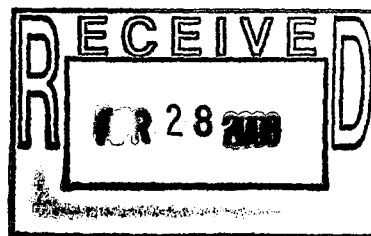


Olefins

1. Chemical product and company identification

Product name	BUTADIENE - 1,3 (STABILIZED)
MSDS #	0000000999
Code	0000000999 (NAP)
Product use	Industrial applications
Supplier	INEOS Europe Ltd. Clayhill Beechen Lane Lyndhurst Hampshire S043,7DD United Kingdom
EMERGENCY SPILL INFORMATION:	+44 (0) 208 762 8322 (National Chemical Emergency Centre (UK))
OTHER PRODUCT INFORMATION	+44 (0) 2380 287295



2. Composition/information on ingredients

Ingredient name	CAS #	% by weight
1,3-butadiene	106-99-0	>99

3. Hazards identification

Physical state	Liquefied gas	ORIGINAL - DO NOT REMOVE
Color	Colorless.	
Emergency overview	DANGER! Extremely flammable. Vapor may cause flash fire. Product stabilized but may polymerize readily. Extremely cold material; can cause burns similar to frostbite. Cancer hazard. Can cause cancer. May cause heritable genetic damage. Keep away from heat, sparks and flame. Do not get in eyes, on skin or on clothing. Do not breathe vapor or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Risk of cancer depends on duration and level of exposure.	
Routes of entry	Eye contact. Absorbed through skin. Inhalation.	
Potential health effects		
Eyes	Liquid can cause burns similar to frostbite. Will cause serious damage to the eyes.	
Skin	Liquid can cause burns similar to frostbite. May cause cancer.	
Inhalation	Inhalation of vapor/aerosol concentrations above the recommended exposure limits causes headaches, drowsiness, and nausea, and may lead to unconsciousness or death. Causes respiratory tract irritation. May cause cancer. May cause heritable genetic damage. See toxicological Information (section 11)	
Ingestion	Not applicable. Liquefied gas.	

See toxicological information (section 11)

4. First aid measures

Eye contact	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.
Skin contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Contaminated leather, particularly footwear, must be discarded. Note that contaminated clothing may be a fire hazard. Get medical attention if irritation develops.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	Not applicable. Liquefied gas

5. Fire-fighting measures

Flammability of the product	Extremely flammable.
Auto-ignition temperature	415 °C
Flash point	-70 °C (Closed cup)
Explosion limits	Lower: 1.4 % Upper: 16.3 %
Products of combustion	Carbon oxides (CO, CO ₂), other hazardous substances.
Unusual fire/explosion hazards	Extremely flammable liquefied gas. Vapors may form explosive mixtures with air. Vapor may cause flash fire. Vapors may accumulate in low or confined areas, travel considerable distance to source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. Container explosion may occur under fire conditions or when heated. Hazardous polymerization possible with catalyst and heat.
Fire-fighting media and instructions	In case of fire, use water spray (fog), foam, dry chemical, or CO ₂ . Do not use water jet. In case of fire, allow gas to burn if flow cannot be shut off immediately. Do not extinguish a leaking gas flame unless leak can be stopped. Move containing vessels if you can do it without risk. Vapors can travel to a source of ignition and flashback. DO NOT FIGHT FIRE WHEN IT REACHES MATERIAL. Withdraw from fire and let it burn. Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. First move people out of line-of-sight of the scene and away from windows. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.
Protective clothing (fire)	Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

6. Accidental release measures

Personal precautions	Immediately contact emergency personnel. Eliminate all ignition sources. Keep unnecessary personnel away. Use suitable protective equipment (See Section: "Exposure controls/personal protection"). Follow all fire fighting procedures (See Section: "Fire-fighting measures"). Do not touch or walk through spilled material.
Environmental precautions and clean-up methods	If emergency personnel are unavailable, contain spilled material. If possible, turn leaking container so that gas escapes rather than liquid. Let evaporate. Use water spray curtain to divert vapor drift. Place spilled material in an appropriate container for disposal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways. See Section 13 for Waste Disposal Information.
Personal protection in case of a large spill	Splash goggles. Full suit. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

7. Handling and storage

Handling	Do not get in eyes, on skin or on clothing. Do not breathe vapor or mist. Use only with adequate ventilation. Keep away from heat, sparks and flame. Keep away from sources of ignition - No smoking. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.
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Storage

Store in a segregated and approved area. Keep container tightly closed in a cool, well-ventilated place. Avoid all possible sources of ignition (spark or flame). Keep away from heat and direct sunlight. Must be inhibited to prevent the formation of explosive peroxides. Do not store in aluminum and its alloys, copper and its alloys, monel, brass, polyamide-epoxy. Suitable storage materials are stainless steel, mild steel, PTFE, PVC, vinyl and phenolic-coated containers. Storage tank vents should be inspected regularly for polymer fouling which can arise from vapor phase polymerization. Auto-refrigeration drains can become plugged and valves may become inoperable because of formation of ice due to expanding vapors or vaporising liquids.

8. Exposure controls/personal protection

Occupational exposure limits

Ingredient name

1,3-butadiene

Occupational exposure limits

ACGIH TLV (United States, 1/2005).

TWA: 4.4 mg/m³ 8 hour(s).

TWA: 2 ppm 8 hour(s).

OSHA PEL (United States, 8/1997).

STEL: 5 ppm 15 minute(s).

TWA: 1 ppm 8 hour(s).

Control Measures

Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions. Administrative controls and personal protective equipment may also be required.

Hygiene measures

Wash hands after handling compounds and before eating, smoking, using lavatory, and at the end of day.

Personal protection

Eyes

Do not get in eyes. Chemical splash goggles.

Skin and body

Do not get on skin or clothing. Wear clothing and footwear that cannot be penetrated by chemicals or oil.

Respiratory

Use only with adequate ventilation. Do not breathe vapor or mist. If operating conditions cause high vapor concentrations or TLV is exceeded, use supplied-air respirator.

Hands

Wear gloves that cannot be penetrated by chemicals or oil. (PVC gloves.)

The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.

Consult your supervisor or S.O.P. for special handling directions

Consult local authorities for acceptable exposure limits.

9. Physical and chemical properties

Physical state	Liquefied gas
Odor	Sweetish.
Color	Colorless.
Heat of combustion	Not available.
Boiling point / Range	-4.4 °C
Melting point / Range	-109 °C
Specific gravity	0.62
Density	0.621 g/cm ³ at 20°C
Vapor pressure	250 kPa at 20°C
Vapor Density (Air = 1)	1.87
Solubility	Insoluble in cold water.
LogK _{ow}	1.85

10. Stability and reactivity

Stability and reactivity	Product stabilized but may polymerize readily. May form explosive peroxides.
Conditions to avoid	Keep away from sources of ignition. Keep away from heat, sparks and flame. Keep container in a cool, well-ventilated area. Vapors may form explosive mixtures with air. Reacts with oxygen. May form explosive peroxides. Avoid depletion of inhibitor.
Incompatibility with various substances	Incompatible with halogens, hydrogen peroxide, chlorinated hydrocarbons, fluorine, nitric acid, oxidizing agents and sulfuric acid. Incompatible with heat, amines, ammonium salts, aziridine, methanol, phenyl acetronitrile, cellulose, ethylenimine, oxidizable metals (copper, zinc, aluminium, nickel, iron) and acids.
Hazardous decomposition products	carbon oxides (CO, CO ₂) (carbon monoxide, carbon dioxide), other hazardous substances.
Hazardous polymerization	Must be inhibited to prevent hazardous polymerization. Product stabilized but may polymerize readily. Hazardous polymerization possible with catalyst and heat.

11. Toxicological information

Ingredient name	Test	Result	Route	Species
1,3-butadiene	LC50	129000 ppm (4 hour(s))	Inhalation	Rat

Chronic toxicity

Carcinogenic effects

Cancer hazard. Can cause cancer. May cause heritable genetic damage. Risk of cancer depends on duration and level of exposure.

1,3-Butadiene: 1,3-Butadiene has been shown to cause cancer in rodents, and to cause genetic damage in mice but not in rats or hamsters. This is thought to be related to differences in metabolism, particularly mice, and specific sensitivities of that species.

An epidemiology study of workers in a 1,3-butadiene monomer production facility showed an excess of lymphosarcoma deaths. However, a causal relationship to butadiene exposure is unlikely since there was a lack of a dose-response compared potential 1,3-butadiene exposure, and mortality was higher in workers with shorter durations of exposure. Mortality from leukaemia actually decreased with increasing length of employment.

Another epidemiology study of approximately 16,000 workers in the styrene-butadiene-rubber (SBR) industry reported that high levels of exposure to 1,3-butadiene, either alone or in combination with a stopping agent, was associated with an increased incidence of leukaemia mortality in certain segments of the workforce. The study found no increases in any other cause of death, including other lymphopietic cancers that have been said to be caused by 1,3-butadiene.

There were no adverse reproductive and developmental effects from 1,3-butadiene exposure in studies conducted with rats, guinea pigs, and rabbits; however, mice showed developmental effects. Following chronic inhalation exposure, female mice developed ovarian atrophy and male mice testicular atrophy.

Mutagenic effects

May cause heritable genetic damage.

12. Ecological information

Ecotoxicity	No testing has been performed by the manufacturer.
Mobility	This product is not likely to move rapidly with surface or groundwater flows because of its low water solubility of: <0.1% This product is likely to volatize rapidly into the air because of its high vapor pressure. This product is not likely to partition to organic material in the environment because its Log (Kow) is: 1.85

Bioaccumulative potential This product shows a low bioaccumulation potential.

13. Disposal considerations

Waste information

Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Incinerate in a licensed high temperature hazardous waste incinerator. Dispose of in accordance with all applicable local and national regulations.

Empty containers may contain toxic, flammable/combustible or explosive residue or vapors. Do not cut, grind, drill, weld, reuse or dispose of containers unless adequate precautions are taken against these hazards. Since the emptied containers retain product residue, follow product insert warnings even after container is emptied. Labels should not be removed from containers until they have been cleaned.

Consult your local or regional authorities.

14. Transport information

International transport regulations

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1010	Butadienes, stabilized	2.1	Not applicable (gas).	---	Not determined.
TDG Classification	UN1010	Butadienes, stabilized	2.1	Not applicable (gas).	---	Not determined.
IMDG Classification	UN1010	Butadienes, stabilized	2.1	Not applicable (gas).	---	Not determined.
IATA Classification	UN1010	Butadienes, stabilized	2.1	Not applicable (gas).	---	Not determined.

15. Regulatory information

U.S. Federal regulations

US INVENTORY (TSCA): Listed on inventory.

This product is not regulated under Section 302 of SARA and 40 CFR Part 355.

SARA 311/312 MSDS distribution - chemical inventory - hazard identification: 1,3-butadiene: Fire hazard, reactive, Sudden Release of Pressure, Immediate (Acute) Health Hazard, Delayed (Chronic) Health Hazard

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	1,3-butadiene	106-99-0	99 - 100
Supplier notification	1,3-butadiene	106-99-0	99 - 100

CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4):: 1,3-butadiene: 10 lbs. (4.536 kg);

State regulations

Massachusetts RTK:1,3-butadiene
 New Jersey:1,3-butadiene
 Pennsylvania RTK:1,3-butadiene (special hazard, environmental hazard, generic environmental hazard)

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.
 1,3-butadiene

Inventories

AUSTRALIAN INVENTORY (AICS): Listed on inventory.

CANADA INVENTORY (DSL): Listed on inventory.

CHINA INVENTORY (IECS): Listed on inventory.

EC INVENTORY (EINECS/ELINCS): Listed on inventory.

JAPAN INVENTORY (ENCS): Listed on inventory.

KOREA INVENTORY (ECL): Listed on inventory.

PHILIPPINE INVENTORY (PICCS): Listed on inventory.

16. Other information

Label requirements

DANGER!

- Extremely flammable.
- Vapor may cause flash fire.
- Product stabilized but may polymerize readily.
- Extremely cold material; can cause burns similar to frostbite.
- Cancer hazard. Can cause cancer.
- May cause heritable genetic damage.

HMIS® Rating :

Health	2	*	National Fire
Flammability	4		Protection
Physical	2		Association
Hazard			(U.S.A.)
Personal	X		
protection			



Date of issue

08/15/2007.

Date of previous issue

10/06/2005.

Prepared by

Product Stewardship

Notice to reader

NOTICE : This Material Safety Data Sheet is based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We are not responsible for any damage or injury resulting from abnormal use, from any failure to follow appropriate practices or from hazards inherent in the nature of the product.