Hexafluoro-1,3-butadiene

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
SDS Reference Number: 1300203
Issue date: 9/27/2017 Revision date: 6/24/2026 Version: 1.1

SECTION 1 Identification

1.1. Product identifier

Product form	:	Substance
Substance name	:	Hexafluoro-1,3-butadiene
CAS-No.	:	685-63-2
Product code	:	1300-2-03
Formula	:	C4F6

1.2. Other means of identification

Synonyms	:	1,1,2,3,4,4-Hexafluorobuta-1,3-diene
Other means of identification	:	MFCD00039273
EC-No.	:	211-681-0

1.3. Recommended use of the chemical and restrictions on use

Use of the substance/mixture	:	Laboratory chemicals,Manufacture of substances,Scientific research and development

1.4. Supplier's details

SynQuest Laboratories, Inc.
P.O. Box 309
Alachua, FL, Alachua, 32615
United States of America
T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.5. Emergency phone number

Emergency number	:	(844) 523-4086 (3E Company - Account 10069)

SECTION 2 Hazard Identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable gases, Category 1	H220	Extremely flammable gas.
Gases under pressure : Liquefied gas	H280	Contains gas under pressure; may explode if heated.
Acute toxicity (oral), Category 4	H302	Harmful if swallowed.
Acute toxicity (dermal), Category 4	H312	Harmful in contact with skin.
Acute toxicity (inhalation), Category 3	H331	Toxic if inhaled.
Skin corrosion/irritation, Category 2	H315	Causes skin irritation.
Serious eye damage/eye irritation, Category 2A	H319	Causes serious eye irritation.
Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation	H335	May cause respiratory irritation.
Specific target organ toxicity — Repeated exposure, Category 1	H372	Causes damage to organs (central nervous system, kidneys, respiratory system, Skin) through prolonged or repeated exposure.

Full text of H statements : see section 16

2.2. Label elements

GHS US labeling

Hazard pictograms (GHS US) :

Signal word (GHS US) : Danger

Hazard statements (GHS US) : H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
H302+H312 - Harmful if swallowed or in contact with skin
H315 - Causes skin irritation
H319 - Causes serious eye irritation
H331 - Toxic if inhaled
H335 - May cause respiratory irritation
H372 - Causes damage to organs (central nervous system, kidneys, respiratory system, Skin) through prolonged or repeated exposure

Precautionary statements (GHS US) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 - Do not breathe dust, fume, gas, mist, vapours, spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves.
P301+P312 - If swallowed: Call a POISON CENTER or doctor/ physician if you feel unwell
P302+P352 - If on skin: Wash with plenty of soap and water
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P311 - Call a POISON CENTER or doctor/physician
P312 - Call a POISON CENTER or doctor/physician if you feel unwell
P314 - Get medical advice or attention if you feel unwell.
P321 - Specific treatment (see supplemental first aid instruction on this label).
P330 - Rinse mouth.
P332+P313 - If skin irritation occurs: Get medical advice or attention.
P337+P313 - If eye irritation persists: Get medical advice or attention.
P362+P364 - Take off contaminated clothing and wash it before reuse.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - In case of leakage, eliminate all ignition sources.
P403 - Store in a well-ventilated place.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.
P501 - Dispose of contents and/or container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulations.

2.3. Hazards associated with known or reasonably anticipated uses

No additional information available

2.4. Hazards not otherwise classified

No additional information available

2.5. Unknown acute toxicity

No additional information available

SECTION 3 Composition/information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Product identifier	%	GHS US classification
Hexafluoro-1,3-butadiene (Main constituent)	CAS-No.: 685-63-2	≤ 100	Flam. Gas 1, H220 Press. Gas (Liq.), H280 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Acute Tox. 3 (Inhalation), H331 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335 STOT RE 1, H372

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4 First aid measures

4.1. Description of necessary first-aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.

First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.

First-aid measures after skin contact : Wash with plenty of soap and water. Get immediate medical advice/attention.

First-aid measures after eye contact : Remove contact lenses, if present and easy to do. Continue rinsing. Immediately flush eyes thoroughly with water for at least 15 minutes. Get immediate medical advice/attention.

First-aid measures after ingestion : Due to its physical form, exposure to this chemical is not likely. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention.

4.2. Most important symptoms/effects, acute and delayed

Symptoms/effects : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

Symptoms/effects after inhalation : May cause drowsiness or dizziness.

4.3. Indication of immediate medical attention and special treatment needed, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire.

5.2. Specific hazards arising from the chemical

Fire hazard : Thermal decomposition generates: Carbon oxides. Hydrogen fluoride.

Explosion hazard : Contains gas under pressure; may explode if heated. Use water spray or fog for cooling exposed containers. May form flammable/explosive vapor-air mixture.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection during firefighting : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection".

SECTION 6 Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate unnecessary personnel. Ensure adequate air ventilation. May cause suffocation by reducing oxygen available for breathing. Do not breathe gas, fumes, vapor or spray.

For non-emergency personnel

Emergency procedures : Only qualified personnel equipped with suitable protective equipment may intervene.

For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

Emergency procedures : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level. Consider the risk of potentially explosive atmospheres. Eliminate every possible source of ignition.

Environmental precautions : Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.2. Methods and materials for containment and cleaning up

For containment : Stop leak if safe to do so.

Methods for cleaning up : Ventilate area.

Other information : For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

For further information refer to section 8: "Exposure controls/personal protection"

SECTION 7 Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, gas, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes. Keep away from ignition sources (including static discharges). Proper grounding procedures to avoid static electricity should be followed. Use only non-sparking tools.

Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Handle empty containers with care because residual vapors are flammable. Close valve after each use and when empty.

7.2. Conditions for safe storage, including incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep container closed when not in use. Keep away from ignition sources.

Storage area : Store in dry, cool, well-ventilated area.

Incompatible materials : Refer to Section 10 on Incompatible Materials.

SECTION 8 Exposure controls/personal protection

8.1. Control parameters

No additional information available

8.2. Appropiate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Systems under pressure should be regularily checked for leakage. Oxygen detectors should be used when asphyxiating gases may be released. Gas detectors should be used when toxic gases may be released.

8.3. Individual protection measures, such as personal protective equipment

Hand protection:
protective gloves. 29 CFR 1910.138: Hand Protection
Eye protection:
Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection
Skin and body protection:
Wear suitable protective clothing
Respiratory protection:
In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection

Personal protective equipment symbol(s):

Thermal hazard protection:

Cold insulating gloves.

Other information:

Safety shoes. 29 CFR 1910.136: Foot Protection.

SECTION 9 Physical and chemical properties

9.1. Basic physical and chemical properties

Physical state	:	Gas
Color	:	No data available
Odor	:	No data available
Odor threshold	:	No data available
pH	:	No data available
Melting point	:	-132.1 °C
Freezing point	:	No data available
Boiling point	:	6 – 7 °C
Flash point	:	No data available
Flammability (solid, gas)	:	No data available
Vapor pressure	:	25 psia (@ 20 °C)
Relative vapor density at 20 °C	:	No data available
Relative density	:	No data available
Density	:	1.553 g/ml (@ -20 °C)
Molecular mass	:	162.03 g/mol
Solubility	:	No data available

Partition coefficient n-octanol/water (Log Pow)	:	(>2.22 - <2.26 - at 25.3 °C (at pH >6.2-<6.4)
Auto-ignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity, kinematic	:	No data available
Explosion limits	:	No data available
Particle characteristics	:	No data available

9.2. Data relevant with regard to physical hazard classes (supplemental)

Refractive index	:	1.378 (@ -20 °C)

SECTION 10 Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

No additional information available

10.4. Conditions to avoid

Protect from sunlight. Do not expose to temperatures exceeding 50 ℃. Keep away from heat, sparks and flame.

10.5. Incompatible materials

Alkali metals. Finely divided metals (Al, Mg, Zn). Strong oxidizing agents.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

SECTION 11 Toxicological information

11.1. Likely routes of exposure

Acute toxicity (oral)	:	Harmful if swallowed.
Acute toxicity (dermal)	:	Harmful in contact with skin.
Acute toxicity (inhalation)	:	Toxic if inhaled.

Hexafluoro-1,3-butadiene (685-63-2)	
LC50 Inhalation - Rat	3.34 – 5.442 mg/l/4h
ATE US (gases)	700 ppmV/4h

Skin corrosion/irritation	:	Causes skin irritation.
Serious eye damage/irritation	:	Causes serious eye irritation.
Respiratory or skin sensitization	:	No data available
Germ cell mutagenicity	:	No data available
Carcinogenicity	:	No data available
Reproductive toxicity	:	No data available

STOT-single exposure	:	May cause respiratory irritation.
STOT-repeated exposure	:	central nervous system, kidneys, respiratory system, Skin.
Aspiration hazard	:	Not applicable
Symptoms/effects	:	The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.
Symptoms/effects after inhalation	:	May cause drowsiness or dizziness.

SECTION 12 Ecological information

12.1. Ecotoxicity

Hazardous to the aquatic environment, short–term (acute)	:	No data available
Hazardous to the aquatic environment, long–term (chronic)	:	No data available

12.2. Persistence and degradability

Hexafluoro-1,3-butadiene (685-63-2)	
Persistence and degradability	Rapidly degradable

12.3. Bioaccumulative potential

Hexafluoro-1,3-butadiene (685-63-2)	
Partition coefficient n-octanol/water (Log Pow)	(>2.22 - <2.26 - at 25.3 °C (at pH >6.2-<6.4)

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Ozone	:	No data available
Fluorinated greenhouse gases	:	No

SECTION 13 Disposal considerations

Waste treatment methods	:	Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.
Product/Packaging disposal recommendations	:	Dispose of contents/container in accordance with licensed collector's sorting instructions.
Additional information	:	Recycle the material as far as possible.

SECTION 14 Transport information

14.1. UN number

UN-No.(DOT)	:	UN3160
UN-No. (TDG)	:	UN3160
UN-No. (IMDG)	:	3160
UN-No. (IATA)	:	3160

14.2. UN Proper Shipping Name

Proper Shipping Name (DOT)	:	Liquefied gas, toxic, flammable, n.o.s.
Proper Shipping Name (TDG)	:	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.
Proper Shipping Name (IMDG)	:	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.
Proper Shipping Name (IATA)	:	Liquefied gas, toxic, flammable, n.o.s.

14.3. Transport hazard class(es)

DOT

Transport hazard class(es) (DOT) : 2.3 (2.1)

Hazard labels (DOT) : 2.3, 2.1

TDG

Transport hazard class(es) (TDG) : 2.3 (2.1)

Hazard labels (TDG) : 2.3, 2.1

IMDG

Transport hazard class(es) (IMDG) : 2.3 (2.1)

Hazard labels (IMDG) : 2.3, 2.1

IATA

Transport hazard class(es) (IATA) : 2.3 (2.1)

14.4. Packing group

Packing group (DOT) : Not applicable

Packing group (TDG) : Not applicable

Packing group (IMDG) : Not applicable

Packing group (IATA) : Not applicable

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Transport in bulk

Not applicable

14.7. Special precautions for user

DOT

UN-No.(DOT) : UN3160

DOT Special Provisions (49 CFR 172.102) : 1 - This material is poisonous by inhalation (see 171.8 of this subchapter) in Hazard Zone A (see 173.116(a) or 173.133(a) of this subchapter), and must be described as an inhalation hazard under the provisions of this subchapter.

DOT Packaging Non Bulk (49 CFR 173.xxx) : 192

DOT Packaging Bulk (49 CFR 173.xxx) : 245

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : Forbidden

DOT Vessel Stowage Location	:	D - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’

TDG

UN-No. (TDG)	:	UN3160
TDG Special Provisions	:	16 - 1) The technical name of the most dangerous substance related to the primary class must be shown, in parentheses, on the shipping document following the shipping name in accordance with clause 3.5(1)(c)(i)(A) of Part 3, Documentation. The technical name must also be shown, in parentheses, on a small means of containment or on a tag following the shipping name in accordance with subsections 4.11(2) and (3) of Part 4, Dangerous Goods Safety Marks. 2) subsection (1), the technical name for the following dangerous goods is not required to be shown on a shipping document or on a small means of containment when Canadian law for domestic transport or an international convention for international transport prohibits the disclosure of the technical: a) UN1544, ALKALOID SALTS, SOLID, N.O.S. or ALKALOIDS, SOLID, N.O.S; b) UN1851, MEDICINE, LIQUID, TOXIC, N.O.S; c) UN3140, ALKALOID SALTS, LIQUID, N.O.S. or ALKALOIDS, LIQUID, N.O.S; d) UN3248, MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S; or e) UN3249, MEDICINE, SOLID, TOXIC, N.O.S. An example in Canada is the “Food and Drugs Act”,23 - 1) A consignor of these dangerous goods must include on a shipping document, after the classification of the dangerous goods, the words “toxic by inhalation” or “toxic – inhalation hazard” or “toxique par inhalation” or “toxicité par inhalation” if the dangerous goods meet the criteria for inclusion in Class 6.1, Packing Group I, due to inhalation toxicity. For example: CYANIDE SOLUTION, N.O.S, Class 6.1, UN1935, PG I, toxic by inhalation 2) A person must not handle, offer for transport or transport these dangerous goods by passenger carrying road vehicle, passenger carrying railway vehicle or passenger carrying ship if they meet the criteria for inclusion in Class 6.1, Packing Group I, due to inhalation toxicity. 3) This special provision does not apply to a person who transports these dangerous goods in accordance with the exemption in section 1.15 of Part 1, Coming Into Force, Repeal, Interpretation, General Provisions and Special Cases,38 - A person must not handle, offer for transport or transport these dangerous goods in a large means of containment if they are in direct contact with the large means of containment.
ERAP Index	:	25
Explosive Limit and Limited Quantity Index	:	0
Excepted quantities (TDG)	:	E0
Passenger Carrying Vessel Index	:	Forbidden
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	:	Forbidden
Emergency Response Guide (ERG) Number	:	119

IMDG

Special provision (IMDG)	:	274
Limited quantities (IMDG)	:	0
Excepted quantities (IMDG)	:	E0
Packing instructions (IMDG)	:	P200
EmS-No. (Fire)	:	F-D - FIRE SCHEDULE Delta - FLAMMABLE GASES
EmS-No. (Spillage)	:	S-U - SPILLAGE SCHEDULE Uniform - GASES (FLAMMABLE, TOXIC OR CORROSIVE)
Stowage category (IMDG)	:	D
Stowage and handling (IMDG)	:	SW2

IATA

Special provision (IATA)	:	A2
PCA Limited quantities (IATA)	:	Forbidden
PCA limited quantity max net quantity (IATA)	:	Forbidden
PCA packing instructions (IATA)	:	Forbidden
PCA max net quantity (IATA)	:	Forbidden
CAO packing instructions (IATA)	:	Forbidden
CAO max net quantity (IATA)	:	Forbidden

ERG code (IATA) : 10P

SECTION 15 Regulatory information

15.1. Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

15.2. International regulations

CANADA

Hexafluoro-1,3-butadiene (685-63-2)

Listed on the Canadian NDSL (Non-Domestic Substances List)

EU-Regulations

Hexafluoro-1,3-butadiene (685-63-2)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

National regulations

Hexafluoro-1,3-butadiene (685-63-2)

Listed on the Japanese ENCS (Existing New Chemical Substances) inventory
Listed on KECL/KECI (Korean Existing Chemicals Inventory)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the TCSI (Taiwan Chemical Substance Inventory)

15.3. State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16 Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations
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Full text of hazard classes and H-statements	
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
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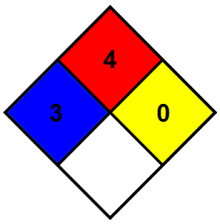
H315	Causes skin irritation
H319	Causes serious eye irritation
H331	Toxic if inhaled
H335	May cause respiratory irritation
H372	Causes damage to organs through prolonged or repeated exposure

NFPA health hazard	:	3 - Materials that, under emergency conditions, can cause serious or permanent injury.
NFPA fire hazard	:	4 - Materials that rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and burn readily.
NFPA reactivity	:	0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating

Health	:	3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	:	4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)
Physical	:	0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

Safety Data Sheet (SDS), USA

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.