


Number: 005

Section 1. Product and Company Identification

Product name: Butyl alcohol
Synonyms: -
Recommended use and Restrictions on use: Ester manufacture, especially for n-butyl acetate; Solvents of resin and paint film; plasticizing agent; assistant staining agent; Water pressure fluid; A prescription of cleanser; Dehydrated agent (both boiling and distillation); Intermediate; "Butylated" melamine resin; Ethylene glycol ether; n-butyl acryl ate.
Manufacturer, Importer, or Supplier: Shiny Chemical Industrial Co., Ltd. Address: No.5, Yeong Gong 1 st Rd, Yeong An Dist., Kaohsiung 82841, Taiwan, R.O.C. Telephone: +886-7-8619171 ext. 711~714
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Section 2. Hazards Identification

Classification: 1. Flammable Liquids: Category NO.3 2. Serious Eye Damage/Eye Irritation: Category NO.1 3. Skin Corrosion/Irritation: Category NO.2 4. Acute Toxicity (oral): Category NO.4 5. Aspiration Hazard: Category NO.3
Label elements:  Hazard pictograms: Flame, Corrosion, Exclamation mark Signal word: Danger Hazard Statements: 1. Flammable liquid and vapour. 2. Causes serious eye damage. 3. Causes skin irritation. 4. Harmful if swallowed. 5. May cause respiratory irritation. Precautionary statements: 1. Keep away from sources of ignition - No Smoking.

2. If contacted with eyes, flush with plenty of water before seek for medical attention.

Other Hazards: -

Section 3. Composition/Information on Ingredients

Pure substance

Chemical Name: Butyl alcohol

Synonyms: n-Butanol, n-Butyl alcohol, Proryl carbinol, 1-Hydroxybutane, Butyric alcohol, Butyl alcohol

CAS NO. : 71-36-3

Weight: >99%

Section 4. First Aid Procedures

Description of first aid measures:

• Inhalation:

1. Remove contamination sources or move victims to fresh air.
2. If breathing stops, have trained personnel administer artificial respiration. Administer cardiopulmonary resuscitation (CPR) immediately if the heart has stopped.
3. Get medical attention immediately.

• Skin contact:

1. Wash contaminated sites tenderly with warm water for at least 20 minutes.
2. Remove contaminated clothing, shoes, and leather when washing.
3. Get medical attention immediately if irritation persists.
4. Clean contaminated clothing, shoes, and leather thoroughly before reuse or abandon.

• Eye contact:

1. Immediately lift eyelids, flushing eyes with plenty of warm water for at least 20 minutes.
2. Get medical attention immediately.

• Ingestion:

1. Never give anything by mouth to victims will soon lose consciousness or unconsciousness already or with the convulsion.
2. Have conscious victims gargle thoroughly with clear water.
3. Don't induce vomiting.
4. Have victim drink 240~300 mL of water.
5. If vomiting occurs, lean victim forward to reduce the risk of ingesting vomits, and repeat gargling.

The most Important Symptoms and Hazardous Effects: Central nervous system

depression. It may cause alcoholism-like syndromes.

Protection for emergency personnel: Use appropriate personal protective equipment such as class C clothing to take first aid in a safety area.

Notes to Physicians: If swallowed, consider gastric lavage and activated carbon.

Section 5. Firefighting Measures

Suitable extinguishing media: Carbon dioxide, chemical dry, alcohol foam.

Special hazards during firefighting: Vapors heavier than air will propagate to fire sources and cause flash back.

Firefighting procedures: It is unsuitable to extinguish with water. If leaks are not on fire, use water mist absorbing heat to cool containers. Protect spill-stopping personnel.

Protective equipment for firefighters: Extinguishing staffs should wear respirators protective gloves, and fire-fighting clothing.

Section 6. Accidental Release Measures

Personal precautions:

1. Restrain personnel from close to spilled areas before totally cleaning out.
2. Confirm the cleaning work be responsible by trained staffs.
3. Wear appropriate personal protective equipments.

Environmental precautions:

1. Ventilate this area.
2. Remove all sources of ignition.

Methods for cleaning up:

1. Do not touch spilled material.
2. Avoid leaks flushing to sewers or confined areas.
3. Try to stop or reduce leaks in safety condition.
4. Use sand, soil, and inert absorbing agents to block leaks.
5. Small spill: Use the material, not react with spill, to absorb. Contaminated absorbing agents have same risk as spill. Place in covered and labeled containers. Spray water on spilled areas. Use plenty of water to dilute small spill.
6. Large spill: Contact fire control, urgent handling units and suppliers to seek aid.

Section 7. Handling and Storage

Handling:

1. This material is flammable and toxic liquid. Engineering control should be applied and make the best use of personal protective equipments when handling. Educate risk of this material and safety training of use.
2. Remove all ignition sources away from heat and incompatible substances.
3. There should be a "No smoking" sign in workspace.

4. The liquids will accumulate the electric charge. Consider extra design to increase electric conductance. All barrels, containers, and pipelines must have earth connection and contact with naked metal. While transporting and operating, reduce velocity flow, increase operating time to elevate the time that the liquids stays in pipeline, or operate at low temperature.
5. When the operation of allocation is not in the airtight system, insure allocating containers, received-transporting apparatus and containers connected with same electric potential.
6. Empty tanks, containers, and pipelines may have risk residuals. Don't weld, cut, hole or do other heat work before clearing up.
7. Barrels or storage containers can be filled with the inert gas to reduce fire and explosion.
8. Use spark-resistant ventilation system in workplace. Apparatus should be the explosion-proof type.
9. Keep sidewalks and exports unimpeded.
10. Storage and large operating areas are considered to install fire and spill detection system, and appropriate automatic fire-fighting system or enough and useful emergency apparatus.
11. Avoid mist or vapors. Operate in well-ventilated assigned place and adopt the minimum consumption. Separate operation and storage areas.
12. Wear appropriate personal protective equipments to avoid contacting with this chemical or contaminated apparatus if necessary.
13. Don't use with incompatible substances to avoid increasing risk of fire and explosion.
14. Use storage containers made of compatible substances. Package carefully to avoid spray out.
15. Don't use air or inert gas to pressurize and transport liquids from containers.
16. Unless allocating areas isolated with the fire-resistant structure, don't allocate and work in storage areas.
17. Use approved storage containers of flammable liquids and allocating apparatus.
18. Don't pour contaminated liquids back to original storage containers.
19. Containers should be labeled, confined and prevented from damage while not using.

Storage:

1. Store in shady, cool, dry, and well-ventilated place that sunshine cannot directly illuminate, and keep away from heat, ignition sources, and incompatible substances.
2. Storage apparatus should be constructed with the refractory materials.

3. The floor should be constructed with the impermeable materials to avoid absorbing from the floor.
4. Set slope, doorsill or dig grooves in an entrance to discharge spill to safe places.
5. Storage areas should be labeled clearly with no barriers. Permit assigned or trained personnel to enter.
6. Keep storage areas away from workspace, lifts, building, room exits, and main passages.
7. Have appropriate fire extinguisher and leak cleaning apparatus near storage areas.
8. Check containers regularly whether damage or leak.
9. Check all new containers whether appropriately labeled and no damage.
10. Limit storage.
11. Store spill in containers made of compatible substances.
12. Storage tanks have earth connection and connected with other apparatus by using same electric potential.
13. Install depressurizing and vacuum releasing valves in all barrels stored flammable liquids.
14. Store in accordance with the storage temperature suggested by chemical manufacturers or suppliers. Install warm-detecting sirens if necessary to alarm temperature is too high or too low.
15. Avoid storing large amount in room. Store in fireproofing isolating building as possible.
16. Install flame-extinguishing devices in storage exhaust pipes.
17. Storage tanks should be underground tanks. Seal whole area on the bottom to avoid leak surrounded with liquid dikes, which can block the whole capacity.

Section 8. Exposure controls

Engineering controls:

1. Operation sometimes needs local exhaust systems.
2. Use spark-resistant and earth-connection ventilation system separately.
3. Direct outside exhaust vents.
4. Supply adequate fresh air to replenish the exhausted air.

Control parameters

TWA	STEL	CEILING	BEIs
100 ppm	125 ppm	-	-

Personal protective equipment:

- Respiratory protection:
 1. < 1,250ppm: Stable flow air-feed type, dynamical air purifying with organic vapor cartridges type respiratory protective equipments.

2. < 1,400ppm: Chemical full-type with organic vapor cartridges, dynamical air purifying type, air-feed, portable protective equipments.
3. Unknown: Portable positive-pressure type respiratory protective equipments, positive-pressure full-supply with air-feed type respiratory protective equipments.
4. Escape: Mask with organic vapor cartridges, portable escape-type respiratory protective equipments.
 - Hand protection: Protective glove materials of Butyl rubber, Teflon, Viton, 4H, Barricade, CPF3, Responder are better.
 - Eye protection: Chemical leak-proof goggles or full-type masks.
 - Skin and physical protection: -

Hygiene measures:

1. Remove contaminated clothing quickly as possible after work. Clean clothing before reuse or abandon. Tell cleaning staffs the harmfulness.
2. Forbid smoking or eating in workplace.
3. After handling this material, wash hands thoroughly.
4. Keep workplace clean.

Section 9. Physical and Chemical Properties

Appearance: Colorless liquid	Odor: Stinking smell
Odor threshold: 1. 0.12 ~ 11 ppm (monitor) 2. 1 ~ 20 ppm (sensor)	Melting point: -89.3°C
pH: -	Boiling point/Boiling range: 117 ~ 118°C
Flammability (solid, gas): -	Flash point: 37°C
Decomposition temperature: -	Test method: close cup
Auto-ignition temperature: 343°C	Explosion limits: 1.4% ~ 1.2%
Vapor pressure: 6.5 mmHg (25°C)	Vapor density: 2.6 (air=1)
Density: 0.81 (Water = 1)	Solubility: 7.3 ~ 7.7 g/100 mL water (25°C)
Partition coefficient (n-octanol/water, log K _{ow}): 0.84	Volatility rate: 0.47 (N-butyl acetate=1)

Section 10. Stability and Reactivity

Chemical stability: Stable under ordinary conditions.

Possibility of hazardous reactions:

1. Oxidants (nitrate, perchloric acid, peroxide) and chromic trioxide: Increase fire and explosion risk.
2. Aluminum: React at high temperature.

Conditions to avoid: Statics, sparks and ignition sources.

Materials to avoid: Oxidants, aluminum, chromic trioxide.

Hazardous decomposition products: Carbon monoxide, carbon dioxide.

Section 11. Toxicological Information

Exposure Route: Inhalation, skin, eye, ingestion.

Symptoms: Irritation, headaches, tiredness, nausea.

Acute toxicity:

- Inhalation: It is a central nerve inhibitor. Vapors cause headaches, dizziness, tiredness and irritation of upper respiratory tract. 24 ppm may cause slight irritation. 50 ppm may cause headaches.

- Skin:

1. Transient exposure has no irritation.
2. It may dissolve fat and make skin dry temporarily.
3. It will be absorbed via skin and cause toxic effects as inhalation.

- Eyes:

1. The vapor concentration higher than 50 ppm will irritate eyes; liquid will irritate seriously.
2. The concentration higher than 200 ppm may cause cornea inflammation, blurred vision, shedding tears and photophobia.

- Ingestion:

1. Generally speaking, butyl alcohol may lead to alcoholism-like syndromes, such as headaches, dizziness, puzzledness, nausea and vomiting
2. Serious situations include breathing hard, conscious loss and lethargy. There are also reports of liver damage.

- LD₅₀ (animal test, entry): 800 ~ 4,400 mg/kg (rat, swallow).

- LC₅₀ (animal test, entry): >8,000 ppm/4 H (rat, inhalation).

- 405 mg/24 hours (rabbit, skin): Cause moderate irritation.

- 2 mg/24 hours (rabbit, eyes): Cause severe irritation.

Chronic / Long-term toxicity:

1. A 10-year study shows the concentration lower than 100 ppm has no risk associated with employees.
2. Long-term or repetitive contact may cause contact dermatitis (skin dry, red, and chap).
3. Animal studies find the dose may cause toxicity to mothers and sometimes develop malformation.
4. Primary alcohol will be decomposed in the body and excreted. It might not accumulate.
5. Chlorinated solvents (such as carbon tetrachloride), aromatic hydrocarbons (such as xylene) or dithiocarbamate will strengthen toxicity.

6. There are reports in the damage of auditory nerve to aggravate noise-inducing damage. 35,295 mg/Kg (pregnant rats 1 ~ 15 days, swallow) may cause embryo toxicity.

Section 12. Ecological Information

Ecological toxicity:

1. LC₅₀ (fish): 1,910 ~ 1,940 mg/L/96 hours
2. EC₅₀ (aquatic invertebrates): 1,983 mg/L/48 hours (water fleas)
3. Bioconcentration factor (BCF): -

Persistence and degradability:

1. When released into water, this material is expected to biodegrade.
2. When released into the air, this material may react with oxyhydrogen radicals and have a half-life of about 2.3 days.
 - Half-life (Air): 8.8 ~ 87.7 hours
 - Half-life (Water surface): 24 ~ 168 hours
 - Half-life (Groundwater): 48 ~ 1,296 hours
 - Half-life (Soil): 24 ~ 168 hours

Bioaccumulative potential: May not accumulate. This material is decomposed in the body and excreted.

Mobility in soil: When released into the soil, this material is expected to permeate through soil or biodegrade, or evaporate.

Other adverse effects: -

Section 13. Disposal Considerations

Waste disposal:

1. Consult references to regulations.
2. Waste disposal is according to the storage condition.
3. Adopt particular incineration or sanitary burying.

Section 14. Transport Information

United Nations Number (UN No.): 1120

UN Proper Shipping Name: Butyl alcohol

Transport Hazard classes: 3

Packaging Group: III

Marine pollutant (Yes/No): No

Specific Transport Measures and Precautionary Conditions: -

Section 15. Regulatory Information

Applicable Regulations:

1. Waste storage and disposal methods and facilities setup standard.

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| 2. General rules of hazardous materials and harmful substances. |
| 3. Road and Traffic Safety Rules. |

Section 16. Other Information

References	1. CHEMINFO database, CCINFO CD-RAW, 2005-2. 2. MSDS database, CCINFO CD-RAW, 2005-2. 3. RTECS database, TOMES PLUS CD-RAW, Vol.63, 2005. 4. HSDB database, TOMES PLUS CD-RAW, Vol.63, 2005. 5. ChemWatch database, 2004-4.
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Notes	The symbol " - " in this sheet indicates no available information; the symbol " / " indicates the information is not applicable to the substance.