Refining & Chemicals

GPS Safety Summary – 1,3-BUTADIENE

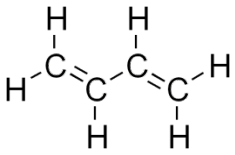
SUBSTANCE NAME

1,3-BUTADIENE

CHEMICAL IDENTITY

Name: 1,3-Butadiene, Butadiene
Chemical name (IUPAC): Buta-1,3-diene
CAS number: 106-99-0
EC number: 203-450-8
Molecular formula: C_4H_6

Structure:



USES AND APPLICATIONS

1,3-Butadiene is mainly used by the chemical industry as a monomer for the manufacture of plastics (such as rubber). It is also used as a synthesis intermediate product in the manufacture of other chemicals.

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PHYSICAL/CHEMICAL PROPERTIES

Phys/Chem Safety Assessment

Property	Value
Physical state (at 20°c)	Liquefied petroleum gas
Colour	Colourless
Odour	Hydrocarbons
Melting / boiling point	-109°C/-4.4°C
Flammability	H220 - Extremely flammable gas
Explosive properties	Explosion limits (% vol) : upper = 11.5 - 16.3; lower = 1.4 - 2
Self-ignition temperature	420°C
Vapor pressure	>2450hPa at 20°C
Mol weight	54 g/mol
Water solubility	Insoluble (735 mg/l)
Octanol-water partition coefficient (LogKow) (at 20°C)	1.99

HEALTH EFFECTS

Human Health Safety Assessment

Effect Assessment	Result
Acute Toxicity	**Inhalation** : High levels of exposure may cause headache, drowsiness, loss of consciousness , asphyxia
Local effect	**Inhalation:** High levels of exposure may cause irritation to respiratory system
	Skin contact : liquefied gas splashes may cause freeze burns
	Eye contact : liquefied gas splashes may cause freeze burns
Sensitisation	Not regarded as a sensitising agent
Toxicity after repeated exposure	**Inhalation :** repeated exposure to high concentrations exposure may induce toxic effects on blood
Genotoxicity / Mutagenicity	Genotoxic
Carcinogenicity	Carcinogenic to human
Reproductive toxicity	Not considered to have toxic effect on fertility or on foetal development in the absence of maternal toxicity

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ENVIRONMENTAL EFFECTS

Environment Safety Assessment

1,3-Butadiene is not acutely toxic to aquatic organisms. Because of its high volatility, 1,3-Butadiene evaporates into the atmosphere where it is expected to undergo degradation in the presence of sunlight. For that raison, 1,3-Butadiene is unlikely to cause ground or water pollution. The product is not considered to be either persistent and bioaccumulative, nor very persistent and very bioaccumulative.

EXPOSURE

Human health

Consumer: 1,3-Butadiene produced in the chemical industry is used almost exclusively as an intermediate to make other products, and extensive measures are taken to minimize exposure. Hence, consumer exposure to 1,3-Butadiene is unlikely in the event of an accidental release or spill. The public may be exposed to low levels of 1,3-Butadiene as a residual in products manufactured (such as tyres). Based on model calculations, exposure will be below safe exposure levels as operation conditions and risk management measures recommended into the Safety Data Sheet (SDS) must be applied.

Worker: The substance is mainly handled in closed systems throughout its life cycle. Workers may be exposed to 1,3-Butadiene during, for example, product transfer operations, product sampling, or maintenance/repair activities. Exposure is minimized as operation conditions and management measures recommended into the SDS must be applied.

Environment

1,3-butadiene is mainly used/manufactured in a closed process. Procedural and control technologies are used to minimize emissions and any resulting exposures. 1,3-butadiene is not classified hazardous for the environment. Nevertheless, if an accidental release occurs, all the emergency procedures are described into the Safety Data Sheet (SDS).

RISK MANAGEMENT RECOMMENDATIONS

Always handle the product in accordance with good industrial hygiene and safety procedures and apply risk management measures recommended into SDS. During operations where emission may occur, especially, during operations where emission may occur, like product transfer operations,

product sampling, or maintenance/repair activities, workers must use appropriate Personal protective equipment (PPE) such as gloves, goggles, safety shoes, respiratory protective equipment, etc… When using the product, never subject a cylinder to severe mechanical shock. Avoid producing or diffusing fumes, vapour or spray into the air, avoid splashes, avoid contact with skin and eyes. As the product may form flammable / explosive vapor-air mixture, all possible sources of ignition must be removed. Handle under adequate ventilation. When using, do not eat, drink or smoke.

Specific risk management measures are reported for each identified use in the SDS.

STATE AGENCY REVIEW

- This substance has been registered under REACH (EC) 1907/2006.
- This substance has been evaluated under OECD HPV program.

REGULATORY INFORMATION / CLASSIFICATION AND LABELLING

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according CLP (EC) 1272/2008.

Classification of the substance

EC-GHS (CLP) Classification according to the regulation EC 1272/2008 (EC-GHS) and ATP

Flam. Gas 1
Press. Gas
Muta. 1B
Carc. 1A
Pictogram(s) GHS02, GHS04, GHS08

H Phrase(s)

H220 - Extremely flammable gas.
H280 - Contains gas under pressure; may explode if heated.
H340 - May cause genetic defects.
H350 - May cause cancer.

P Phrase(s)

P201 - Obtain special instructions before use.
P210 - Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P243 - Take precautionary measures against static discharge.
P273 - Avoid release to the environment
P281: Use personal protective equipment as required.
P309/311 - IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - Eliminate all ignition sources if safe to do so.
P410/403 - Protect from sunlight. Store in a well-ventilated place.

CONCLUSION

- 1,3-Butadiene is mainly use by the chemical industry as a monomer for the manufacture of plastics (such us rubber), or as a synthesis intermediate product in the manufacture of other chemicals.
- Short high inhalation exposure to 1,3-Butadiene may cause drowsiness, loss of consciousness. Repeated high inhalation exposures to 1,3-Butadiene may cause cancer.
- Exposure to humans and the environment is considered low if properly handled.

CONTACT INFORMATION WITHIN COMPANY

For further information on this substance or product safety summaries in general, please contact: pch.reach@total.com

Or visit the ICCA portal on: http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

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GLOSSARY

Acute Toxicity	Harmful effect resulting from a single or short term exposure to a substance
Biodegradation	Decomposition or breakdown of a substance under natural conditions (actions of micro organisms etc)
Bioaccumulation	Progressive accumulation in living organisms of a chemical substance present in the environment
Carcinogenicity	Substance effects causing cancer
Genotoxicity	Substance effect that causes damage to genes, including Mutagenicity and clastogenicity
GHS	Global Harmonized System of chemicals classification
Hazard	Inherent substance property bearing a threat to health or environment
Mutagenicity	Substance effect that cause mutation on genes
Persistence	Refers to the length of time a compound stays in the environment, once introduced
Reprotoxicity	Including teratogenicity, embryotoxicity and harmful effects on fertility
Sensitising	Allergenic

DISCLAIMER

The information contained in this paper is intended as basic advice and general information to this designated specific product (substance) only and whilst this information is provided in utmost good faith and has been based on the best information to our belief and to our knowledge currently available, it is to be relied upon at the user's own risk. The information in this paper is not intended to provide medical or medical emergency response information, nor treatment information; all detailed safety and health information is to be found in the Safety Data Sheets (SDS) for the product (substance) concerned and to be consulted before use of this product (substance). The information in this Safety Summary is not replacing the SDS and is not automatically applicable if this product (substance) is used with other products (substances) or in other processes.

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