




Product name	CAS No.	UN No.	EU No.
Butane	68513-65-5	1011	271-009-7

1. Product and company identification

- a) Product name Butane
- b) Recommended use of the chemical and restrictions on use
- Recommended use of the chemical Petrochemical raw material, fuel, consumer use
 - Restrictions on use No Data Available
- c) Manufacturer / Supplier Information
- Name SK GAS
 - Address ECO Hub, SK Chemicals Complex, 332, Pangyo-ro, Bundang-gu,
Seongnam-si, Gyeonggi-do, Korea
 - Emergency phone number 82-2-6200-8245

2. Hazards identification

- a) Hazard-Risk Classification
- | | |
|-----------------------|--|
| Physical Hazards | Flammable gases category 1A
Gas under pressure (Liquefied gas)
Gas under pressure (Refrigerated liquefied gas) |
| Health Hazards | Specific target organ toxicity (single exposure) category 3 (anesthesia) |
| Environmental Hazards | Not applicable |
- b) Label elements including precautionary statements
- Symbol




 - Signal word Danger
 - Hazard-risk statement
 - (H220) Extremely flammable gas
 - (H280) Contains gas under pressure; may explode if heated
 - (H281) Contains refrigerated gas; may cause cryogenic burns or injury.
 - (H336) May cause drowsiness or dizziness.
 - Precautionary statement

Prevention	(P210) Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. (P282) Wear cold insulating gloves and either face shield or eye protection. (P261) Avoid breathing fume/gas. (P271) Use only outdoors or in a well-ventilated area.
Response	(P377) Leaking gas fire: Do Not extinguish, unless leak can be stopped safely. (P381) In case of leakage, eliminate all ignition sources. (P336) Immediately thaw frosted parts with lukewarm water. Do not rub affected area. (P315) Seek medical advice immediately (P304+P340) IF INHALED: Remove person to fresh air and keep comfortable from breathing. (P312) Get medical help if you feel unwell.
Storage	(P403) Store in a well-ventilated place. (P410+P403) Protect from sunlight. Store in a well-ventilated place. (P403+P233) Store in a well-ventilated place. Keep container tightly closed. (P405) Store locked up.
Disposal	(P501) Dispose of contents/container to in accordance with local/regional/national/international regulations.

c) Other Hazard. Risk which are not included in the classification criteria

- Butane	
Health	0
Flammability	4
Reactivity	0

3. composition / information in ingredients

Chemical name	Other name	CAS 번호	Content (mol%)
Propane	Propane	74-98-6	0 ~ 5%
Butane	Butane	68513-65-5	95 ~ 100%
Pentane	Normal Pentane	109-66-0	0 ~ 5%

* The product is not a mixture of several single substances and the components listed are constituents of a single substance.

4. First aid measure

a) Eye contact	Seek medical attention immediately.
b) Skin contact	Seek medical attention immediately. In case of contact with liquefied gas, melt the affected area with lukewarm water. Before removing frozen clothes from the skin, defrost. In the case of burns, immediately cool the area with cold water for as long as possible, and do not remove clothing that sticks to the skin. If on skin, wash with plenty of soap and water. If skin irritation occurs, get medical advice/attention.
c) Inhalation	Seek medical attention immediately. Keep the affected person warm and at rest. Move to a place with fresh air. If breathing is difficult, give oxygen. If breathing has stopped, perform mouth-to-mouth resuscitation.
d) Ingestion	Seek medical attention immediately.
e) Notes for physician	Ensure that medical personnel are aware of the substance and take protective measures.

5. Fire-fighting measures

a) Suitable (and unsuitable) extinguishing	CO ₂ , dry chemical, water spray or fog for surrounding area. Use dry sand or earth for the smothering extinguishment
b) Specific hazards arising from the chemical	
Risks for fire or explosion	Extreme flammable gas
Hazardous substances generated during combustion	Vapor may cause dizziness or asphyxiant without awareness
NFPA flammability rating	4
c) Special protective equipment and precautions for fire-fighters	Be careful as some leave a flammable residue after evaporation. In case of a leaky gas fire, do not try to extinguish the fire unless the leak can be stopped safely. Remove all sources of ignition if possible to handle safely. Rescuers should wear appropriate protective gear. Get out of the area and keep a safe distance to extinguish. Be careful as liquefied gas vapor is heavier than air and spreads along the ground. Move containers from fire area if it is not hazardous. Be careful as a damaged cylinder may fly off.

Block access by unauthorized persons, isolate hazardous area and deny entry.
 Do not pour water directly to an exposure source or safety device as it may freeze in case of tank fire.
 In case of tank fire, extinguish at maximum distance or use unmanned fire extinguishing equipment.
 In the event of a tank fire, immediately back off if there is a high-pitched sound or discoloration of the tank.
 In case of tank fire, step away from the tank.
 Evacuate according to the accident situation.
 (Evacuation radius: 0.8km, the spread varies depending on the accident location and countermeasures)

6. Accidental release measures

- | | |
|--|---|
| a) Personal precautions, protective equipment and emergency procedures | <p>Stop leak if not hazardous.</p> <p>Eliminate all ignition sources.</p> <p>Be aware of substances and conditions to avoid.</p> <p>Isolate contaminated area until gas is fully diffused and diluted.</p> <p>Do not touch the exposed material or walk around as it can break easily.</p> <p>Do not enter unless required or without protective equipment.</p> <p>Wipe up spills immediately and follow precautions in protective equipment section.</p> <p>If possible, turn the leakage container to release gas rather than liquid.</p> <p>Ventilate the contaminated area.</p> <p>Do not flush directly into the leak source.</p> <p>Do not allow water to come into contact with spillage by reducing vapors using water spray or by dispersing vapor clouds.</p> |
| b) Environmental precautions and protective procedures | |
| Atmosphere | Avoid release to the environment. |
| Soil | Avoid release to the environment. |
| Water | Prevent entry into waterways, sewers, basements, and confined spaces. |
| c) Methods and materials for containment and cleaning up | |
| Small spills | <p>Absorb spills from inert substances (such as dry sand or soil), and place in a chemical waste container.</p> <p>Build dikes for fire extinguishing and collect water.</p> |
| Large spills | Absorb liquid and wash contaminated area with detergent and water. |

7. Handling and storage

- | | |
|---|--|
| a) Precautions for safe handling | <p>Do not handle until all safety precautions have been read and understood.</p> <p>Handle only outdoors or in a well-ventilated area.</p> <p>Work with reference to engineering controls and personal protective equipment.</p> <p>Be sure to ground all equipment when handling material.</p> <p>Be aware of substances and conditions to avoid.</p> <p>Do not apply pressure, cut, weld, solder, bond, puncture, abrade, or expose to heat, flame, sparks, static electricity, or other sources of ignition.</p> <p>Follow all MSDS/label precautions as product residue may remain after container is emptied.</p> <p>Avoid prolonged or prolonged skin contact.</p> <p>Wash the affected area thoroughly after handling.</p> <p>Avoid breathing gas/vapours.</p> <p>Keep away from heat, spark and flame – No Smoking.</p> <p>Avoid direct sunlight and store in a well-ventilated place.</p> <p>The empty cylinder should be completely drained, properly blocked and immediately returned to the cylinder regulator. Place it properly.</p> |
| b) Conditions for safe storage
(including any incompatibilities) | <p>Do not expose the container to heat as pressure may rise when exposed to heat.</p> <p>Store in a cool, well-ventilated area.</p> <p>Be aware of substances and conditions to avoid.</p> |

8. Exposure controls and personal protection

a) Control parameter and Biological Exposure Indices

KOSHA

Propane	TWA: 1,000ppm
Butane	TWA: 800ppm
Pentane	TWA: 600ppm STEL: 750ppm

ACGIH

Propane	TLV-TWA: 1,000ppm
Butane	TLV-TWA: 1,000ppm
Pentane	TLV-TWA: 1,000ppm

OSHA

Propane	PEL-TWA: 1,000ppm PEL-STEL: 1,800ppm
Butane	Not applicable
Pentane	PEL-TWA: 600ppm

NIOSH

Propane	REL-TWA(10hr): 1,000ppm REL-STEL: 1,000ppm
Butane	Not applicable
Pentane	REL-TWA(10hr): 120ppm

Biological exposure standard

Not available

b) Appropriate engineering controls

Facilities storing or using this material should be equipped with eyewash facilities and safety showers.

Manage ventilation facilities to be below the allowable concentration, and install explosion-proof ventilation if there is a risk of explosive concentration.

c) Personal protective equipment

- Respiratory protection

If there is a possibility of direct contact or exposure to the substance, wear appropriate Korea Occupational Safety and Health Agency authorized respirator.

- Eye protection

If there is a possibility of direct contact or exposure to the substance, wear appropriate Korea Occupational Safety and Health Agency authorized goggles.

- Hands protection

If there is a possibility of direct contact or exposure to the substance, wear appropriate Korea Occupational Safety and Health Agency authorized gloves for chemicals.

- Body protection

If there is a possibility of direct contact or exposure to the substance, wear appropriate Korea Occupational Safety and Health Agency authorized protective clothing for chemicals.

9. Physical and chemical properties

a) Appearance	
- Color	Colorless
- Physical state	Liquefied gas
b) Odor	Odorless (before injecting an odorizer), Characteristic odor (after injecting an odorizer)
c) Odor threshold	The odor of gas shall be detected when the gas/air compound ratio reaches 1/1000. (after injecting an odorizer)
d) pH	Not applicable
e) Melting /freezing point	about -155~-138°C
f) Initial boiling point and boiling range	about -10 ~0°C
g) Flash point	about -75 ~ -60°C
h) Evaporation rate	Not available
i) Flammability (liquid, gas)	Flammable gas
j) Upper / lower flammability	about 8.4% / about 1.8%
k) Vapor pressure	about 2.5 Bar (at 21°C)
l) Solubility	about 60mg/L (at 25°C)
m) Vapor density	about 2 (air=1)
n) Specific gravity	about 0.58 (at 15°C)
o) Partition coefficient (n-octanol / water)	about 2.85 (log Kow)
p) Autoignition temperature	About 420°C (The Lowest temperature of all substance)
q) Decomposition temperature	Not available
r) Viscosity	Not available
s) Molecular weight	About 58.4

10. Stability and reactivity

a) Chemical stability and possibility of hazardous reactions	<p>Extreme Flammable gas.</p> <p>Contains high pressure gas; may explode when heated.</p> <p>Forming an explosive mixture with air.</p> <p>Container may explode when heated.</p> <p>Easily ignited by heat, sparks, and flames.</p> <p>Vapor can flash back by moving to the ignition source.</p> <p>Steam can cause dizziness or suffocation without awareness.</p> <p>Some substances can be irritating when inhaled at high concentrations.</p> <p>Cylinder exposed to fire can release flammable gas.</p> <p>Heat decomposition or combustion may produce irritating and highly toxic gases during burning.</p> <p>Be careful as some leave a flammable residue after evaporation.</p>
b) Conditions to avoid	Keep away from strong oxidizers, ignition sources and heat – no smoking.
c) Incompatible materials	Not available
d) Hazardous decomposition products	Heat decomposition or combustion may produce irritating and highly toxic gases during burning.

11. Toxicological information

a) Information on the likely routes on exposure

- Inhalation through the respiratory tract May cause anesthesia
- Ingestion through the mouth Not available
- Skin contact Not available
- Eye contact Not available

b) Health hazards information

- Acute toxicity
 - Oral
 - Propane Not available
 - Butane Not available
 - Pentane Not classified (ATE: 2,000-5,000mg/kg Rat)
 - Dermal Not available
 - Propane Not available
 - Butane Not available
 - Pentane Not available
 - Inhalation
 - Propane Not Classified (ATE: 1,237mg/L 2hr Mouse, LC50 658mg/L 4hr Rat)
 - Butane Not available
 - Pentane Not Classified (ATE: 25.3mg/L 4hr Rat)
- Skin corrosion / irritation
 - Propane Not available
 - Butane Not available
 - Pentane Not available
- Eye damage / irritation
 - Propane Not available
 - Butane Not available
 - Pentane Not available
- Respiratory sensitization
 - Propane Not available
 - Butane Not available
 - Pentane Not available
- Skin sensitization
 - Propane Since the total contents of Category 2 substances is less than 10%, the product corresponds as 'Not classified'.
Category 2 rabbit/irritating(IULID)
 - Butane Not available
 - Pentane Not available

- Carcinogenicity	Not available
Propane	Not available
Butane	Not available
Pentane	Not available
- Germ cell mutagenicity	Not available
Propane	Not available
Butane	Not available
Pentane	Not available
- Reproductive toxicity	Not available
Propane	Not available
Butane	Not available
Pentane	Not available
- Specific target organ toxicity (single exposure)	Since the contents of Category 3 substances is more than 20%, the product is classified as "Specific target organ toxicity (single exposure) Category 3 (anesthesia)"
Propane	Category 3 (anesthesia)
Butane	Category 3 (anesthesia)
Pentane	Category 3 (anesthesia)
- Specific target organ toxicity (repeated exposure)	Not available
Propane	Not available
Butane	Not available
Pentane	Not available
- Aspiration hazard	Not available
Propane	Not available
Butane	Not available
Pentane	Category 1

12. Ecological information

- a) Aquatic hazard
- Acute

Propane	LC50 (4days): 24.11-147.54mg/L (Fish)
Butane	LC50 (48hr): 17.133mg/L (Daphnia magna)
Pentane	LL50 (4days): 27.55mg/L (Fish)

 - Chronic

The product is classified as 'Not classified'.	
Propane	Not available
Butane	Not available
Pentane	NOELR (28days): 6.165mg/L (Fish)
- b) Persistence and degradability
- Persistence

log Kow: 2.36 (Propane), 2.89 (Butane), 2.30 (Pentane)
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 - Degradability

Not available

- c) Bioaccumulative potential
- Biodegradation

65.7% 35day (Propane, Butane)

 - Bioaccumulative potential

BCF: 13 (Propane)

- d) Mobility in soil

Not available

- e) Other adverse effects
- Hazard to the Ozone layer

Propane	Not available
Butanes	Not available
Pentanes	Not available
 - Others

Not available

13. Disposal considerations

- a) Disposal method

All disposal practices must be in compliance with all laws and regulations with elimination of the risk of explosion. Beware of fire and explosion hazards due to residual gas in the container like cylinder or tank
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- b) Disposal precaution

Disposal should be in accordance with applicable regional, national and local laws and regulations.

14. Transport information

- | | |
|--|----------------|
| a) UN number | 1011 |
| b) UN proper shipping name | BUTANE |
| c) Transport hazard class(es) | 2.1 |
| d) Packing group, if applicable | Not applicable |
| e) Environmental hazards | Not applicable |
| f) Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises | |
| - emergency procedures in a fire | F-D |
| - emergency procedures with the gas leak | S-U |

15. Regulatory information

a) Industrial Safety and Health Act

Propane	Substances subject to PSM submission
Butane	Substances subject to PSM submission
Pentane	Substances subject to PSM submission, Substances of Exposure Limits

b) Chemical Control Act

Propane	Not applicable
Butane	Hallucinogenic substance
Pentane	Not applicable

c) Dangerous Material Safety Control Act

Propane	Not applicable
Butane	Not applicable
Pentane	Class 4 Special Flammables

* Butane itself is not subject to the Dangerous Goods Safety Management Act because the chemicals handled by the Dangerous Goods Safety Management Act are only solid or liquid at 1 atmospheric pressure of 20 °C

d) Wastes Management Act (domestic)

Propane	Not applicable
Butane	Not applicable
Pentane	Not applicable

e) Other requirements in domestic and other countries

- Water quality and aquatic ecosystem conservation act :	Not applicable
- Clean air conservation act :	Not applicable
- POPs Management Law :	Not applicable
- Information of EU Classification	Not applicable

Classification

Propane	F+; R12
Butane	Flam. Gas 1 Press. Gas Carc. 1A Muta. 1B
Pentane	Flam. Liq. 2 Asp. Tox. 1 STOT SE 3 Aquatic Chronic 2

Risk Phrases

Propane	R12
Butane	Not applicable
Pentane	H225 H304 H336 H411

Safety Phrase

Propane	S2, S9, S16
Butane	Not applicable
Pentane	Not applicable

- U.S. Federal regulations

OSHA PROCESS SAFETY (29CFR1910.119) :	Not applicable
CERCLA Section 103 (40CFR302.4) :	Not applicable
EPCRA Section 302 (40CFR355.30) :	Not applicable
EPCRA Section 304 (40CFR355.40) :	Not applicable
EPCRA Section 313 (40CFR372.65) :	Not applicable
- Rotterdam Convention listed ingredients :	Not applicable
- Stockholm Convention listed ingredients :	Not applicable
- Montreal Protocol listed ingredients :	Not applicable

16. Other information

a) Information source and references

1. National Chemicals Information System, National Institute of Environmental Research (NCIS)
2. Hazardous Substances Data Bank (HSDB)
3. National Library of Medicine(NLM)
4. Chemical Carcinogenesis Research Information System (CCRIS)
5. Chemicals the Screening Information Dataset (SIDS)
6. International Chemical Safety Cards(ICSC)
7. Canadian Centre for Occupational Health and Safety(CCOHS)
10. U.S. Environmental Protection Agency(EPA): ECOTOX(ECOTOxicology) database
11. National Emergency Management Agency
12. MSDS, Korea Occupational Safety and Health Agency
13. UNECE - Globally Harmonized System of Classification and Labelling of Chemicals(GHS)
14. Integrated Risk Information System(IRIS)
15. Concise International Chemical Assessment Documents (CICADs)
16. Environmental Health Criteria Monographs (EHCs)
17. Health and Safety Guides (HSGs)
18. Exposure criteria for chemicals and physical factors (Notice No. 2020-48 of the Ministry of Employment and Labor)
19. Act on The Control, ETC. of Manufacture of Specific Substances for the Protection of the Ozone Layer
20. Commission Regulation (EU) No 2015/1221

b) First Date Created 2010-06-16

c) Revision number and date
 Number of revisions 9 / 2023.05.25

d) Others No express warranty, or implied warranty of merchantability or fitness for a particular purpose is made with respect to the product or the information contained herein.