

SAFETY DATA SHEET

SECTION 1: IDENTIFICATION OF THE MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier:

Optimus Gas Butane/Isobutane/Propane

Article numbers: 8018640, 8018641, 8018642, 8018643, 8020406 & 8020423

1.2. Relevant identified uses of the mixture and uses advised against:

Fuel gas for consumer use.

1.3. Details of the supplier of the safety data sheet:

Information about the distributor/importer:

Importer Europe:

Katadyn Deutschland GmbH

Hessenring 23
64546 Mörfelden-Walldorf
Germany
Tel: +49 6105 45 67 89

Importer Switzerland:

Katadyn Products Inc

Pfaeffikerstrasse 37
8310 Kempthal
Switzerland
Tel: +41 44 839 21 11

Information about the manufacturer:

Taeyang Corporation
Tel: +82-2-2186-1170
E-mail: taeyang@taeyangsun.co.kr

1.3.1. Responsible person: -
E-mail: sds@katadyn.ch

1.4. Emergency telephone number: English/German (Mo-Fr during office hours): +41 44 839 21 11

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the mixture:

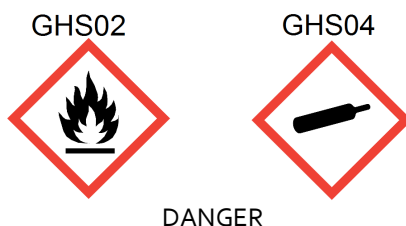
Classification according to Regulation (EC) No 1272/2008 (CLP):
Flammable gases, Hazard Category 1A – H220
Gases under pressure: Compressed gas – H280

Hazard statements:

H220 – Extremely flammable gas.

H280 – Contains gas under pressure; may explode if heated.

2.2. **Label elements:**



Hazard statements:

H220 – Extremely flammable gas.

H280 – Contains gas under pressure; may explode if heated.

Precautionary statements:

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

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

P381 – In case of leakage, eliminate all ignition sources.

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

2.3. **Other hazards:**

Skin contact: Contact with liquid may cause frostbite, aches, and blister formation.

Eye contact: Contact with liquid may cause frostbite, aches, and visual impairment.

Inhalation: Simple asphyxiant and central nervous system suppressant.

Results of PBT and vPvB assessment: No data available.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. **Substances:**

Not applicable.

3.2. **Mixtures:**

Description	CAS number	EC number / ECHA list number	REACH registration number	Conc. (%)	Classification according to Regulation (EC) No 1272/2008 (CLP)		
					Pictogram, signal word code(s)	Hazard class and category code(s)	Hazard statement code(s)
Isobutane Index number: 601-004-00-0	75-28-5	200-857-2	-	30 ± 10	GHS02 GHS04 Danger	Flam. Gas 1A Press. Gas (Liq.)	H220 H280
Propane Index number: 601-003-00-5	74-98-6	200-827-9	-	25 ± 5	GHS02 GHS04 Danger	Flam. Gas 1A Press. Gas (Liq.)	H220 H280
n-Butane Index number: 601-004-00-0	106-97-8	203-448-7	-	45 ± 10	GHS02 GHS04 Danger	Flam. Gas 1A Press. Gas (Liq.)	H220 H280

The sum of isobutane 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 1907/2006 (REACH).

For the full text of hazard statements, see Section 16.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures:

INGESTION:

Measures:

- Treat properly based on the symptoms.
- Take an immediate medical action.

INHALATION:

Measures:

- Move from the exposed areas immediately.
- Apply artificial respiration.
- 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.

SKIN CONTACT:

Measures:

- 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 41.7 °C.
- Gently wrap the affected part in blanket.
- Take an immediate medical action.

EYE CONTACT:

Measures:

- Wash eyes immediately with much water or saline solution until no chemicals remain.
- Take an immediate medical action.

4.2. Most important symptoms and effects, both acute and delayed:

The most important acute and delayed symptoms and effects are contained in Section 11.

4.3. Indication of any immediate medical attention and special treatment needed:

No special treatment needed; treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media:

5.1.1. Suitable extinguishing media:

Extinguishing powder, carbon dioxide. Use water or fog in case of a blaze.

5.1.2. Unsuitable extinguishing media:

No data available.

5.2. Special hazards arising from the substance or mixture:

Extremely flammable gas.

Contains gas under pressure; may explode if heated.

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

Mixture of gas and air may explode.

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

In case of fire, smoke and other combustion products may be formed; the inhalation of such combustion products can have serious adverse effects on health.

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 discoloured 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.

Wear full protective clothing and self-contained breathing apparatus.

SECTION 6: ACCIDENTAL RELEASE MEASURES

- 6.1. Personal precautions, protective equipment and emergency procedures:**
- 6.1.1. For non-emergency personnel:**
 Allow only well-trained experts wearing suitable protective clothing to abide in the field of accident.
- 6.1.2. For emergency responders:**
 Avoid heat, flame, spark and other source of ignition.
 Do not touch a spilled product.
 Stop the flow of the product, if it can be done safely.
 No entry to unauthorized persons, and isolate the dangerous and restricted area.
- 6.2. Environmental precautions:**
 No special measures are required: the released product evaporates in the environment.
- 6.3. Methods and material for containment and cleaning up:**
 Sprinkle water in order to reduce vapour.
 Isolate the area until the gas disperses.
 Prohibit smoke, flame or fire at the dangerous area.
 Ventilate the closed place before entering.
- 6.4. Reference to other sections:**
 For further and detailed information see Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

- 7.1. Precautions for safe handling:**
 Observe conventional hygiene precautions.
 Store and handle in accordance with the regulations of a central government and local autonomous entity.
Technical measures:
 No special measures required.
Precautions against fire and explosion:
 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 A practical training against static electricity is recommended.
- 7.2. Conditions for safe storage, including any incompatibilities:**
Technical measures and storage condition:
 Protect from sunlight. Store in a well-ventilated place.
 Isolate and store the product separated from other materials.
Incompatible materials: See Section 10.5
Packaging material: No special prescriptions.
- 7.3. Specific end use(s):**
 No specific instructions available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters:

Occupational exposure limit values (Commission Directive (EC) No 2000/39 of 8 June 2000):
 The components of the mixture are not regulated with exposure limit value.

DNEL values		Oral exposure		Dermal exposure		Inhalative exposure	
		Short term (acute)	Long term (chronic)	Short term (acute)	Long term (chronic)	Short term (acute)	Long term (chronic)
Consumer	Local	no data	no data	no data	no data	no data	no data
	Systemic	no data	no data	no data	no data	no data	no data
Worker	Local	no data	no data	no data	no data	no data	no data
	Systemic	no data	no data	no data	no data	no data	no data

PNEC values		
Compartment	Value	Note(s)
Freshwater	no data	no notes
Marine water	no data	no notes
Freshwater sediment	no data	no notes
Marine water sediment	no data	no notes
Sewage Treatment Plant (STP)	no data	no notes
Intermittent release	no data	no notes
Secondary poisoning	no data	no notes
Soil	no data	no notes

8.2. Exposure controls:

In case of a hazardous material with no controlled concentration limit it is the employer's duty to keep concentration levels down to a minimum achievable by existing scientific and technological means, where the hazardous substance poses no harm to workers.

8.2.1. Appropriate engineering controls:

In pursuance of work is proper foresight needed to avoid spilling onto clothes and to avoid contact with eyes and skin. Apply general ventilation or local exhaust.

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

Install a washing equipment and safety shower near the work place.

8.2.2. Individual protection measures, such as personal protective equipment:

The information regarding personal protective equipment is only for informative purposes. A complete risk assessment is required before the use of the product for the determination of the appropriate personal protective equipment, taking local circumstances into account.

1. **Eye/face protection:** For the gas, eye protection is not required, but recommended.

For the liquid, spray or dust protective goggles are needed to avoid a direct contact with foreign materials. Contact lenses shall not be used.

2. **Skin protection:**

a. **Hand protection:** Use insulated protective gloves against cold (EN 374).

b. **Other:** For the gas, protective clothing is not necessary.

In case of possible contact with liquid, wear proper protective clothing and equipment in order to prevent skin from freezing.

3. **Respiratory protection:** The respirator shall be selected based on the concentration of contaminants in a workplace:

10000 ppm: Air-supplied respirator, self-contained breathing apparatus.

19000 ppm: Respirator operated in positive pressure mode.

If there is a urgent danger to life or health, use self-contained breathing apparatus.

Please observe the operation limits of the selected respirator.

4. **Thermal hazards:** No thermal hazards known.

8.2.3. Environmental exposure controls:

No specific prescription.

The requirements detailed in Section 8 assume skilled work under normal conditions and usage of the product for appropriate aims. If conditions differ from normal or work is carried out under extreme conditions, an expert's advice is necessary before deciding upon further protective measures.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties:

Parameter	Value / Test method / Remarks
1. Appearance:	gas under pressure (liquefied gas)
2. Odour:	odourless
3. Odour threshold:	no data*
4. pH:	not applicable

5. Melting point/freezing point:	isobutane: -160 °C propane: -187.7 °C n-butane: -138.3 °C
6. Initial boiling point and boiling range:	isobutane: -11.5 °C propane: -42.1 °C n-butane: -0.5 °C
7. Flash point:	isobutane: -88.0 °C propane: -104.4 °C n-butane: -73.3 °C
8. Evaporation rate:	100 %
9. Flammability (solid, gas):	extremely flammable gas
10. Upper/lower flammability or explosive limits:	isobutane: 1.8-8.4 vol. % propane: 2.2-8.5 vol. % n-butane: 1.9-8.4 vol. %
11. Vapour pressure:	isobutane: 0.304 mPa (20 °C) propane: 0.75 mPa (20 °C) n-butane: 0.214 mPa (20 °C)
12. Vapour density:	isobutane: 2.595 (air = 1) propane: 1.55 (air = 1) n-butane: 2.1 (air = 1)
13. Relative density:	isobutane: 0.549 (20 °C) propane: 0.501 (20 °C) n-butane: 0.549 (20 °C)
14. Solubility(ies):	propane: 0.007 g/100 ml (20 °C) n-butane: 3.25 ml/100 ml (20 °C)
15. Partition coefficient: n-octanol/water:	isobutane: 2.8 (log Pow) propane: 2.36 (log Pow) n-butane: 2.89 (log Pow)
16. Auto-ignition temperature:	isobutane: 460 °C propane: 466.1 °C n-butane: 287 °C
17. Decomposition temperature:	no data*
18. Viscosity:	no data*
19. Explosive properties:	mixture of gas and air may explode
20. Oxidizing properties:	no data*

9.2. Other information:

No data available.

*: The manufacturer did not carry out any tests on this parameter for the product or the results of the tests are not available at the time of publication of the data sheet.

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity:

No reactivity known.

10.2. Chemical stability:

Stable at normal temperature and pressure.

10.3. Possibility of hazardous reactions:

No hazardous reactions known.

10.4. Conditions to avoid:

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

Vapour is explosive.

Avoid contact with 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 oxidizing agents (fire and explosion hazard).

Nitric acid, chlorine dioxide.

Carbonyl nickel and acid (explosion at 20-40 °C).

10.6. Hazardous decomposition products:

Pyrolysis products may contain toxic carbon oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects:

Acute toxicity: Based on available data, the classification criteria are not met.

Skin corrosion/irritation: Based on available data, the classification criteria are not met.

Serious eye damage/irritation: Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation: Based on available data, the classification criteria are not met.

Germ cell mutagenicity: Based on available data, the classification criteria are not met.

Carcinogenicity: Based on available data, the classification criteria are not met.

Reproductive toxicity: Based on available data, the classification criteria are not met.

STOT-single exposure: Based on available data, the classification criteria are not met.

STOT-repeated exposure: Based on available data, the classification criteria are not met.

Aspiration hazard: Based on available data, the classification criteria are not met.

11.1.1. **Summaries of the information derived from the test conducted:**

No data available.

11.1.2. **Relevant toxicological properties:**

Acute toxicity:

No toxicity by inhalation.

Skin corrosion/irritation:

Contact with liquid may cause frostbite, aches, and blister formation.

Serious eye damage/irritation:

Not irritating (rabbit).

Contact with liquid may cause frostbite, aches, and visual impairment.

Carcinogenicity:

This product is not carcinogenic based on IARC, ACGIH, NTP, or EPA classification.

STOT-single exposure:

Simple asphyxiant and central nervous system suppressant.

11.1.3. **Information on likely routes of exposure:**

Ingestion, inhalation, skin contact, eye contact.

11.1.4. **Symptoms related to the physical, chemical and toxicological characteristics:**

No data available.

11.1.5. **Delayed and immediate effects as well as chronic effects from short and long-term exposure:**

No data available.

11.1.6. **Interactive effects:**

No data available.

11.1.7. **Absence of specific data:**

No information.

11.1.8. **Other information:**

No data available.

SECTION 12: ECOLOGICAL INFORMATION

12.1. **Toxicity:**

The mixture is not classified as hazardous for the environment.

12.2. **Persistence and degradability:**

No data available.

12.3. **Bioaccumulation potential:**

No data available.

12.4. **Mobility in soil:**

No data available.

12.5. **Results of PBT and vPvB assessment:**

No data available.

12.6. **Other adverse effects:**

No data available.

SECTION 13: DISPOSAL CONSIDERATIONS

- 13.1. **Waste treatment methods:**
Disposal according to the local regulations.
- 13.1.1. **Information regarding the disposal of the product:**
Dispose of in accordance with local and national regulations.
List of Waste Code:
No waste disposal key according to the List of Waste Code (LoW code) can be determined for this product, as only the purpose of application defined by the user enables an allocation. The LoW code number has to be determined after a discussion with a waste disposal specialist.
- 13.1.2. **Information regarding the disposal of the packaging:**
Dispose of in accordance with local and national regulations.
- 13.1.3. **Physical/chemical properties that may affect waste treatment options shall be specified:**
No data available.
- 13.1.4. **Sewage disposal:**
No data available.
- 13.1.5. **Special precautions for any recommended waste treatment:**
No data available.

SECTION 14: TRANSPORT INFORMATION

- 14.1. **UN Number:**
UN 2037
- 14.2. **UN proper shipping name:**
RECEPTACLES, SMALL, CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable
- 14.3. **Transport hazard class(es):**
2.1
- 14.4. **Packing group:**
No packing group.
- 14.5. **Environmental hazards:**
No relevant information available.
- 14.6. **Special precautions for user:**
Limited quantities: LQ2
Passenger aircraft or rail transport: Prohibited.
Cargo aircraft: 150 kg
- 14.7. **Transport in bulk according to Annex II of MARPOL and the IBC Code:**
Not applicable.

SECTION 15: REGULATORY INFORMATION

- 15.1. **Safety, health and environmental regulations/legislation specific for the substance or mixture:**
REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive (EC) No 1999/45 and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive (EEC) No 76/769 and Commission Directives (EEC) No 91/155, (EEC) No 93/67, (EC) No 93/105 and (EC) No 2000/21

REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives (EEC) No 67/548 and (EC) No 1999/45, and amending Regulation (EC) No 1907/2006

COMMISSION REGULATION (EU) No 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

15.2. **Chemical safety assessment:** No information.

SECTION 16: OTHER INFORMATION

Information regarding the revision of the safety data sheet: No information.

Literature references / data sources:

Safety data sheet issued by the manufacturer (15. 05. 2019, version 01/EN).

Methods used for the classification according to Regulation (EC) No 1272/2008:

Classification	Method
Flammable gases, Hazard Category 1A – H220	Based on test methods (test data)
Gases under pressure: Compressed gas – H280	Based on test methods (test data)

Relevant hazard statements (code and full text) of Sections 2 and 3:

H220 – Extremely flammable gas.

H280 – Contains gas under pressure; may explode if heated.

Training advice: No data available.

Full text of the abbreviations in the safety data sheet:

ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.

ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road.

ATE: Acute Toxicity Estimate.

AOX: Adsorbable organic halides.

BCF: Bioconcentration factor.

BOD: Biological Oxygen Demand.

CAS number: Chemical Abstract Service number.

CLP: Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures.

CMR effects: Carcinogenic, mutagenic, reprotoxic effects.

COD: Chemical Oxygen Demand.

CSA: Chemical Safety Assessment.

CSR: Chemical Safety Report.

DNEL: Derived-No-Effect-Level.

ECHA: European Chemical Agency.

EC: European Community.

EC number: EINECS and ELINCS numbers (see also EINECS and ELINCS).

EEC: European Economic Community.

EEA: European Economic Area (EU + Iceland, Liechtenstein and Norway).

EINECS: European Inventory of Existing Commercial Chemical Substances.

ELINCS: European List of Notified Chemical Substances.

EN: European Norm.

EU: European Union.

EWC: European Waste Catalogue (replaced by LoW – see below).

GHS: Globally Harmonized System of Classification and Labelling of Chemicals.

IATA: International Air Transport Association.

ICAO-TI: Technical Instructions for the Safe Transport of Dangerous Goods by Air.

IMDG: International Maritime Dangerous Goods.

IMSBC: International Maritime Solid Bulk Cargoes.

IUCLID: International Uniform Chemical Information Database.

IUPAC: International Union of Pure and Applied Chemistry.
Kow: n-Octanol - Water Partition Coefficient.
LC50: Lethal concentration resulting in 50 % mortality.
LD50: Lethal dose resulting in 50 % mortality (median lethal dose).
LoW: List of Waste.
LOEC: Lowest Observed Effect Concentration.
LOEL: Lowest Observed Effect Level.
NOEC: No Observed Effect Concentration.
NOEL: No Observed Effect Level.
NOAEC: No Observed Adverse Effect Concentration.
NOAEL: No Observed Adverse Effect Level.
OECD: Organization for Economic Cooperation and Development.
OSHA: Occupational Safety and Health Administration.
PBT: Persistent, Bioaccumulative and Toxic.
PNEC: Predicted No Effect Concentration.

QSAR: Quantitative Structure Activity Relationship.
REACH: Regulation 1907/2006/EC concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals.
RID: Regulations Concerning the International Transport of Dangerous Goods by Rail.
SCBA: Self Contained Breathing Apparatus.
SDS: Safety Data Sheet.
STOT: Specific Target Organ Toxicity.
SVHC: Substances of Very High Concern.
UN: United Nations.
UVCB: Chemical Substances of Unknown or Variable Composition, Complex Reaction Products and Biological Materials.
VOC: Volatile Organic Compound.
vPvB: very Persistent and very Bioaccumulative.

This safety data sheet had been prepared on the basis of information provided by the manufacturer/supplier and conform to the relevant regulations.

The information, data and recommendations contained herein are provided in good faith, obtained from reliable sources and believed to be true and accurate as of the date issued; however, no representation is made as to the comprehensiveness of the information.

The SDS shall be used only as a guide for handling the product; in the course of handling and using the product other considerations may arise or be required.

Users are cautioned to determine the appropriateness and applicability of the above information to their particular circumstances and purposes and assume all risk associated with the use of this product.

It is the responsibility of the user to fully comply with local, national and international regulations concerning the use of this product.

Safety data sheet was prepared by:
MSDS-Europe
International branch of ToxInfo Kft.

Professional help regarding the explanation of
the safety data sheet:
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