SDS(Safety Data Sheet)

Product	Commercial Butane (LPG)		
MSDS Number	List No.	Issuing date	Last revised date
-	PD1025	2008-07-25	2024-01-16

1. IDENTIFICATION

1) Product name

Commercial Butane (LPG)

2) Recommended use of the chemical and restriction on use

- Recommended use Fuels and additives
- Restrictions on use Do not use for any other purpose.

3) Details of the supplier of the safety data sheet

○ **Manufacturer**

- Company name GS Caltex Corporation
- Address GS Tower, 508, Nonhyeon-ro, Gangnam-gu, Seoul, Korea
- Emergency telephone number 1544-5151

2. HAZARDS IDENTIFICATION

1) Classification of the product

FLAMMABLE GASES : Category 1

GASES UNDER PRESSURE : Compressed gas

2) Label elements

○ **Hazard pictograms**

○ **Signal word**

Danger

○ **Hazard statements**

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

○ **Precautionary statements**

1) Prevention

- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

2) Response

- P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
- P381 In case of leakage, eliminate all ignition sources.

3) Storage

- P403 Store in a well-ventilated place.

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

4) Disposal

- Not applicable

3) Other hazards

○ **Product NFPA Level**

(※ 0-Lack, 1-Low, 2-Moderate, 3-High, 4-Very High)

Product name	Health	Flammable	Reaction
Commercial Butane (LPG)	0	0	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical name	Trade names and Synonyms	CAS No.	EC No.	Contain Ratio(%)
Butane	Butyl hydride ; Methylethylmethane ;N-Butane	106-97-8	203-448-7	95
Petroleum gases, liquefied	Bottled gas ; Compressed petroleum gas ; Erdolgase, verflussigt (german) (EINECS)	68476-85-7	270-704-2	5

4. FIRST AID MEASURES

1) Eye contact

- If eye irritation persists: Get medical advice/attention.

2) Skin contact

- In case of contact with substance, immediately flush skin with running water for at least 20 minutes.
- If skin irritation occurs: Get medical advice/attention.
- Thaw frosted parts with lukewarm water. Do no rub affected area.

3) Inhalation

- Administer oxygen if breathing is difficult.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
- IF exposed or concerned: Get medical advice/attention.

4) Ingestion

- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

5) Indication of any immediate medical attention and special treatment needed

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. FIRE FIGHTING MEASURES

1) Suitable (and unsuitable) extinguishing media

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.
- Use dry sand or earth to smother fire.

2) Special hazards arising from the substance or mixture	- May violently polymerize and result in fire and explosion. - Will form explosive mixtures with air. - May explode from heat, shock, friction or contamination. - Some may burn but none ignite readily. - Vapors may travel to source of ignition and flash back. - Fire may produce irritating, corrosive and/or toxic gases. - Extremely flammable gas. - Contains gas under pressure; may explode if heated. - Heating may cause a fire or explosion.
3) Special protective equipment and precautions for firefighters	- Fire involving Tanks: Do not direct water at source of leak or safety devices; icing may occur. - Fire involving Tanks: For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. - In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. - Eliminate all ignition sources if safe to do so.

6. ACCIDENTAL RELEASE MEASURES

1) Health considerations and protective equipment	- Isolate hazard area. - ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). - All equipment used when handling the product must be grounded. - Allow substance to evaporate. - Ventilate the contaminated area. - Please note that materials and conditions to be avoided.
2) Environmental precautions	- Large spill: Prevent entry into waterways, sewers, basements or confined areas. - Prevent spreading of vapors through sewers, ventilation systems and confined areas.
3) Methods and material for containment and cleaning up	- Dike and collect water used to fight fire.

7. HANDLING AND STORAGE

1) Precautions for safe handling	- Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. - Follow all MSDS/label precautions even after container is emptied because they may retain product residues. - All equipment used when handling the product must be grounded. - Please note that materials and conditions to be avoided. - Handling refer to engineering control/personal protection section.
2) Conditions for safe storage (including any incompatibilities)	- Containers can build up pressure if exposed to heat (fire). - Please note that materials and conditions to be avoided. - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

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

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

1) Control parameters

Chemical name	Exposure limits	ACGIH TLV	OSHA PEL	Biological limit values(BLV)
Butane	TWA : 800 ppm	Not available	Not available	Not available
Petroleum gases, liquefied	TWA : 1,000 ppm	Not available	PEL: 1000 ppm	Not available

2) Appropriate engineering controls

- Install local exhaust ventilation system.
- Check legal suitability of exposure level.

3) Personal protection equipment

○ **Respiratory protection**

- If exposure consentration of the material is lower than 100 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material ; such
- If exposure consentration of the paticle material is lower than 250 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material
- If exposure consentration of the particle material is lower than 500 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate materia
- If exposure consentration of the particle material is lower than 10000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate mater
- If exposure consentration of the material is lower than 100000 ppm of the permitted exposure standards, Wear a respiratory protective device, equipped with an adequate filter by considering physicochemical properties of exposured particulate material ; su
- If exposure consentration of the material exceeds the permitted exposure standards, Wear European Standard EN 149 approved full or half face piece (with goggles) respireatory protective equipment.

○ **Eye protection**

- An eye wash unit and safety shower station should be available nearby work place.
- Wear enclosed safety goggles to protect from gaseous state organic material causing eye irritation or other disorder.

○ **Hand protection**

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

○ **Body protection** - Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Item	Input Value
Apperance	Gas
Color	No Data
Smell	불쾌한냄새
Smell Threshold	No Data
pH (Numerical value)	No Data
Melting/Freezing Point	-138 ℃
Boilling Point	-48 ~ -1 ℃
Flash Point	-73 ℃
Evaporating Rate	No Data
Flammability(Solid, Gas)	인화성 가스
Explosibility Range	UEL : 8.4% LEL : 1.8%
Steam Pressure	1,820 mmHg @ 25 ℃
Solubility	No Data
Vapor Density	1.45 to 2.00 (Air = 1)
Specific Gravity	0.57~0.6 g/cm³ (25 ℃)
Distribution Coefficient	1~2.89 (Log Kow)
SelfIgnition Temperature	365 ℃
Pyrolysis Temperature	No Data
Viscosity	No Data
Molecular Weight	44~58 (C3H8~C4H10)

10. STABILITY AND REACTIVITY

1) Chemical Stability and hazardous reactivity
- May violently polymerize and result in fire and explosion.
- Can form explosive mixtures at temperatures at or above the flashpoint.
- May explode from heat, shock, friction or contamination.
- Fire may produce irritating, corrosive and/or toxic gases.

2) Conditions to avoid - Ignition source(heat, spark, flame, friction, shock, contamination)

3) Incompatible materials - Combustibles

4) Hazardous decomposition - During a fire, irritating and highly toxic gases may be generated by thermal

products decomposition or combustion.

11. TOXICOLOGICAL INFORMATION

1) Information on the likely routes of exposures

○ **Inhalation**

- No inhalation effects through respiratory system.

○ **Skin contact**

- No effect on skin contact.

○ **Eye contact**

- No effect on eye contact.

○ **Ingestion**

- No ingestion effect through mouth.

2) Health hazard information

○ **Acute toxicity**

*** Oral - Not classified (ATEmix > 2000 mg/kg)**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

*** Dermal - Not classified (ATEmix > 2000 mg/kg)**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

*** Inhalation(Gas) - Not classified (ATEmix > 20000 ppm)**

- Butane : mouse(male); inhalation: gas; LC50=520400 ppm (read across: Isobutane) (ECHA)
- Petroleum gases, liquefied : mouse(male); inhalation: gas; LC50 = 539600 ppm /2h (4 hour-exposure convertion : 381555 ppm /4h) (read across: A-46) ECHA)

*** Inhalation(Vapour) - Not applicable**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

*** Inhalation(Dust, mist) - Not applicable**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **Skin corrosion/Irritation : Not classified**

- Butane : Not available
- Petroleum gases, liquefied : Not available

○ **Serious eye damage/irritation : Not classified**

- Butane : not irritating (HSDB)
- Petroleum gases, liquefied : Not available

○ **Respiratory sensitization : Not classified**

- Butane : Not available
- Petroleum gases, liquefied : Not available

○ **Skin sensitization : Not classified**

- Butane : Not available

- Petroleum gases, liquefied : Not available

○ **Carcinogenicity : Not classified**

- Butane : IARC, EU CLP 1272/2008, OSHA, ACGIH, US EPA IRIS, NTP : not listed
- Petroleum gases, liquefied : EU CLP 1272/2008 : Carc. 1A (Note K : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0,1 % w/w 1,3- butadiene (EINECS No 203-450-8), S, U)

○ **Germ cell mutagenicity : Not classified**

- Butane : In vitro Bacterial Reverse Mutation Assay : negative (OECD TG 471) (ECHA)
  in vitro mammalian chromosome aberration test: negative (OECD TG 473, GLP) (ECHA)
  In vivo Drosophila SLRL assay: negative (ECHA)
- Petroleum gases, liquefied : EU CLP 1272/2008 : Muta. 1B (Note K : Note K : The classification as a carcinogen need not apply if it can be shown that the substance contains less than 0,1 % w/w 1,3- butadiene (EINECS No 203-450-8), S, U)
  In vitro Bacterial Reverse Mutation Assay : negative (read across: Hydrocarbon propellant (containing 97.4 mole% isobutane)) (OECD TG 471) (ECHA)
  In vivo Mammalian Erythrocyte Micronucleus Test; negative (OECD TG 474, GLP) (ECHA)

○ **Reproductive toxicity : Not classified**

- Butane : rat(male/female); 0, 900, 3000 and 9000 ppm; There were no effects on gestation duration, number of live and dead pups, pup abnormalities or pup sex and weights. The NOAEC for butane for reproductive/developmental toxicity was 9000 ppm. Equivalent to 21394 mg/m3. (OECD TG 422, GLP) (ECHA)
- Petroleum gases, liquefied : rat(male/female); inhalation; 0, 1000, 5000, 10000 ppm; Subchronic Inhalation Toxicity: 90-Day Study; No treatment-related effects on oestrous cycle in females or sperm count, motility or morphology in males at any exposure concentration. (OECD TG 413, GLP) (ECHA)
  rat; 0, 1000, 5000, 10,000 ppm; Prenatal Developmental Toxicity Study; The no observed adverse effect concentration (NOAEC) of liquified petroleum gas for maternal and developmental toxicity to rats was 10,000 ppm. (OECD TG 414, GLP) (ECHA)

○ **Specific target organ toxicity (single exposure) : Not classified**

- Butane : Not available
- Petroleum gases, liquefied : Not available

○ **Specific target organ toxicity (repeated exposure) : Not classified**

- Butane : inhalation; rat(male/female); 0, 900, 3000 and 9000 ppm; no general systemic toxicity. NOAEC (systemic toxicity)=9000 ppm(21394 mg/m3) (OECD TG 422, GLP) (ECHA)
- Petroleum gases, liquefied : inhalation; rat(male/female); 0, 1000, 5000, 10000 ppm; Subchronic Inhalation Toxicity: 90-Day Study; NOAEC(systemic toxicity)=10000 ppm (highest concentration tested) (OECD TG 413, GLP) (ECHA)

○ **Aspiration hazard : Not classified**

- Butane : The viscosity of butane is 7.5 μPa s at 27°C. & hydrocarbons
- Petroleum gases, liquefied : Not available

12. ECOLOGICAL INFORMATION

1) Ecotoxicity

- Acute toxicity : Not classfied (ATEmix>1mg/L)
- Chronic toxicity : Not classfied

○ **Acute (short-term) aquatic hazard:**

Fish

- Butane : 96h-LC50 = 25.378 mg/L (estimated) (ECOSAR Class: Neutral Organics) (ECOSAR)
- Petroleum gases, liquefied : 96h-LC50 = 11.406 mg/l (ECOSAR: neutral organics QSAR) (estimated) (ECHA)

Invertebrates

- Butane : 48h-LC50(Daphnid) = 14.818 mg/L (estimated) (ECOSAR Class: Neutral Organics) (ECOSAR)
- Petroleum gases, liquefied : 48h-LC50(Daphnid) = 6.971 mg/l (ECOSAR: neutral organics QSAR) (estimated) (ECHA)

Aquatic algae

- Butane : 96h-EC50(Green Algae) = 12.405 mg/L (estimated) (ECOSAR Class: Neutral Organics) (ECOSAR)
- Petroleum gases, liquefied : 96h-EC50(Alage) = 7.039 mg/l (ECOSAR: neutral organics QSAR) (estimated) (ECHA)

○ **Chronic (Long-term) aquatic hazard:**

Fish

- Butane : Not available
- Petroleum gases, liquefied : Not available

Invertebrates

- Butane : Not available
- Petroleum gases, liquefied : Not available

Aquatic algae

- Butane : Not available
- Petroleum gases, liquefied : Not available

2) Persistence and degradability

○ **Persistence**

- Butane : log Kow=2.31 (20 °C; pH:7) (ECHA)
- Petroleum gases, liquefied : log Kow = 1.81 (20 °C; pH:7) (ECHA)

○ **Degradability**

- Butane : The half life of methane has been estimated to be 1906 days. (read across: Methane) (ECHA)
- Petroleum gases, liquefied : The half life of methane has been estimated to be 1908 days. (ECHA)

3) Bioaccumulative potential

○ **Bioaccumulation**

- Butane : BCF=37.48 (estimated) (EPISUITE)
- Petroleum gases, liquefied : BCF = 80.12 (estimated) (EPISUITE)

○ **Biodegradation**

- Butane : 100 % degradation after 385.5 h; readily biodegradable (read across: Ethane) (ECHA)
- Petroleum gases, liquefied : 100 % degradation after 385.5 h; readily biodegradable (ECHA)

4) Mobility in soil

- Butane : Koc=322 (EPISUITE)
- Petroleum gases, liquefied : Koc = 874.5 (EPISUITE)

5) Hazard to the ozone layer

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

6) Other adverse effects

- Butane : Not available
- Petroleum gases, liquefied : Not available

13. DISPOSAL CONSIDERATIONS

1) Disposal methods

- Waste must be disposed of in accordance with federal, state and local environmental control regulation.

2) Special precaution for disposal

- Consider the required attentions in accordance with waste treatment management regulation.

14. TRANSPORT INFORMATION

1) UN No.

- 1011

2) Proper shipping name

- BUTANE

3) Transport hazard class(es)

- 2

4) Packing group

- Not applicable

5) Marine pollutant

- Not applicable

6) Special safety response for transportation or transportation measure

- Types of Emergency Measures in Case of Fire : F-D
- Types of Emergency Measures in Leakage : S-U

15. REGULATORY INFORMATION

EINECS(or ELINCS)

- Butane : European EINECS phase-in substance
- Petroleum gases, liquefied : European EINECS phase-in substance

EU CLP (CLASSIFICATION) - PRODUCT : Not applicable

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

Substances restricted under REACH

- Butane : Substances restricted under REACH
- Petroleum gases, liquefied : Substances restricted under REACH

Substances subject to authorization under REACH

REACH SVHC List

Korea

○ **Occupational Safety and Health Act**

- Butane : Substance subject to occupational exposure limits, Substance subject to submission of process safety reports
- Petroleum gases, liquefied : Substance subject to occupational exposure limits, Substance subject to submission of process safety reports

○ **K-REACH**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **Chemical Control Act in Korea**

- Butane : List of substance subjected to the PRTR
- Petroleum gases, liquefied : Not applicable

○ **Safety Control of Dangerous Substances Act**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

U.S.A

○ **US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **CERCLA Designation of hazardous substances (40 CFR 302.4)**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **CERCLA Section 302 regulation**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **CERCLA Section 304 regulation**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **CERCLA Section 313 regulation**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

Interntional Convention on Environment

○ **Rotterdam Convention list**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **Stockholm Convention list**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **Montreal Protocol list**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

National Inventory

○ **Korea**

- Butane : Not applicable
- Petroleum gases, liquefied : Not applicable

○ **U.S.A**

- Butane : US TSCA phase-in substance
- Petroleum gases, liquefied : US TSCA phase-in substance

○ **China**

- Butane : China phase-in substance
- Petroleum gases, liquefied : China phase-in substance

○ **Japan**

- Butane : Japan ENCS phase-in substance
- Petroleum gases, liquefied : Japan ENCS phase-in substance

16. OTHER INFORMATION

1) Reference

- Sources of information used in preparing this SDS included one or more of the following: Internal technical data, data from OECD eChemPortal, ECHA, NITE, TOXNET, IPCS and KOSHA search results.

2) Issue Date

- 2008-07-25

3) Revision number and Last date revised

○ **Number of revised**

- 3

○ **Date of last revision**

- 2024-01-11

○ **Last Revision History**

- We have reviewed the ingredient content and revised the 3. COMPOSITION/INFORMATION ON INGREDIENTS sections. No changes to the hazard classification.

4) Other

- The information contained in the Safety Data Sheet is at the date of its issuance to the best of our knowledge correct according to the data available to us. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.