan-2-ol	78-92-2	PEL : Permissible exposure limit	450 mg/m3 (150 ppm)	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended

Butan-2-ol	78-92-2	TWA : Time weighted average	305 mg/m3 (100 ppm)	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000), as amended

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	:	liquid
Color	:	colourless
Odor	:	characteristic
Odor threshold	:	Note: No data available
pH	:	Note: neutral
Melting point/range	:	ca. -89 °C
Boiling point/boiling range	:	ca. 99 °C
Flash point	:	75 °F (24 °C)
Evaporation rate	:	Note: No data available
Lower explosion limit	:	1.7 %(V)
Upper explosion limit	:	9.8 %(V)
Vapor pressure	:	16.5 hPa at 20 °C(68 °F) 110 hPa at 50 °C(122 °F)
Vapor density	:	Note: No data available

Density	:	0.81 g/cm3 at 20 °C
Water solubility	:	125 g/l at 20 °C
Solubility in other solvents	:	Note: Soluble in most organic solvents
Partition coefficient: n-octanol/water	:	log Pow: 0.61
Ignition temperature	:	390 - 406 °C
Auto-ignition temperature	:	Note: not auto-flammable
Decomposition temperature	:	Note: At normal pressure may be distilled without decomposition.
Viscosity, dynamic	:	ca. 3.5 - 4.2 mPa.s at 20 °C
Viscosity, kinematic	:	Note: No data available
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Molecular weight	:	74.12 g/mol

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	Vapours may form explosive mixture with air.
Conditions to avoid	:	Keep away from heat and sources of ignition.
Incompatible materials	:	Plastic materials can be attacked.

Strong oxidizing agents
Acids
Halogens
Peroxides

Hazardous decomposition products : Fire may cause evolution of:
carbon oxides (CO, CO2).

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity : LD50: 2,193 mg/kg
Species: Rat
Method: OECD Test Guideline 423

Acute inhalation toxicity : LC50: > 20 mg/l
Exposure time: 4 h
Species: Rat

Acute dermal toxicity : LD50: > 2,000 mg/kg
Species: Rabbit
Method: OECD Test Guideline 402

Skin irritation : Species: Rabbit
Result: non-irritant
Method: OECD Test Guideline 404
Exposure time: 4 h

Eye irritation : Species: Rabbit
Result: Risk of serious damage to eyes.
Method: OECD Test Guideline 405

Sensitisation : Maximisation Test
Species: Guinea pig
Result: non-sensitizing
Method: OECD Test Guideline 406

Genotoxicity in vitro	:	Test Method: Microbial mutagenesis assay (Ames test) Metabolic activation: with and without metabolic activation Result: negative Method: OECD Test Guideline 471
Genotoxicity in vivo	:	Test Method: Micronucleus test Species: Mouse Application Route: Intraperitoneal injection Method: OECD Test Guideline 474 Result: negative
Aspiration toxicity	:	Not classified due to data which are conclusive although insufficient for classification.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish	:	LC50: 2,993 mg/l Exposure time: 96 h Species: Pimephales promelas (fathead minnow)
Toxicity to daphnia and other aquatic invertebrates	:	EC50: 308 mg/l Exposure time: 48 h Species: Daphnia magna (Water flea)
Toxicity to algae	:	EC50: 2,039 mg/l Exposure time: 96 h Species: Pseudokirchneriella subcapitata (green algae)
Toxicity to bacteria	:	Cell multiplication inhibition test 500 mg/l Exposure time: 16 h Species: Pseudomonas putida Method: DIN 38412

Elimination information (persistence and degradability)

Bioaccumulation	:	Bioconcentration factor (BCF): < 100 Note: Bioaccumulation is unlikely.
Biodegradability	:	aerobic Result: Readily biodegradable. Value: 86 %

Further information on ecology

Biochemical Oxygen Demand (BOD)	:	Value: 1,870 mg/g
Chemical Oxygen Demand (COD)	:	Value: 2,470 mg/g
Adsorbed organic bound halogens (AOX)	:	Note: Product does not contain any organic halogens.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods	:	Observe all Federal, State, and Local Environmental regulations.

SECTION 14. TRANSPORT INFORMATION

DOT	UN/ID No.	:	UN 1120
	Proper shipping name	:	BUTANOLS
	Class		3
	Packing group		III
	Hazard Labels		3

IATA	UN/ID No.	:	UN 1120
	Description of the goods	:	BUTANOLS
	Class	:	3
	Packaging group	:	III
	Hazard Labels	:	3
	Packing instruction (cargo aircraft)	:	366
	Packing instruction (passenger aircraft)	:	355
	Packing instruction	:	Y344

(passenger aircraft)

IMDG	UN/ID No.	:	UN 1120
	Description of the goods	:	BUTANOLS
	Class	:	3
	Packaging group	:	III
	Hazard Labels	:	3
	EmS Number	:	F-E, S-D
	Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

Inventories

US. Toxic Substances Control Act	:	On TSCA Inventory
Australia. Industrial Chemicals Act (AIIC), as amended	:	On the inventory, or in compliance with the inventory
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL)	:	All components of this product are on the Canadian DSL
Japan. Kashin-Hou Law List	:	On the inventory, or in compliance with the inventory
Korea. Existing Chemicals Inventory (KECI)	:	On the inventory, or in compliance with the inventory
Philippines. Inventory of Chemicals and Chemical Substances (PICCS)	:	On the inventory, or in compliance with the inventory
China. Inventory of Existing Chemical Substances (IECSC)	:	On the inventory, or in compliance with the inventory
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	:	On the inventory, or in compliance with the inventory

National regulatory information

SARA 302 Components	:	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.	
SARA 313 Components	:	The following components are subject to reporting levels established by SARA Title III, Section 313:	
	:	Butan-2-ol	78-92-2
SARA 311/312 Hazards	:	Fire Hazard Acute Health Hazard	
California Prop. 65	:	This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.	
Massachusetts RTK	:	Butan-2-ol	78-92-2
New Jersey RTK	:	Butan-2-ol	78-92-2
Pennsylvania RTK	:	Butan-2-ol	78-92-2

SECTION 16. OTHER INFORMATION

		HMIS III	NFPA
Health hazard	:	2*	2
Flammability	:	3	3
Physical Hazard	:	0	
Instability	:		0

* - Chronic health hazard
Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

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. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.
Previous Issue Date: 10/08/2016
Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group