

Name of the product	Hexafluoro -1, 3-Butadiene (C4F6)
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1. Chemical product and corporate information.

- A. Name of the product Hexafluoro -1, 3-Butadiene
- B. Recommended use of the product and limitation of the usage.  
 Recommended use of the product No data available  
 Limitation of the usage: No data available.
- C. Supplier's information.(In case of imported product, state the supplier's information for emergency contact)  
 Name of the corporate: FEWM Co. LTD  
 Address: 53, Jeungpyeong2sandan-ro, Doan-myeon, Jeungpyeong-gun, Chungcheongbuk-do  
 Emergency Contact: 043)838-9562

2. Hazards. Maleficence

- A. Hazards. Maleficence classification Inflammable gas: Category 1.  
 High-pressure gas: liquid gas.

B. Cautionary statements including the measures for safety.

Symbolics



Signals

Hazards wordings

Warning

H220: Extremely flammable gas

H280: Contains gas under pressure; may explode if heated

Preventional wordings

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.
Storage	P381: Eliminate all ignition sources if safe to do so. P403: Store in a well-ventilated place.. P410 + P403: Protect from sunlight. Store in a well-ventilated place.
Disposal	No Data available
C. Other hazards and maleficence not included in the standards of the category of hazards and maleficence (NFPA)	
Sanitation	No data available
Fire	No data available
Reactivity	No data available

### 3. Title and content of the component

Name of the component	Hexafluoro-1, 3-butadiene
Nickname (Trivial name)	
CAS no	685-63-2
Content (%)	100%

### 4. Emergency measures.

#### A. If in eyes

Immediately wash the skin and eye with running water for more than 20 minutes. Take emergency medical measures.

#### B. If on skin

Take emergency medical measures.  
Remove the contaminated clothes and shoes and quarantine the contaminated area. Immediately wash the skin and eye with running water for more than 20 minutes. In case of a burn, cool the area with cold water for as long as possible, and do not remove the clothes stuck on the skin.  
Burn, serious injury, frostbite could be caused when in contact with gas or liquid gas.

#### C. If inhaled

Consult with the medical agency (doctor). Keep warm and comfortable. When exposed to a large amount of dust or fume, remove it with clean air, and in case of coughing or other symptoms, take medical measures.

#### D. If swallowed.

Take emergency medical measures.  
In case the material is swallowed or inhaled, do not perform mouth to mouth artificial respiration, and move to an appropriate respiratory medical center.

#### E. Other cautions to doctor

Symptoms due to contact or inhalation could delay.

Make sure that the medical personnel is aware of the material and take protective measures.

#### 5. Measures in case of explosion, fire.

##### A. Appropriate (inappropriate) extinguisher.

In the case of extinguishment concerned with this material, use alcohol foam, carbon dioxide or water spray.

Use dry sand or soil when extinguishment by smothering.

##### B. Specific hazard from the chemical component

The container may explode on heating.

May cause fire and explosion by intense polymerization.

Extremely flammable gas.

Forms explosive mixture with air.

May be fatal on inhalation and contact on skin.

In the case of fire, irritating, corrosive, toxic gas may be formed.

The vapor may cause dizziness or suffocation without awareness.

Cylinder exposed to fire could release inflammable gas.

Vapor may flashback by moving to the source of ignition.

May be ignited by heat, spark, flame.

The spillage has the risk of fire/explosion.

##### C. Protective equipment when fire-fighting and preventional measures.

Do not extinguish, unless leak can be stopped safely.

Eliminate all the sources of ignition if it is safe to do so.

The rescuer must wear appropriate protections.

Fight fire away from the region from a reasonable distance.

Be careful as the liquid gas spreads on the ground as it is heavier than the air.

Be careful as the damaged container may fly.

Immediately refrain in case of tank fire, if there is noise from the pressure relief equipment or discoloration to the tank.

In the case of tank fire, cool the container with a large amount of water after the extinguishment.

In case of tank fire, extinguish at the maximum distance or use an unmanned extinguisher.

In the case of tank fire, as there is a risk of freezing, do not wet the source of leakage or safety facility.

If not in danger, move the container from the area of the fire.

Do not extinguish the fire on leaked gas if the leakage does not stop.

In case of tank fire, if it a large-scale fire, use an unmanned extinguisher and if not possible, refrain and let it burn.

#### 6. Measures in case leakage.

##### A. Required measures and protections to protect the body.

Avoid inhalation of (dust, hume, gas, mist, vapor, spray)  
Do not extinguish the fire on leaked gas if the leakage does not stop.  
Remove all the sources of ignition as the microfine particles may cause fire or explosion.  
If possible, turn the container of the leakage and let is release as a gas rather than liquid.  
Quarantine the contaminated area until the gas dilutes by complete spreading.  
Do not wet the source of spillage directly.  
Eliminate all the sources of ignition.

B. Measures and protections for the body.

Reduce the vapor using water spray, or avoid the contact of water with the spillage by disheveling the steam point.  
If not dangerous, stop the leakage.  
In case of spillage without fire, wear front protects for vapor.  
Pay attention to the materials and conditions to avoid.

C. Environmental measures.

Prevent entering the waterway, drainage, basement, confined area.  
Spillage could cause pollution.

D. Methods of purification or removal.

Absorb the liquid and clean the contaminated area with water and soap.  
Remove the dust in the air and prevent the dispersion by humidifying it with water.  
Absorb the spillage with inert material (such as dry sand or soil) and place it in the container of chemical waste.  
For fire fighting purposes, build embarkment and collect water.

## 7. Handling and storage measures.

A. Safety measures.

Graft all the equipment when handling the material  
Pay attention to the material and conditions to avoid.  
Open the lid carefully.  
Use according to the handling/storage  
As there could be remains of the material to the container after it has been emptied, hence follow all the MSDS/label preventional measures.  
Do not pressurize, cut, weld, solder, connect, pierce, grind or expose to heat, fire, spark, static or other sources of ignition.  
Use only outdoors or in a well-ventilated area.  
Avoid inhalation of (dust, hume, gas, mist, vapor, spray)  
Work with reference to engineering maintenance and personal protection.

B. Safe storage measures.

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

Avoid direct sunlight and keep in a well-ventilated area.

The pressure of the container could rise when exposed to heat hence refrain from exposure to heat.

Pay attention to the material and conditions to avoid.

8. Prevention of spillage and personal protection.

A. Exposure standards of the chemical material, biological exposure standards etc.

Domestic Regulations No data available.

ACGIH Regulation No data available.

Biological exposure standards No data available.

B. Appropriate engineering maintenance. No data available.

C. Personal protection

Respiratory protection Use the respiratory protection that has completed the inspection by the Korea Occupational Safety and Health Agency as per the physiochemical characteristics of the exposed gaseous/liquid material. In the case of gaseous/liquid material, the following respiratory protections are recommended - Mobile full-face gas mask (for organic compound (in case of acidic gas, for acidic gas)) or mobile half gas mask (for organic compound (in case of an acidic gas, for acidic gas)) or direct full-face gas mask (for organic compound (in case of an acidic gas, for acidic gas)) or motor gas mask. In case of lack of oxygen (<19.5%), wear air supplied respirator or air respirator.

Eye protection No data available.

Hand protection No data available.

Body protection No data available.

9. Physicochemical characteristic.

A. External

Shape Gas (Source: CRC Handbook)

Color No color(Source: Seekchem)

B. Odor Odorless (Source: Seekchem)

C. Odor threshold No data available.

D. pH No data available.

E. Melting point/ freezing point -132 C (Source: ChemIDplus)

F. Initial boiling post and boiling point range 6 C (Source:ChemIDplus)

G. Ignition point -17 C (Source:Univ of Akron)

H. Vaporization speed No data available.

I. Inflammability (solid, vapor) Inflammable. (Source: Chemicalbook)

- J. Upper limit or lower limit of the range of ignition or explosion 13 / 7 % (Source: KOSHANET (<http://www.kosha.net/index.jsp>))
- K. Steam pressure 1460 mmHg (25 C)  
(Source: National Institute of Technology and Evaluation [http://www.safe.nite.go.jp/data/sougou/pkc\\_e\\_search\\_frm.html](http://www.safe.nite.go.jp/data/sougou/pkc_e_search_frm.html))
- L. Solubility 2440 mg/l (Source: National Institute of Technology and Evaluation [http://www.safe.nite.go.jp/data/sougou/pkc\\_e\\_search\\_frm.html](http://www.safe.nite.go.jp/data/sougou/pkc_e_search_frm.html))
- M. Vapor density No Data available
- N. Specific gravity 1.553 (Source: Chemicalbook)
- O. n-octanol-water partition coefficient 2.09 (Log Kow) (Source: National Institute of Technology and Evaluation [http://www.safe.nite.go.jp/data/sougou/pkc\\_e\\_search\\_frm.html](http://www.safe.nite.go.jp/data/sougou/pkc_e_search_frm.html))
- P. Auto-ignition temperature No data available.
- Q. Decomposition temperature No data available.
- R. Viscosity No data available.
- S. Molecular weight 162.033  
(Source: CRC Handbook)

## 10. Stability and reactivity

- A. Chemical stability and hazardous reactivity  
Extremely inflammable gas.  
Includes high-pressure gas: May explode on heating  
May cause fire and explosion by intense polymerization.  
The container may explode on heating.  
Forms explosive mixture with air.  
Spillage has the risk of fire/explosion.  
Vapor may flashback by moving to the source of ignition.  
Cylinder exposed to fire could release inflammable gas.  
The vapor may cause dizziness or suffocation without awareness.  
May be fatal when inhaled or on skin.
- B. Conditions to avoid Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- C. Materials to avoid Water
- D. Harmful decomposed product Irritating, corrosive, toxic gas.

## 11. Toxicological information.

- A. Information on routes of exposure of high possibility.  
No data available.
- B. Health hazards information.
- Acute toxicity
- Oral No data available.
- Skin No data available.
- Inhalation No data available.

Skin corrosion or irritation	No data available.
Serious eye damage or irritation	No data available.
Respiratory sensitization	No data available.
Skin sensitizations	No data available.
Carcinogenicity	No data available.
Occupation safety and health acts	No Data Available.
Notice of Ministry of Employment and Labor	No Data Available.
IARC	No data available.
OSHA	No Data Available.
ACGIH	A4
NTP	No data available.
EU CLP	No data available.
Germ-cell mutagenicity	No data available.
Reproductive toxicity	No data available.
Specific target organ systemic toxicity (Single exposure)	No data available
Specific target organ systemic toxicity (Repeated exposure)	No data available.
Aspirations respiratory tract hazards	No data available.
Other maleficence effects	No data available.

## 12. Effects on the environment.

### A. Ecotoxicity

Fish	No data available.
Crustacean	No data available.
Algae	No data available.

### B. Persistent and biodegradable.

Persistent	2.09 log Kow (Source: ChemIDplus)
Degradability	No data available.

### C. Bio-accumulative potential

Condensability	No data available.
Biodegradability	No data available.

D. Mobility in soil No data available.

E. Other adverse effects No data available

## 13. Disposal considerations.

### A. Methods of waste disposal

1) dispose of by neutralization, hydrolysis, oxidation, deoxidation. 2) dispose of by high-temperature incineration or other applied high temperature. 3) dispose of by solidification.

B. Cautious measures when disposal.

Dispose of the content and container as per (the stated regulations of the concerned law)

#### 14. Information required for the transport.

A. UN No.	3161
B. Proper shipping name	Other liquefied gas (flammable), LIQUEFIED GAS. FLAMMABLE. N.O.S
C. Transportation hazard classification	2.1
D. If applied, the packing group	-
E. Marine pollution (Marine pollutant material)	Not applicable.
F. Special transport measures to the transport or the transportation and precautionary conditions that the user should know.	
Emergency measures in case of fire	F-D
Emergency measures in case of spillage	S-U

#### 15. Legal regulatory status.

A. Regulations by occupation safety and health acts safety report (PSM)	Object of submission of public
B. Regulations by Chemicals control Act	Toxic material. The material of risk of accidents.
C. Regulations by Safety Control of Dangerous Substances	Not Applicable.
D. Regulations by waste control act	Specified waste.
E. Regulations by domestic and foreign law.	
Other domestic regulations.	Not Applicable.
Persistent organic pollutants control act	Not Applicable.
Foreign regulations	
The USA knowledge management (OSHA Regulations)	Not Applicable.
The USA knowledge management (CERCLA Regulations)	Not Applicable.
The USA knowledge management (EPCRA 302 Regulations)	Not Applicable.
The USA knowledge management (EPCRA 304 Regulations)	Not Applicable.
The USA knowledge management (EPCRA 313 Regulations)	Not Applicable.
The USA knowledge management (EPCRA 302 Regulations)	Not Applicable.
The USA knowledge management (Materials of Rotterdam agreement)	Not Applicable.
The USA knowledge management (Materials of Stockholm agreement)	Not Applicable.
The USA knowledge management (Materials of Montreal protocol)	Not Applicable.
EU Classification(result of definite classification)	Not Applicable.
EU Classification (Hazard text)	Not Applicable.
EU Classification (Safety text)	Not Applicable.



## 16. Other information.

### A. Source of reference.

National Institute of Environmental Research (Inhalation)

Quantitative Structure Activity Relation (QSAR) (condensability)

EPI Suite (biodegradability)

CRC Handbook (molecular weight, shape) ChemIDplus (melting point/freezing point, persistent, initial boiling point and boiling point range) Chemicalbook (specific gravity, flammability (solid, gas)) KOSHANET (<http://www.kosah.net/index.jsp>) (upper limit/lower limit of the range of inflammability or explosion)

National Institute of Technology and Evaluation

[http://www.safe.nite.go.jp/data/sougou/pkc\\_e\\_search\\_frm.html](http://www.safe.nite.go.jp/data/sougou/pkc_e_search_frm.html) (n-octanol-water partition coefficient (Kow))

National Institute of Technology and Evaluation

[http://www.safe.nite.go.jp/data/sougou/pkc\\_e\\_search\\_frm.html](http://www.safe.nite.go.jp/data/sougou/pkc_e_search_frm.html) (Solubility)

National Institute of Technology and Evaluation

[http://www.safe.nite.go.jp/data/sougou/pkc\\_e\\_search\\_frm.html](http://www.safe.nite.go.jp/data/sougou/pkc_e_search_frm.html) (steam pressure)

Seekchem (Odor, color)

Univ of Akron (point of ignition)

B. Initial date of preparation 1st August 2017

C. Number of revision and first date of issue

Number of revision times

Last date of revision 9th August 2018

D. Miscellaneous

The issued Material safety data sheet (MSDA) is document edited and partly amended by referencing the MSDS provided by Korea Occupational Safety and Health Agency