Number: 104

Section 1. Product and Company Identification

Product name: r-Butyrolactone
Synonyms: -
Used in the production of drugs such as cyclopropylamine and pyrrolidone, as well as industrial solvents, diluents, curing agents, etc.
Manufacturer, Importer, or Supplier: Shiny Chemical Industrial Co., Ltd. Address: No.5, Yeong Gong 1st Rd, Yeong An Dist., Kaohsiung 82841, Taiwan, R.O.C. Telephone: +886-7-8619171 ext. 711~714
Emergency telephone number: +886-7-8619171 ext. 711~714 Fax: +886-7-6222620

Section 2. Hazards Identification

Classification:

1. Acute toxic substance (Inhalation), category 4
2. Serious damage/Eyes irritation, category 1
3. Specific target organ toxicity substances - single exposure, category 3

Label elements:

Hazard pictograms: Exclamation mark, Corrosion
Signal word: Danger
Hazard Statements:

1. Harmful if swallowed.
2. Causes serious eye damage.
3. May cause respiratory irritation.

Precautionary statements:

1. Wear appropriate protective clothing, gloves, eye mask / face shield.
2. If contact with your eyes, immediately wash your skin with plenty of water and consult with doctors.
3. Once clothes are contaminated, take off immediately.

Other Hazards: -

Section 3. Composition/Information on Ingredients

Pure substance

Chemical Name: r-Butyrolactone

Synonyms: Dihydro-2(3H)-furanone、gamma-Butalactone、1,4-Butanolide、4-Butanolide、Butyric acid lactone、gamma-Butyrolactone、4-Butyrolactone gamma-Butyryl lactone、4-Deoxytetronic acid、2-Oxotetrahydrofuran、Gamma bl、4-Hydroxybutanoic acidlactone、gamma-Hydroxybutyric acid lactone、Tetrahydro-2-furanone、4-Hydroxybutyric acid lactone BLO.
CAS NO. : 96-48-0
Weight: ≧99.5%

Section 4. First Aid Procedures

Description of first aid measures:

• Inhalation: If smoke or flammable substances are inhaled, the patient should be removed from the contaminated area.

• Skin contact:

1. Immediately remove all contaminated clothing and footwear.
2. Wash skin and hair with water and soap.
3. If you feel irritation, seek medical attention.

• Eye contact:

1. Immediately open the eyelids and continue to rinse eyes.
2. Keep eyes open and wash eyes thoroughly, occasionally open the upper and lower eyelids to rinse.
3. Continue to rinse to the Poison Consultation Center or the doctor to take over the treatment, or rinse for more than 15 minutes.
4. Immediately send medical treatment.
5. After eyes injury, contact lens should be removed by a professional.

• Ingestion:

1. If swallowed, it should be treated as soon as possible.
2. Consult the Poisons Center or the doctor.
3. Must seek medical attention immediately.
4. At the same time, qualified first-aid personnel should observe and rescue according to the patient's condition.
5. If the medical staff and the doctor are already in place, patient is required to take care and a copy of the safety information sheet for the substance. Follow-up treatment, should be provided by the medical staff.
6. If treatment is not available immediately in or around the workplace, a copy of patient and safety data sheet will be sent to the hospital for treatment.
7. If unable to complete medical treatment or more than 15 minutes vehicle distance from the hospital, except special instructions, conscious patient should lean back forward below the throat, using fingers to induce vomiting and keep the patient leaning forward or lying on the left side (head down as much as

possible) to maintain unblocked and avoid inhaling objects into the lungs. 8. Inducing vomiting by physical methods should wear protective gloves.
The most Important Symptoms and Hazardous Effects: -
Protection for emergency personnel: Apply appropriate personal protective equipment such as class C clothing to conduct first aid in a safety area.
Notes to Physicians: Treated according to different symptoms.

Section 5. Firefighting Measures

Suitable extinguishing media: 1. Foam. 2. Carbon dioxide. 3. Chemical dry powder. 4. Use water or water spray during fire.
Special hazards during firefighting: 1. Combustible. 2. If fire occurs, it is minor fire hazard. 3. Heating may cause expansion or decomposition, and lead the container to burst. 4. May produce toxic fumes or carbon monoxide may be produced during combustion. 5. May produce irritating fumes. 6. Droplets containing combustible materials may be explosive. 7. May be toxic, corrosive smoke.
Firefighting procedures: 1. Inform the firefighting team of the hazardous substance and hazard features. 2. Wear full protective clothing and respiratory protection. 3. Avoid leakage and flow into rivers or waterways. 4. Spray a large amount of water mist to control the fire and cool the adjacent area. 5. Avoid sprinkling water into the pool. 6. Prohibit access to high temperature containers. 7. Spray water mist from the protected area to cool the container exposed to fire. 8. Remove the container from fire in a safe situation.
Protective equipment for firefighters: -

Section 6. Accidental Release Measures

Personal precautions: -
Environmental precautions: -
Methods for cleaning up: Small leaks:

1. Remove all ignition sources.
2. Clean up all leaks and spills immediately.
3. Avoid vapors inhaling or getting in contact with skin and eyes.
4. Wear protective clothing to avoid personal contact.
5. Absorb spillage with mud, inert material or vermiculite. Receiving spills.
6. Wipe the spill.
7. Store in a properly and clearly marked waste container.

Large leaks:

1. Moderate hazard.
2. Evacuate personnel in the area and move to the upper wind area.
3. Notify emergency processing units of the disaster and hazard characteristics.
4. Wear respiratory protection and protective gloves.
5. Try to avoid leakage and flow into rivers or waterways.
6. No smoking, exposure to light or ignition sources.
7. Improve ventilation.
8. Try to stop the leak in a safe situation.
9. Use muddy sand, inert mud or inert materials to contain or absorb leakage.
10. Place the recyclable material in a clearly labeled container.
11. Return the solid residue to a clearly sealed container for disposal.
12. Flush the area and avoid material influx into the river.
13. If accidentally contaminate rivers or waterways, you should notify emergency processing units.

Section 7. Handling and Storage

Handling:

1. Dispose of in a well ventilated area.
2. Avoid material accumulation in depressions and sewage pits.
3. Forbidden to enter the restricted space without confirmation.
4. Avoid smoking, exposure to light or sources of ignition.
5. Avoid contact with incompatible materials.
6. Do not eat or smoke during operation.
7. Close the container during non-use.
8. Avoid container physical damage.

Precautions:

1. Avoid all personal contact, including inhalation.
2. If any risk of over exposure, wear personal protective clothing.
3. Be sure to wash your hands with water and soap after disposal.
4. Overall should be washed separately.
5. The contaminated clothing can only reuse after cleaning.

6. Maintain good occupational health practices.
7. Follow the manufacturer's recommendations for storage and disposal.
8. Regularly detect air quality to ensure the safety of the working environment.

Storage:
Suitable containers:
1. Avoid all personal contact, including inhalation.
2. If any risk of over exposure, wear personal protective clothing.
3. Be sure to wash your hands with water and soap after disposal.
4. Do not use epoxy-lined barrels.

Store incompatible materials: Avoid reaction with oxidizing agents.
Storage requirements:-

Section 8. Exposure controls

Engineering controls:
1. Usually need local exhaust ventilation system.
2. If any risk of over exposure, wear a qualified respiratory protection. Correctly wear respiratory for protection.
3. In some cases it may be necessary to wear a qualified self-contained breathing apparatus (SCBA).
4. Warehouse or confined storage space should provide adequate ventilation conditions.

Control parameters			
TWA	STEL	CEILING	BEIs
-	-	-	-

Personal protective equipment:
• Respiratory protection: Select the level and model of the respirator based on contaminant and chemical characteristics.
• Hand protection: Wear chemical protective gloves such as PVC.
• Eye protection:
1. Safety glasses with side shields.
2. Chemical goggles.
3. Wearing contact lens may cause harm.

• Skin and physical protection: Wear safety footwear or full rubber boots, such as rubber.

Hygiene measures:
1. Remove the contaminated clothing as soon as possible after washing. Wash or dispose it, and inform the laundry personnel of the harmfulness of the pollution.
2. No smoking or eating in the workplace.
3. Wash hand thoroughly after handling this product.

4. Maintain workplace cleanliness.

Section 9. Physical and Chemical Properties

Appearance: Colorless liquid	Odor: Pleasant flavor
Odor threshold: -	Melting point: -43°C
pH: 4.5 (10% solution)	Boiling point/Boiling range: 206°C
Flammability (solid, gas): -	Flash point: 98°C Test method: close cup
Decomposition temperature: 455°C	
Auto-ignition temperature: -	Explosion limits: 1.4% ~ 6.9%
Vapor pressure: 0.45 mmHg (25°C)	Vapor density: 3 (air=1)
Density: 1.13 (g/cm^3) (Water=1) (25°C)	Solubility: Slightly soluble in water, soluble in organic solvents, alcohol
Partition coefficient (n-octanol/water, log K_{ow}): -	Volatility rate: slow

Section 10. Stability and Reactivity

Chemical stability: Stable under normal temperature and pressure.
Possibility of hazardous reactions: No hazardous polymerization will occur.
Conditions to avoid: Avoid contact with incompatible materials.
Materials to avoid: Avoid reacting with oxidizing agents.
Hazardous decomposition products: -

Section 11. Toxicological Information

Exposure Route: Inhalation, Skin, Eye, Ingestion.
Symptoms: Temporary discomfort, systemic effects, eye damage, damage to individual health, cancer or mutation.
Acute toxicity: • Skin: 1. Long-term exposure can cause temporary discomfort. Exposure should be kept to a minimum and use appropriate gloves in the workplace to maintain good hygiene measures. 2. Skin contact may be harmful to personal health and may cause systemic effects through absorption. 3. Do not expose when open wounds, abrasions or sensitive skin. 4. Harmful systemic injury may result from wound, abrasion or graze entering the blood system. 5. Check the skin before using and ensure proper protection of the external wound. • Inhalation:

1. It is evidenced by exposure to more than one kind animal that the substance produces a harmful systemic effect.
2. Exposure should be kept to a minimum extent, and appropriate management practices should be used in the workplace to maintain good hygiene measures.

• Ingestion:

1. May be harmful if accidental ingestion.
2. Animal experiments indicate that ingestion of approximately 150 grams may result in death or serious damage to health.

• Eyes:

Applying to the eyes can cause serious eye damage.

• LD_{50} (animal test, entry): 1,540 mg/kg (rat, swallowed);
>5,000 mg/kg (guinea pig, skin);
1,460 mg/kg (small genus, swallowed);
1,100 mg/kg (mouse, intraperitoneal injection);
500 mg/kg (rabbit, IV)

• LC_{50} (animal test, entry): -

Chronic / Long-term toxicity:

1. May causes cancer or mutation, but there is not enough data to evaluate.
2. IARC lists it as Group 3: Unable to judge human carcinogenicity.

Section 12. Ecological Information

Ecological toxicity:

1. LC_{50} (fish): 100-500 mg/L /48H (minnow)
2. EC_{50} (aquatic invertebrates): -
3. Bioconcentration factor (BCF): -

Persistence and degradability: -

• Half-life (Air): -
• Half-life (Water surface): -
• Half-life (Groundwater): -
• Half-life (Soil): -

Bioaccumulative potential: Accumulation in the body of water is low.

Mobility in soil: Highly fluid in the soil.

Other adverse effects: Do not discharge to drains or sewers.

Section 13. Disposal Considerations

Waste disposal:

1. Pierce the container to prevent reuse and bury in a legal landfill.
2. Forbidden to clean the water from equipment into drainage system.
3. Be necessary to collect all treated water before disposal.

4. Recycle as much as possible. Consult the manufacturer for recycling or consult the waste management agency for disposal.
5. Buried or incinerated in an approved disposal site.
6. Recycle the container if possible, or discard at a qualified landfill.

Section 14. Transport Information

United Nations Number (UN No.): -
UN Proper Shipping Name: -
Transport Hazard classes: -
Packaging Group: -
Marine pollutant (Yes/No): -
Specific Transport Measures and Precautionary Conditions: -

Section 15. Regulatory Information

Applicable Regulations:

1. Labor Safety and Health Law.
2. Regulation of Labeling and Hazard Communication of Dangerous and Harmful Materials.
3. Organic solvent poisoning prevention rules.
4. Harmful substances concentration permission standards in the labor working environment.
5. Road Traffic Safety Rules.
6. Industrial waste storage and disposal facilities standard.
7. Public dangerous goods and High-pressure flammable gas setting standards & Safety management approach.

Section 16. Other Information

References	1. CHEMINFO Database · CCINFO CD · 2005-2 2. RTECS Database · TOMES PLUS CD · Vol.63 · 2005 3. HSDB Database · TOMES PLUS CD · Vol.63 · 2005 4. ChemWatch Database · 2004-4
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Revision Date	2022/09/01
Notes	The symbol " - " in this sheet indicates no available information; the symbol " / " indicates the information is not applicable to the substance.