



Material Safety Data

Product Name :C4 LPG (BUTANE)

긴급전화번호 (Emerhency Telephone Number)
061 - 688 - 6117 (24 hours)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1. Product

- Product Name : C4 LPG (BUTANE)
- UN NO. : 1011

2. Advisable use and Restriction

- Advisable use : FUEL
- Restriction : Do not handle until all safety precautions have been read and understood.

3. Manufacturer information

- Manufacture company : YEOCHUN NCC
- Address: 2 Yeosusandan-3ro(205-6,Pyeongyeo-dong), Yeosu, Jeollanam-Do, Korea (555-210)
- Telephone: 82-61-688-6117

2. HAZARD IDENTIFICATION

1. Hazard classification

- FLAMMABLE GASES Category 1
- GASES UNDER PRESSURE Liqueied gas

2. Allocation label elements

- Symbol



- Signal Word : Danger
- Hazard statements

H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.

- Precautionary statements
 - Prevention

P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

– Response

P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381 Eliminate all ignition sources if safe to do so.

– Storage

P403 Store in a well-ventilated place.

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P410 + P403 Protect from sunlight. Store in a well-ventilated place.

3. Other hazard information not included in hazard classification (NFPA)

Chemical Name	NFPA Level		
	Health	Flammability	Reactivity
BUTANE	1	4	0
ISOBUTANE	0	4	0

3. INGREDIENT INFORMATION

Components	Common name	CAS No.	PCT(M%)
BUTANE	BUTANE	106-97-8	85 ~ 95
ISOBUTANE	ISOBUTANE	75-28-5	5 ~ 15

4. FIRST AID MEASURES

1. Following eye contact

- It is unlikely that emergency treatment will be required for contact with the gas form.
- If contact with liquefied or compressed gas occurs, flush eyes with large amounts of water for at least 15-20 minutes until no evidence of chemical remains.
- Get medical attention immediately.

2. Following skin contact

- It is unlikely that emergency treatment will be required for contact with the gas form.
- If contact with liquefied or compressed gas occurs, flush skin with large amounts of water for at least 15-20 minutes until no evidence of chemical remains.
- Get medical aid immediately.
- Wash skin with soap and water.
- If frostbite or cryogenic burns occur, warm affected area in warm water at a temperature of 107°F (41.7°C).
- Seek immediate medical assistance.

3. Following inhalation

- Administer oxygen if breathing is difficult.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Give artificial respiration if victim is not breathing.
- Keep victim warm and quiet.
- Move to fresh air.

- Seek immediate medical assistance.
- 4. Following ingestion
 - It is unlikely that emergency treatment will be required for contact with the gas form..
 - It is unlikely that emergency treatment will be required.
- 5. Advice to physician
 - Do not apply drugs of the adrenaline ephedrine group.
 - Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
 - Exposures require specialized first aid with contact and medical follow-up .

5. FIRE FIGHTING MEASURES

1. Suitable/Unsuitable extinguishing media
 - Suitable extinguishing media
 - CO2.
 - Dry chemical.
 - Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
 - Use dry sand or earth to smother fire.
 - Water spray.
 - Unsuitable extinguishing media
 - Direct water.
2. Specific hazards arising from the chemical
 - Pyrolytic product
 - Can decompose at high temperatures forming toxic gases.
 - corrosive and/or toxic fumes.
 - Risk of fire and explosion
 - Containers may explode when heated.
 - Contains gas under pressure; may explode if heated.
 - Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
 - Extremely flammable gas.
 - Extremely flammable.
 - Fire may produce irritating and/or toxic gases.
 - May ignited from heat, friction or contamination.
 - May violently polymerize and result in fire and explosion.
 - Will form explosive mixtures with air.
 - When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
 - Will be easily ignited by heat, sparks or flames.
3. Special protective equipment for firefighters
 - Contact may cause burns to skin and eyes.
 - DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
 - Damaged cylinders should be handled only by specialists.
 - Evacuate area and fight fire from a safe distance.
 - Fire involving Tanks: ALWAYS stay away from tanks engulfed in fire.
 - Fire involving Tanks: Cool containers with flooding quantities of water until well after fire is out.

- Fire involving Tanks: Do not direct water at source of leak or safety devices: icing may occur.
- Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles: if this is impossible, withdraw from area and let fire burn.
- Fire involving Tanks: Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Move containers from fire area if you can do it without risk.
- Rescuers should put on appropriate protective gear.
- Runoff may cause pollution.
- Ruptured cylinders may rocket.
- Substance may be transported hot.
- Use extinguishing agent suitable for type of surrounding fire.
- Vapors from liquefied gas are initially heavier than air and spread along ground.

6. ACCIDENTAL RELEASE MEASURES

1. Health considerations and protective equipment

- All equipment used when handling the product must be grounded.
- Allow substance to evaporate.
- Do not direct water at source of leak.
- Do not enter areas which have more than 23.5% oxygen in the atmosphere, without respirator or air supplied mask.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Do not touch or walk through spilled material.
- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- If possible, turn leaking containers so that gas escapes rather than liquid.
- Isolate area until gas has dispersed.
- Isolate hazard area.
- Keep unnecessary and unprotected personnel from entering.
- Please note that materials and conditions to be avoided.
- Stop leak if you can do it without risk.
- The very fine particles can cause a fire or explosion, eliminate all ignition sources.
- Ventilate the contaminated area.

2. Environmental precautions

- Prevent entry into waterways, sewers, basements or confined areas.

3. For cleaning up

- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Dike and collect water used to fight fire.
- Small Spill: Flush area with flooding quantities of water.

7. HANDLING AND STORAGE

1. Precautions for safe handling

- Caution: Dangerous fire hazard when exposed to heat, or flame, sparks.
- Use adequate machine for prevention when package handling.
- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)

2. Conditions for safe storage (including any incompatibilities)

- Choose a place that can be protected from strong oxidizers and acid.
- Store containers: AVOID the place where can be damage and contamination.
- Store in a cool/low-temperature, well-ventilated {dry} place {away from heat and ignition sources}

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1. Exposure exposure limits, Biological exposure standard :

Components	Occupational exposure	ACGIH	Biological standard
BUTANE	TWA : 800ppm	TWA : 1000ppm	No data available
ISOBUTANE	No data available	TWA : 1000ppm	No data available

2. Appropriate engineering controls

- Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

3. Personal protection equipment

○ Respiratory protection

- If high frequency of use or exposure, wear air respirator.
- Wear breathing protection, which needs a confirmation from the Korea Occupational Safety and Health Agency.

○ Eye protection

- Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
- Provide emergency showers and eyewash.
- Wear suitable protective goggles and face shields.

○ Hand protection

- Wear Non-moisture permeable chemical resistance protective gloves(latex, nitrile rubber, PC) for prevent skin contact.
- Wear insulated gloves.
- Wear suitable protective gloves.

○ Body protection

- Wear suitable protective clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless gas
Odour	Disagreeable odor
Odour threshold	(2.9 – 14.6 mg/m ³)
pH Values	N/A
Melting point/freezing point	-138 °C

Initial boiling point and boiling range	-0.5 °C
Flash point	-60 °C
Evaporation rate	N/A
Flammability(solid, gas)	Highly flammable gas
Upper/lower flammability or explosive limits	1.8~8.4 Vol %
Vapour pressure	2.137 x 10 ² kPa (21.1 °C)
Solubility(ies)	6 x 10 ⁻³ g/100mℓ (25 °C, Water)
Vapor Densities	2 (Air =1)
Relative density	0.6 (Water =1)
n-octanol/water partition coefficient	2.89 (Log Kow)
Auto ignition temperature	365 °C
Decomposition temperature	-10840 (cal/g)
Viscosity	7.54 x 10 ⁻³ cP (7.5 μPa s, 27 °C)
Molecular weight(mass)	58.12

10. STABILITY AND REACTIVITY

1. Stability and hazardous reactivity

- Can decompose at high temperatures forming toxic gases.
- Containers may explode when heated.
- Contains gas under pressure; may explode if heated.
- Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Extremely flammable gas.
- Extremely flammable.
- Fire may produce irritating and/or toxic gases.
- Fire may produce irritating, corrosive and/or toxic gases.
- May cause toxic effects if inhaled.
- May violently polymerize and result in fire and explosion.
- Will form explosive mixtures with air.
- Some may burn but none ignite readily.
- Stable under normal temperatures and pressures.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Will be easily ignited by heat, sparks or flames.

2. Conditions to avoid

- Ignition source(heat, spark, flame, etc.).

3. Materials to avoid

- Combustibles, reducing material.
- Irritating and/or toxic gas.

4. Hazardous decomposition products

- Corrosive/toxic fume.
- Irritating, corrosive and/or toxic gas.

11. TOXICOLOGICAL INFORMATION

1. Exposure route information

- Dermal, Inhalation exposure is possible since GAS

2. Health hazard information

※ No data of the product. thus data was described by the product component.

Acute toxicity

● Oral PRODUCT : No data

- BUTANE : No data
- ISOBUTANE : No data

● Dermal PRODUCT : No data

- BUTANE : No data
- ISOBUTANE : No data

● Inhalation-Gases PRODUCT : N/A (ATE mix > 715945 ppm)

- BUTANE : N/A / LC50 > 800000 ppm/15m Rat (Dead, similar substance CAS No. 74-98-6)
- ISOBUTANE : N/A / LC50 367978.3689 ppm Mouse

● Inhalation-Vapours PRODUCT : N/A

- BUTANE : N/A
- ISOBUTANE : N/A

● Inhalation-Dust/mist PRODUCT : N/A

- BUTANE : N/A
- ISOBUTANE : N/A

SKIN CORROSION/IRRITATION PRODUCT : No data

- BUTANE : No data
- ISOBUTANE : No data

SERIOUS EYE DAMAGE/EYE IRRITATION PRODUCT : N/A

- BUTANE : N/A / Not irritating Rabbit
- ISOBUTANE : N/A / Not irritating Rabbit

RESPIRATORY SENSITIZATION PRODUCT : No data

- BUTANE : No data
- ISOBUTANE : No data

SKIN SENSITIZATION PRODUCT : No data

- BUTANE : No data
- ISOBUTANE : No data

CARCINOGENICITY PRODUCT : N/A

- BUTANE : N/A
- OSHA : No data
- Notice of Employment and Labor : No data
- NTP : No data

- IARC : No data
- EU CLP : 1A (containing $\geq 0,1$ % butadiene (203-450-8))
- ACGIH : No data
- ISOBUTANE : N/A
- OSHA : No data
- Notice of Employment and Labor : No data
- NTP : No data
- IARC : N/A
- EU CLP : Carc. 1A (containing $\geq 0,1$ % butadiene)
- ACGIH : No data
- GERM CELL MUTAGENICITY PRODUCT : N/A
 - BUTANE : N/A / Mammal (human) chromosomal aberrations in the trench show negative, regardless of metabolic activity. (OECD Guideline 473, GLP)
 - ISOBUTANE : N/A / Negative on the microbial retroactive mutation test
- REPRODUCTIVE TOXICITY PRODUCT : N/A
 - BUTANE : N/A / Rats-based reproductive toxicity test results do not show any particular abnormalities related to reproduction and development (OECD Guideline 422, GLP)
 - ISOBUTANE : No data
- SPECIFIC TARGET ORGAN TOXICITY SINGLE EXPOSURE PRODUCT : N/A
 - BUTANE : Category 3(Narcotic effects) / Results of acute inhalation toxicity test with mouse showed central nervous system inhibition, rapid shallow breathing, and apnea signs. (LC50(120min) = 1237mg/L air) Acute toxicity test results with rabbits do not show toxicity to the eyes.
 - ISOBUTANE : No data
- SPECIFIC TARGET ORGAN TOXICITY REPEATED EXPOSURE PRODUCT : N/A
 - BUTANE : N/A / Repeat inhalation toxicity test (4 weeks) using rats does not show any particular abnormalities other than weight loss (NOAEC = 4000ppm)(OECD Guideline 422, GLP)
 - ISOBUTANE : No data
- ASPIRATION HAZARD PRODUCT : No data
 - BUTANE : No data
 - ISOBUTANE : No data

12. ECOLOGICAL INFORMATION

1. Aquatic toxicity PRODUCT
ACUTE AQUATIC HAZARD : Not classified, LONG-TERM AQUATIC HAZARD: Not classified
- Fish
 - BUTANE : LC50 27.98 mg/L/96h Fish
 - ISOBUTANE : No data
 - Crustacea
 - BUTANE : LC50 69.43 mg/L/48h Aquatic invertebrates
 - ISOBUTANE : No data
 - Aquatic algae
 - BUTANE : EC50 16.67 mg/L/96h Aquatic algae
 - ISOBUTANE : No data

2. Persistence and degradation

- Degradation
 - BUTANE : No data
 - ISOBUTANE : No data
- n-octanol water partition coefficient
 - BUTANE : 2.89 log Kow
 - ISOBUTANE : 2.76 log Kow

3. Bioaccumulative potential

- Bioaccumulation
 - BUTANE : No data
 - ISOBUTANE : 1.57 ~ 1.97
- Biodegradation
 - BUTANE : 100 % 385.5 hr
 - ISOBUTANE : 65.7 (%) 35 day

4. Mobility in soil

- Soil adsorption coefficient(Koc)
 - BUTANE : No data
 - ISOBUTANE : No data

5. Other adverse effects

- Others
 - BUTANE : No data
 - ISOBUTANE : No data
- Hazardous to ozone layer
 - BUTANE : N/A
 - ISOBUTANE : N/A

13. DISPOSAL CONSIDERATIONS

1. Disposal methods

- Dispose of container and unused contents in accordance with all applicable regulations.

2. Precautions (including disposal of contaminated container of package)

- Empty containers may explode and residues can be ignited when pressured, cut, weld, heated.
- Empty containers may rupture when pressured.
- Empty containers recycled under environmental laws.
- Wear an appropriate Personal protection. (See Exposure Controls/Personal Protection section.)

14. TRANSPORT INFORMATION

1. UN No : 1011
2. Proper shipping name : BUTANE
3. Class or division : 2.1
4. Packing group : Not established

5. Marine pollutant : Not established
6. Special safety response for transportation or transportation measure :
- Emergency measures in case of fire : F-D
 - Emergency measures in the effluent : S-U

15. REGULATORY INFORMATION

- EU Classification (CLASSIFICATION) PRODUCT : Not established
 - ISOBUTANE : F+; R12
 - BUTANE : F+; R12
- EU Classification (Risk Phrases) PRODUCT : Not established
 - ISOBUTANE : R12
 - BUTANE : R12
- EU Classification (Safety Phrases) PRODUCT : Not established
 - ISOBUTANE : S:(2)-9-16
 - BUTANE : S:(2)-9-16
- 2006/507/EC PRODUCT : Not established
 - ISOBUTANE : Not established
 - BUTANE : Not established
- 689/2008/EC PRODUCT : Not established
 - ISOBUTANE : Not established
 - BUTANE : Not established
- Designation, Reportable Quantities, and Notification PRODUCT : Not established
 - ISOBUTANE : Not established
 - BUTANE : Not established
- Emergency Planning and Notification PRODUCT : Not established
 - ISOBUTANE : Not established
 - BUTANE : Not established
- Toxic Chemical Release Reporting – Community Right-to-Know PRODUCT : Not established
 - ISOBUTANE : Not established
 - BUTANE : Not established
- Process Safety Management of Highly Hazardous Chemicals PRODUCT : Not established
 - ISOBUTANE : Not established
 - BUTANE : Not established

16. OTHER INFORMATION

1. Reference
- ACGIH
 - CCR
 - EU CLP
 - Exploring QSAR – Hydrophobic, Electronic, and Steric Constants.

- HSDB
- IARC
- ICSC
- IUCLID
- NTP
- Non-Fluorinated Propellants and Solvents for Aerosols, chapter 6 pp 61-72.
- Non-Fluorinated Propellants and Solvents for Aerosols, chapter 6 pp 61-72. CRC Press, Cleveland, Ohio, USA
- OSHA
- Publication
- Study report
- The Estimation Programs Interface (EPI) Suite™ v4.00
- United States Environmental Protection Agency
- Washington, DC: American Chemical Society.

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- 2.0.0 : 2010.09.17
- 3.0.0 : 2017.03.16
- 4.0.0 : 2018.01.31
- 5.0.0 : 2020.12.01

4. Other

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