

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

1. IDENTIFICATION OF SUBSTANCE / MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name OPTIMUS GAS
Product no. 8018640, 8018641, 8018642, 8018643, 8020406 & 8020423

1.2 Relevant identified uses of substance or mixture and uses advised against

Identified uses Fuel etc.

1.3 Details of the supplier of the safety data sheet

Company TAEYANG CORPORATION
Telephone +82-2-2186-1170
E-mail taeyang@taeyangsun.co.kr

1.4 Emergency telephone number +82-2-2186-1170
(This number is serviced during office hours only.)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

2.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP]

Flammable gases Cat. 1
Gases under pressure (Liquefied gas)

2.1.2. Classification according to Directive 1999/45/EC

Extremely flammable.

2.2 Label elements

2.2.1 Labelling according Regulation (EC) No 1272/2008 [CLP]

Symbol



Signal word DANGER

Hazard Statement
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
Precautionary statement
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P410 + P403 Protect from sunlight. Store in a well-ventilated place.

2.2.2 According to European Directive 67/548/EEC as amended

Hazard symbol(s)



R-phrases(s) R12 Extremely flammable.
S-phrases(s) S 9 Keep container in a well-ventilated place.
S16 Keep away from sources of ignition - No smoking.

2.3. Other hazards

CERCLA Index (0~3) Health=1, Fire=3, Reactivity=0, Durability=0
NFPA Index (0~4) Health=1, Fire=4, Reactivity=0

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

3. COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Mixture

Components	%	Classification
Iso-Butane CAS No. 75-28-5	30±10	Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP] - Flammable gases Cat. 1 - Gases under pressure (Liquefied gas)   According to European Directive 67/548/EEC as amended. - Extremely flammable. 
Propane CAS No. 74-98-6	25±5	Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP] - Flammable gases Cat. 1 - Gases under pressure (Liquefied gas)   According to European Directive 67/548/EEC as amended. - Extremely flammable. 
N-Butane CAS No. 106-97-8	45±10	Classification according to Regulation (EC) No 1272/2008 [EU-GHS/CLP] - Flammable gases Cat. 1 - Gases under pressure (Liquefied gas)   According to European Directive 67/548/EEC as amended. - Extremely flammable. 

* The sum of Iso-Butane and N-Butane is not less than 70% and not greater than 80%.

* This product is exempted under Entry 10 of Annex V to the European Regulation No. 1997/2006 (REACH).

4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation	Move from the exposed areas immediately. Artificial respiration if needed. Secure the airway, maintain blood pressure, and inhale oxygen if possible. Keep a patient in a warm and comfortable condition. Treat appropriately depending on the symptoms. Take a proper medical action.
------------	---

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

Skin contact	Thoroughly wash off with soft detergent and much water (15~20 minutes). If there are symptoms such as frostbite and freezing, take the following process. Warm the affected part with warm water of 107 °F (41.7 °C). Gently wrap the affected part in blanket. Take an immediate medical action.
Eye contact	Wash eyes immediately with much water or saline solution until no chemicals remain. Take an immediate medical action.
Ingestion	Treat properly based on the symptoms. Take an immediate medical action.

5. FIRE FIGHTING MEASURES

5.1 Extinguishing media

Powder fire extinguisher, carbon dioxide (Use water or fog in case of a blaze)

5.2 Special hazards arising from the substance or mixture

May burst or explode if exposed to heat or spark.

Heavier than the air, and there is a possibility of ignition and backfire.

Container may explode by heat or fire.

Mixture of gas & air may explode.

Low electrical conduction may cause static electricity, and ignited by a spark.

5.3 Advice for firefighters

If not dangerous, remove from a fire area.

After putting out a fire, sprinkle cooling water in the side of the container which is exposed by heat.

Escape from the end of tank.

Use a fire hose or monitor nozzle if a blaze occurs in the stored area, and leave it burned if difficult.

Immediately remove if the size of blaze grows bigger or the tank is discolored by heat.

Leave it burned and isolate by more than 1 mile if we cannot stop the spills from gas tank, and tank lorry.

Extinguish it if the gas spills can be stopped. Use much water in a form of fog from a long distance.

Keep away outside a one-third-of-a-mile radius if fire is out of control or the container is exposed to a flame.

Don't inhale the smoke from the burning materials with one's back against the wind.

5.4 Special Information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid heat, flame, spark and other source of ignition.

Do not touch a spilled material.

Do it if you can stop a spilled material with safety.

Sprinkle water in order to reduce vapour.

Isolate the area until the gas disperses.

Prohibit smoke, flame or fire at the dangerous area.

No entry to unauthorized persons, and isolate the dangerous and restricted area.

Ventilate the closed place before entering.

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

6.2 Environmental precautions

No data available

6.3 Methods and material for containment and cleaning up

No data available

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Store and handle in accordance with the regulations of a central government and local autonomous entity.

Recommend a practical training against static electricity.

7.2 Conditions for safe storage, including any incompatibilities

Please isolate and store the materials separated from other materials which shall not be put together at the same time.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Occupational exposure limits

Exposure standard : Industry safety & health law

Components	OSHA TWA	ACGIH TWA	NIOSH TWA
Iso-Butane	No data	800 ppm (1900 mg/m ³)	800 ppm (1900 mg/m ³)
Propane	1000 ppm (1800 mg/m ³)	2500 ppm	1000 ppm (1800 mg/m ³)
N-Butane	800 ppm (1900 mg/m ³)	800 ppm	800 ppm (1900 mg/m ³)

8.2 Appropriate engineering controls

Set up a partial ventilation or general diluted ventilation equipment.

Install explosion-screening facilities for the relevant ventilation equipment if there is a possibility of explosion for the material.

Employer shall install a washing equipment and shower stall near the work place because possibly employee's eye can be exposed to foreign materials

8.3 Personal protection equipment

Eye protection	For the gas, eye protection not required, but recommended. For the liquid, spray or dust protective goggles are needed to avoid a direct contact with foreign materials. Contact lense shall not be used
Protection clothes	For gas, protective clothing is not necessary. In case of possible contact with liquid, employee must wear proper protection clothes and equipment in order to prevent a skin from freezing.
Protection gloves	Wear insulated gloves and gloves against the cold.

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

Respiratory protection

Below respirator and maximum use concentration is recommended by NIOSH guide or allowance standard report about chemical hazard established by America Health and Human Services Department.

Specifically-selected respirator shall be based on pollutant density in a work place, and does not exceed the operation limit of respirator, and finally approved by NIOSH and NSHA at the same time.

LPG (Liquefied Petroleum Gas)

- 10,000ppm : Air-supply respirator, self-support respirator
- 19,000ppm : Respirator operated by continuous flow form
 - ✓ Whole self-support respirator
 - ✓ Whole air-supply respirator
 - ✓ Whole air-supply respirator operated continuously by oil pressure
 - Shelter : Shelter-type self-support respirator
- If there is a urgent danger to life or health,
 - Operated by inhalation & ventilation resistance or positive pressurization as all of the self-support respirators
 - Inhalation & ventilation resistance supportively equipped with self-support respirator operated by inhalation & ventilation resistance or positive pressurization
 - Whole air-supply respirator operated by positive pressurization

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Properties	Iso-Butane	Propane	N-Butane
Appearance	liquid & vapor	liquid & vapor	liquid & vapor
Odor	odorless	odorless	odorless
Odor threshold	No data	No data	No data
pH	Not applicable	Not applicable	Not applicable
Melting point/Freezing point	-160°C	-187.7°C	-138.3°C
Boiling point and range	-11.5°C	-42.1°C	-0.5°C
Flash point	-88.0°C	-104.4°C	-73.3°C
Evaporation rate	100%	100%	100%
Flammability (solid, gas)	no way to know	no way to know	no way to know
Upper/lower flammability or explosive limits	8.4 vol% 1.8 vol%	9.5 vol% 2.2 vol%	8.4 vol% 1.9 vol%
Vapor pressure	0.304MPa @20°C	0.75MPa @20°C	0.214MPa @21.1°C
Vapor density	2.595(air=1)	1.55(air=1)	2.1(air=1)
Relative density	0.549 @ 20°C	0.501 @ 20°C	0.549 @ 20°C
Solubility	no way to know	0.007 g/100mL @ 20°C	3.25 mL/100mL @ 20°C
Partition coefficient: n-octanol/water	2.8 as log POW	2.36 as log POW	2.89 as log POW
Auto-ignition temperature	460°C	466.1°C	287°C
Decomposition temperature	no way to know	no way to know	no way to know
Viscosity	No data	No data	No data
Explosive properties	No data	No data	No data
Oxidizing properties	No data	No data	No data

10. STABILITY AND REACTIVITY

10.1 Reactivity

Stable at a normal temperature and pressure

10.2 Chemical stability

No data available.

10.3 Possibility of hazardous reactions

No dangerous reactions known.

10.4 Conditions to avoid

Avoid a contact with heat, flame, spark and other sources of ignition.

Vapor has a explosiveness.

Do not contact with a skin.

May cause frostbite.

Because of a pressure, containers may be burst if exposed to heat, and thus could move to a long distance.

10.5 Incompatible materials

Strong oxidizer : Hazard of fire, explosion

Nitric acid, chlorine dioxide : Material to be avoided

Carbonyl nickel & acid: Explode at (20~40) °C

10.6 Hazardous decomposition products

Pyrolysis product may contain poisonous carbon oxidized substance

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

11. TOXICOLOGICAL INFORMATION

11.1 Routes of exposure	No data available
11.2 Information on toxicological effects	
Acute toxicity	No toxicity by inhalation.
Skin corrosion/irritation	Contact with liquid may cause frostbite, ache, and water blister.
Serious eye damage/irritation	Not irritating (Rabbit) Contact with liquid may cause frostbite, ache, and eyesight loss.
Respiratory or skin sensitisation	No data available
Germ cell mutagenicity	No data available
Carcinogenicity	This product is or contains a component that is probably not carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.
Reproductive toxicity	No data available
STOT-single exposure	Simple asphyxiant, and central nervous system suppressant.
STOT-repeated exposure	No data available
Aspiration hazard	No data available

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity	No data available.
12.2 Persistence and degradability	No data available.
12.3 Bioaccumulative potential	No data available.
12.4 Mobility in soil	No data available.
12.5 Other adverse effects	No data available.

13. DISPOSAL CONSIDERATIONS

13.1 Disposal instructions	Comply with a central government and local autonomous entity regulations. Disposal shall be executed by a standard of 40 CFR 262 applied for hazardous waste generator. EPA hazardous waste No. D001.
13.2 Waste from residues / unused products	No data available.
13.3 Contaminated packaging	No data available.

14. TRANSPORT INFORMATION

14.1 UN number	UN 2037, Gas Cartridges - Propane : LPG - Iso-Butane : Iso-Butane - N-Butane : N-Butane or N-Butane mixture
14.2 UN proper shipping name	RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable LQ2

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

14.3 Transport hazard class(es)	2.1
14.4. Packing group	N.A.
14.5. Environmental hazards	N.A.
14.6. Special precautions for user	Passenger plane or train : Prohibited Cargo plane : 150 kg

15. REGULATORY INFORMATION

15.1 Regulatory information

This safety datasheet complies with the requirements of Regulation (EC) No. 1907/2006.

15.2 Chemical Safety Assessment:

No data available

15.3 Inventory status

No data available

16. OTHER INFORMATION

The contents and format of this MSDS/SDS are in accordance with Regulation (EC) No 1907/2006.

• References

Other MSDS (TAEYANG Corporation, GS Caltex Corporation, Korea Petro Chemical Ind. Co., Ltd., Aldirch, Shell Trading International Limited etc.)
KOSHA – Chemical information database system
ESIS (European chemical Substances Information System) (<http://ecb.jrc.ec.europa.eu/>)
International Uniform Chemical Information Database (IUCLID) (<http://ecb.jrc.it/esis>)

• Abbreviation and acronyms

ACGIH – American Conference of Industrial Hygienists
CAS - Chemical Abstracts Service
CLP - Regulation on classification, labeling and packaging of substances and mixtures. (Directive 67/548/EEC)
EC - European Community
EEC - The European Economic Community
EPA - Environmental Protection Agency
GHS - Global Harmonized System
IARC - International Agency for Research on Cancer
NIOSH - National Institute for Occupational Safety and Health
NTP - The National Toxicology Program
OSHA - Occupational Safety and Health Administration
STOT - Specific Target Organ Toxicity

Safety Data Sheet

Version No. 01/EN
Revision N.A.
Printing date 15 May. 2019

- **Disclaimer of Liability**

The information in this MSDS/SDS was obtained from source which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reason, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of component in another product, this MSDS/SDS information may not be applicable.

***** End of Document