Revision 2

1. IDENTIFICATION

Product Name	**1-Butanol**
Other Names	1-Hydroxybutane; Butyl alcohol; Butyric alcohol; n-Butanol; n-Butyl Alcohol; Proryl carbino
Uses	Used as a solvent and chemical intermediate
Chemical Family	No Data Available
Chemical Formula	$C_4H_{10}O$
Chemical Name	Acetic acid
Product Description	No Data Available
Company	Arman sina.co
Contact Information	info@armansina.com www.armansina.com

2. HAZARD IDENTIFICATION

Hazard Categories

Flammable liquids Category 3
Acute toxicity (Oral) Category 4
Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 1
Specific target organ toxicity - single exposure Category 3
Specific target organ toxicity - repeated exposure Category 2

Signal Word Danger

Hazard Statements

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.

Precautionary Statements

Prevention

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ eye protection/ face protection.
P270	Do not eat, drink or smoke when using this product.

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Response

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and
easy to do. Continue rinsing.
P332 + P317 If skin irritation occurs: Get medical advice/ attention.
P337 + P317 If eye irritation persists: Get medical advice/ attention.

if present and easy to do. Continue rinsing.

	P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
	P302 + P352	IF ON SKIN: Wash with plenty of water.
	P301 + P316	IF SWALLOWED: Get emergency medical help immediately.
	P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Storage	P403 + P235	Store in a well-ventilated place. Keep cool.
	P405	Store locked up.
Disposal	P501	Dispose of contents/ container to an approved facility in accordance with local, regional, national and international regulations.

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3. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients

Chemical Entity	Formula	CAS Number	Proportion
1-Butanol	$C_4H_{10}O$	71-36-3	>=99.5 %

4. FIRST AID MEASURES

Description of necessary measures according to routes of exposure

Swallowed

IF SWALLOWED seek medical advice immediately and show this container or label. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

Eye

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

agents or any other additives.

Skin

IF ON SKIN (or hair): Wash with soap and water. If skin irritation occurs: Get medical advice/attention. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse.

Inhaled

IF INHALED: Move to fresh air in case of accidental inhalation of vapours. In case of shortness of breath, give oxygen. I f breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.

Advice to Doctor

5. FIRE FIGHTING MEASURES

General Measures	Flammable liquid and vapor.
Flammability Conditions	FLAMMABLE LIQUID & VAPOUR: May be ignited by heat, sparks or flame.
Extinguishing Media	Water spray, foam, dry powder or carbon dioxide.
Fire and Explosion Hazard	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. Heat may cause the containers to explode.
Hazardous Products of Combustion	Fire will produce irritating, toxic and/or corrosive gases, including carbon dioxide (CO2), other pyrolysis products typical of burning organic material.
Special Fire Fighting Instructions	Use water spray to keep fire-exposed containers cool. Water may be ineffective in fighting the fire. Fight fire from a protected location. Move containers from fire area if you can do so without risk.
Personal Protective Equipment	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA.
Flash Point	37 °C (Closed Cup)
Lower Explosion Limit	1.4 %(V)
Upper Explosion Limit	11.3 %(V)
Auto Ignition Temperature	No Data Available
Hazchem Code	No Data Available

6. ACCIDENTAL RELEASE MEASURES

General Response Procedure	Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.
Clean Up Procedures	Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use only non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.
Containment	Stop leak if safe to do so - Prevent entry into waterways, drains or confined areas. Vapour-suppressing foam may be used to control vapours; Water spray may be used to knock down or divert vapour clouds.
Decontamination	Neutralise residues with lime or soda ash. Wash area and prevent runoff into drains.
Environmental Precautionary Measures	Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.
Evacuation Criteria	For non-emergency personnel: Isolate leaks provided that there is no additional risk for the people performing this task. Evacuate the area and keep out those without protection. Personal protection equipment must be used against potential contact with the spilt product (See section 8). Above all prevent the formation of any vapour-air flammable mixtures, through either ventilation or the use of an inert medium. Remove any source of ignition. Eliminate electrostatic charges by interconnecting all the conductive surfaces on which static electricity could form, and also ensuring that all surfaces are connected to the ground. For emergency responders: Wear protective equipment. Keep unprotected persons away. See section 8
Personal Precautionary Measures	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. See Section 8 of the MSDS for Personal Protective Equipment

7. HANDLING AND STORAGE

Handling	DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Take precautionary measures against static discharges. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only nonsparking tools. Wear protective gloves/protective e clothing/eye protection/face protection. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wash hands thoroughly after handling.

Storage	Keep away from food, drink and animal feeding stuffs. Keep container tightly closed in a cool, well-ventilated place. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids.
Container	Keep only in the original container or packaging as supplied and/or recommended by the manufacturer.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

General	These Workplace Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These workplace exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity. A time weighted average (TWA) has been established for Butan-1-ol (Safe Work Australia) of 152 mg/m^3, (50 ppm). STEL: Peak limitation - n-Butyl alcohol - Safe Work Australia. The STEL (Short Term Exposure Limit) is an exposure value that should not be exceeded for more than 15 minutes and should not be repeated for more than 4 times per day. There should be at least 60 minutes between successive exposures at the STEL. The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week.
Exposure Limits	exposure limit values l 52 mg/m3 50 ppm Footnote Limitation
Biological Limits	
Engineering Measures	No Data Available
Personal Protection Equipment	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. An eye wash and safety shower must be available in the immediate work area. Use explosion-proof ventilation equipment. Eye/face protection: Wear safety glasses with side shields (or goggles). Skin protection Hand protection: Chemical resistant gloves Other: Wear suitable protective clothing.
Special Hazards Precaustions	In case of inadequate ventilation use suitable respirator.
Work Hygienic Practices	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Provide eyewash station and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Clear liquid
Odour	Characteristic
Colour	Colourless
pH	No Data Available
Vapour Pressure	0.9 kPa (25 °C)
Relative Vapour Density	2.6 AIR=1
Boiling Point	118 ° C

Melting Point	**-89.8 °C**
Freezing Point	**-89.8 °C**
Solubility	**90 g/l in water**
Specific Gravity	**No Data Available**
Flash Point	**37 °C (Closed Cup)**
Auto Ignition Temp	**650 °F**
Evaporation Rate	**No Data Available**
Bulk Density	**No Data Available**
Corrosion Rate	**No Data Available**
Decomposition Temperature	**No Data Available**
Density	**No Data Available**
Specific Heat	**No Data Available**
Molecular Weight	**74.12 g/mol (C4H10O)**
Net Propellant Weight	**No Data Available**
Octanol Water Coefficient	**0.88**
Particle Size	**No Data Available**
Partition Coefficient	**No Data Available**
Saturated Vapour Concentration	**No Data Available**
Vapour Temperature	**No Data Available**
Viscosity	**No Data Available**
Volatile Percent	**No Data Available**
VOC Volume	**No Data Available**
Additional Characteristics	**No information available.**
Potential for Dust Explosion	**Not applicable.**
Fast or Intensely Burning Characteristics	**No Data Available**
Flame Propagation or Burning Rate of Solid Materials	**No information available.**
Non-Flammables That Could Contribute Unusual Hazards to a Fire	**No information available.**
Properties That May Initiate or Contribute to Fire Intensity	**FLAMMABLE LIQUID & VAPOUR: May be ignited by heat, sparks or flame.**
Reactions That Release Gases or Vapours	**No Data Available**
Release of Invisible Flammable Vapours and Gases	**No Data Available**

10. STABILITY AND REACTIVITY

General Information	**No dangerous reaction known under conditions of normal use.**
Chemical Stability	**Material is stable under normal conditions.**
Conditions to Avoid	**Heat, sparks, flames. Contact with incompatible materials.**
Materials to Avoid	**Strong oxidizing agents. Acids. Aldehydes. Isocyanates.**
Hazardous Decomposition Products	**Thermal decomposition may release oxides of carbon.**

Hazardous Polymerisation	**Will not occur.**

11. TOXICOLOGICAL INFORMATION

General Information

Information on likely routes of exposure
Ingestion: Harmful if swallowed.
Inhalation: May cause irritation to the respiratory system. May cause drowsiness or dizziness.
Skin contact: May be harmful in contact with skin. Causes skin irritation.
Eye contact: Causes serious eye damage.

Acute

Ingestion

Acute toxicity (Oral):
LD 50 (Rat): 790 mg/kg

Other

Acute toxicity (Dermal):
LD 50 (Rabbit): 3,400 mg/kg

Inhalation

Acute toxicity (Inhalation):
- LC 50 (Rat, 4 h): 8,000 mg/l

Carcinogen Category — **None**

12. ECOLOGICAL INFORMATION

Ecotoxicity

Acute Fish Toxicity (BUTYL ALCOHOL)
LC50 / 96 hours Fathead Minnow - 1,840 mg/L

Persistence/Degradability — **No Data Available**

Mobility — **The product is partly soluble in water. May spread in the aquatic environment**

Environmental Fate — **Avoid release to the environment.**

Bioaccumulation Potential

Bioconcentration factor (BCF) Product: **Rainbow trout,donaldson trout (Oncorhynchus mykiss), Bioconcentration factor (BCF): 0.38 (Static)**

Environmental Impact — **The product components are not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.**

13. DISPOSAL CONSIDERATIONS

General Information — **Since emptied containers retain product residue, follow label warnings even after container is emptied.**

Special Precautions for Land Fill	**Discharge, treatment, or disposal may be subject to national, state, or local laws. Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.**

14. TRANSPORT INFORMATION

Land Transport

Proper Shipping Name	**1-Butanol**
Class	**3**
Subsidiary Risk(s)	**3 Flammable Liquids**
EPG	**No Data Available**
UN Number	**1120**
Hazchem	**No Data Available**
Pack Group	**III**
Special Provision	**No Data Available**

Sea Transport

Proper Shipping Name	**1-Butanol**
Class	**3**
Subsidiary Risk(s)	**3 Flammable Liquids**
UN Number	**1120**
Hazchem	**No Data Available**
Pack Group	**No Data Available**
Special Provision	**III**
EMS	**No Data Available**
Marine Pollutant	**No**

Air Transport

Proper Shipping Name	**1-Butanol**
Class	**3**
Subsidiary Risk(s)	**3 Flammable Liquids**
UN Number	**1120**
Hazchem	**No Data Available**
Pack Group	**III**
Special Provision	**No Data Available**

15. OTHER INFORMATION

Revision	3
Key/Legend	**< Less Than** **> Greater Than** **AICS Australian Inventory of Chemical Substances** **atm Atmosphere** **CAS Chemical Abstracts Service (Registry Number)** **cm² Square Centimetres** **CO2 Carbon Dioxide** **COD Chemical Oxygen Demand** **deg C (° C) Degrees Celcius** **deg F (° F) Degrees Farenheit** **g Grams** **g/cm³ Grams per Cubic Centimetre** **g/l Grams per Litre** **HSNO Hazardous Substance and New Organism** **IDLH Immediately Dangerous to Life and Health** **immiscible Liquids are insoluable in each other.** **inHg Inch of Mercury** **inH2O Inch of Water** **K Kelvin** **kg Kilogram** **kg/m³ Kilograms per Cubic Metre** **lb Pound** **LC50 LC stands for lethal concentration. LC50 is the concentration of a material in air which causes the death of 50%** (one half) of a group of test animals. The material is inhaled over a set period of time, usually 1 or 4 hours. **LD50 LD stands for Lethal Dose. LD50 is the amount of a material, given all at once, which causes the death of 50% (one** half) of a group of test animals. **ltr or L Litre** **m³ Cubic Metre** **mbar Millibar** **mg Milligram** **mg/24H Milligrams per 24 Hours** **mg/kg Milligrams per Kilogram** **mg/m³ Milligrams per Cubic Metre** **Misc or Miscible Liquids form one homogeneous liquid phase regardless of the amount of either component present.** **mm Millimetre** **mmH2O Millimetres of Water** **mPa.s Millipascals per Second** **N/A Not Applicable** **NIOSH National Institute for Occupational Safety and Health** **NOHSC National Occupational Heath and Safety Commission** **OECD Organisation for Economic Co-operation and Development** **Oz Ounce** **PEL Permissible Exposure Limit** **Pa Pascal** **ppb Parts per Billion** **ppm Parts per Million** **ppm/2h Parts per Million per 2 Hours** **ppm/6h Parts per Million per 6 Hours** **psi Pounds per Square Inch** **R Rankine** **RCP Reciprocal Calculation Procedure** **STEL Short Term Exposure Limit** **TLV Threshold Limit Value** **tne Tonne** **TWA Time Weighted Average** **ug/24H Micrograms per 24 Hours** **UN United Nations** **wt Weight**