

SAFETY DATA SHEET

Isoprene

Version 3.0

Revision Date 14.03.2024

Print Date 21.03.2024

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Isoprene

Product code : X2151, X2154, X2181, X2184, X2185

Synonyms : 1,3-butadiene,2-methyl-, 2-Methylbuta-1,3-diene, Isoprene
Monomer, methyl bivinyl, methyl butadiene, 2-

CAS-No. : 78-79-5

Manufacturer or supplier's details

Supplier : SHELL EASTERN CHEMICALS (S)
A REGISTERED BUSINESS OF SHELL EASTERN
TRADING (PTE) LTD (UEN:198902087C)
9 North Buona Vista Drive , #07-01
The Metropolis Tower 1
Singapore 138588
Singapore

Telephone : +65 6384 8269

Telefax : +65 6384 8454

Contact for Safety Data Sheet :

Emergency telephone number : +800 2537 8747 (ALERT SGS- toll Free) or +65 6542 9595
(ALERT SGS)

Recommended use of the chemical and restrictions on use

Recommended use : Chemical intermediate., Base chemical for the production of synthetic rubbers.

Restrictions on use : This product must not be used in applications other than the above without first seeking the advice of the supplier.

2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 1

Acute toxicity (Oral) : Category 5

Germ cell mutagenicity : Category 2

Carcinogenicity : Category 1B

Long-term (chronic) aquatic hazard : Category 2

GHS label elements

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Hazard pictograms

:



Signal word

:

Danger

Hazard statements

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PHYSICAL HAZARDS:
H224 Extremely flammable liquid and vapour.
HEALTH HAZARDS:
H303 May be harmful if swallowed.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
ENVIRONMENTAL HAZARDS:
H401 Toxic to aquatic life.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statements

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Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P273 Avoid release to the environment.

Response:

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378 In case of fire: Use appropriate media to extinguish.
P312 Call a POISON CENTER/ doctor if you feel unwell.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.

Storage:

P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

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Other hazards which do not result in classification

This material is a static accumulator. Even with proper grounding and bonding, this material can still accumulate an electrostatic charge. If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur. Will float and can be reignited on surface water. Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger. May form flammable/explosive vapour-air mixture. Highly reactive. May form explosive peroxides. Slightly irritating to respiratory system. Vapours may cause drowsiness and dizziness. Slightly irritating to the skin. Repeated exposure may cause skin dryness or cracking. Slightly irritating to the eye.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

Hazardous components

Chemical name	CAS-No.	Classification	Concentration (% w/w)
Isoprene	78-79-5	Flam. Liq.1; H224 Acute Tox.5; H303 Muta.2; H341 Carc.1B; H350 Aquatic Chronic2; H411	<= 100

Contains stabiliser.

For explanation of abbreviations see section 16.

4. FIRST-AID MEASURES

- General advice : Not expected to be a health hazard when used under normal conditions.
- If inhaled : No treatment necessary under normal conditions of use. If symptoms persist, obtain medical advice.
- In case of skin contact : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. If persistent irritation occurs, obtain medical attention.
- In case of eye contact : Flush eye with copious quantities of water. Remove contact lenses, if present and easy to do. Continue rinsing. If persistent irritation occurs, obtain medical attention.
- If swallowed : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Rinse mouth.

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Most important symptoms and effects, both acute and delayed

: Not considered to be an inhalation hazard under normal conditions of use.
Possible respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.

No specific hazards under normal use conditions.
Skin irritation signs and symptoms may include a burning sensation, redness, or swelling.

No specific hazards under normal use conditions.
Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.

Ingestion may result in nausea, vomiting and/or diarrhoea.

Defatting dermatitis signs and symptoms may include a burning sensation and/or a dried/cracked appearance.
Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination.
Continued inhalation may result in unconsciousness and death.

If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever.

Protection of first-aiders

: When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.

Notes to physician

: Call a doctor or poison control center for guidance.
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

: Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.

Unsuitable extinguishing media

: Do not use water in a jet.

Specific hazards during firefighting

: Carbon monoxide may be evolved if incomplete combustion occurs.
Will float and can be reignited on surface water.
The vapour is heavier than air, spreads along the ground and distant ignition is possible.
Flammable vapours may be present even at temperatures below the flash point.

Specific extinguishing methods

: Standard procedure for chemical fires.
Clear fire area of all non-emergency personnel.

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Keep adjacent containers cool by spraying with water.

Special protective equipment for firefighters : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures :
Observe all relevant local and international regulations.
Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.
Local authorities should be advised if significant spillages cannot be contained.

: Avoid contact with skin, eyes and clothing.
Isolate hazard area and deny entry to unnecessary or unprotected personnel.
Do not breathe fumes, vapour.
Do not operate electrical equipment.

Environmental precautions : Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment.

Methods and materials for containment and cleaning up : For small liquid spills (< 1 drum), transfer by mechanical means to a labeled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.
For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely.

Observe all relevant local and international regulations.

Additional advice : For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Risk of explosion. Inform the emergency services if liquid enters surface water drains.

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For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.

Vapour may form an explosive mixture with air.

Local authorities should be advised if significant spillages cannot be contained.

7. HANDLING AND STORAGE

General Precautions : Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.
Ensure that all local regulations regarding handling and storage facilities are followed.

Advice on safe handling : Avoid inhaling vapour and/or mists.
Avoid contact with skin, eyes and clothing.
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.
The vapour is heavier than air. Beware of accumulation in pits and confined spaces.
Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
Bulk storage tanks should be diked (bunded).
Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.
Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.
If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.
Be aware of handling operations that may give rise to additional hazards that result from the accumulation of static charges.
These include but are not limited to pumping (especially turbulent flow), mixing, filtering, splash filling, cleaning and filling of tanks and containers, sampling, switch loading, gauging, vacuum truck operations, and mechanical movements.
These activities may lead to static discharge e.g. spark formation.
Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 1 m/s until fill pipe submerged to twice its diameter, then ≤ 7 m/s). Avoid splash filling.
Do NOT use compressed air for filling, discharging, or handling operations.
Inhibitor levels should be maintained.
Protect against light.

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|----------------------|--|
| Avoidance of contact | : Strong oxidising agents.
Strong acids.
Strong bases.
Copper alloys |
| Product Transfer | : If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve. Refer to guidance under Handling section. |

Storage

- | | |
|------------|---|
| Other data | : Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.
Must be stored in a diked (bunded) well- ventilated area, away from sunlight, ignition sources and other sources of heat.
Must be kept inhibited during storage and shipment as material can polymerise.
Vapours from tanks should not be released to atmosphere.
Breathing losses during storage should be controlled by a suitable vapour treatment system.
Nitrogen blanket recommended.
Electrostatic charges will be generated during pumping.
Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment to reduce the risk.
The vapours in the head space of the storage vessel may lie in the flammable/explosive range and hence may be flammable.
Reacts with atmospheric oxygen. Material contains a stabilizer to inhibit oxidative colour change.
Prolonged storage of the product can cause the stabiliser to lose its effectiveness.
The product is normally supplied in a stabilized form. If the permissible storage period and/or storage temperature is noticeably exceeded, the product may polymerise with heat evolution. |
|------------|---|

- | | |
|--------------------|--|
| Packaging material | : Suitable material: For containers, or container linings use mild steel, stainless steel.
Unsuitable material: Copper., Copper alloys. |
|--------------------|--|

- | | |
|-----------------|------------------|
| Specific use(s) | : Not applicable |
|-----------------|------------------|

See additional references that provide safe handling practices for liquids that are determined to be static accumulators:
American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or
National Fire Protection Agency 77 (Recommended Practices on Static Electricity).
IEC/TS 60079-32-1: Electrostatic hazards, guidance

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8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Isoprene	78-79-5	TWA	3 ppm 8.4 mg/m ³	Shell Internal Standard (SIS) for 8-12 hour TWA.

Biological occupational exposure limits

No biological limit allocated.

Monitoring Methods

Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate.

Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory.

Examples of sources of recommended exposure measurement methods are given below or contact the supplier. Further national methods may be available.

National Institute of Occupational Safety and Health (NIOSH), USA: Manual of Analytical Methods
<http://www.cdc.gov/niosh/>

Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods
<http://www.osha.gov/>

Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances
<http://www.hse.gov.uk/>

Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany
<http://www.dguv.de/inhalt/index.jsp>

L'Institut National de Recherche et de Sécurité, (INRS), France <http://www.inrs.fr/accueil>

Engineering measures

- : Use sealed systems as far as possible.
- Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits.
- Local exhaust ventilation is recommended.
- Eye washes and showers for emergency use.
- Firewater monitors and deluge systems are recommended.
- Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.
- The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances.
- Appropriate measures include:

General Information:

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities

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and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

Personal protective equipment

Protective measures

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. If air-filtering respirators are suitable for conditions of use: Select a filter suitable for organic gases and vapours [Type AX boiling point $\leq 65^{\circ}\text{C}$ (149°F)].

Hand protection
Remarks

: Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. Longer term protection: Viton. Incidental contact/Splash protection: Nitrile rubber gloves. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency

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and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

- Eye protection : Wear goggles for use against liquids and gas.
Wear full face shield if splashes are likely to occur.
- Skin and body protection : Wear chemical and cold resistant gloves/gauntlets, and boots,
and apron.
- Thermal hazards : Not applicable
- Hygiene measures : Wash hands before eating, drinking, smoking and using the
toilet.
Launder contaminated clothing before re-use.

Environmental exposure controls

- General advice : Local guidelines on emission limits for volatile substances
must be observed for the discharge of exhaust air containing
vapour.
Minimise release to the environment. An environmental
assessment must be made to ensure compliance with local
environmental legislation.
Information on accidental release measures are to be found in
section 6.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Liquid.
- Colour : colourless
- Odour : Unpleasant, irritating
- Odour Threshold : 0.005 ppm
- pH : Not applicable
- Melting point/freezing point : -146 °C / -231 °F
- Boiling point/boiling range : 34 °C / 93 °F (1013.0 hPa)
- Flash point : -54 °C / -65 °F
- Evaporation rate : not determined
- Flammability (solid, gas) : Flammable liquid.

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Upper explosion limit	: 8.9 %(V)
Lower explosion limit	: 1.5 %(V)
Vapour pressure	: 73.3 kPa (25 °C / 77 °F)
Relative vapour density	: 2.3
Relative density	: 0.679Method: ASTM D4052
Density	: 679 kg/m3 (20 °C / 68 °F) Method: ASTM D4052
Solubility(ies)	
Water solubility	: 642 mg/l (25 °C / 77 °F)
Partition coefficient: n-octanol/water	: log Pow: 2.42
Auto-ignition temperature	: 220 °C / 428 °F
Viscosity	
Viscosity, dynamic	: 0.25 mPa.s (0 °C / 32 °F) Method: ASTM D445
Viscosity, dynamic	0.22 mPa.s (20 °C / 68 °F) Method: ASTM D445
Viscosity, dynamic	0.16 mPa.s (60 °C / 140 °F) Method: ASTM D445
Viscosity, kinematic	: Data not available
Explosive properties	: Not classified
Oxidizing properties	: Not applicable
Surface tension	: Data not available
Conductivity	: Low conductivity: < 100 pS/m The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid

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Particle size : Data not available

Molecular weight : 68 g/mol

10. STABILITY AND REACTIVITY

- Reactivity : Prolonged exposure to air may lead to peroxide formation.,
Reacts with strong oxidising agents.
- Chemical stability : The product is normally supplied in a stabilized form. If the permissible storage period and/or storage temperature is noticeably exceeded, the product may polymerise with heat evolution. Reacts violently with: Nitric, sulphuric and chlorosulphuric acids. Oxidises on contact with air to form unstable peroxides. Polymerisation may occur at elevated temperatures. Normally stable under ambient conditions and if properly inhibited.
- Possibility of hazardous reactions : Normally stable under ambient conditions and if properly inhibited.
- Conditions to avoid : Heat, flames, and sparks.
Exposure to air.
Exposure to sunlight.
In certain circumstances product can ignite due to static electricity.
- Incompatible materials : Strong oxidising agents.
Strong acids.
Strong bases.
Copper alloys
- Hazardous decomposition products : Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

11. TOXICOLOGICAL INFORMATION

- Basis for assessment : Information given is based on product data.
Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).

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Information on likely routes of exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

Acute toxicity

Components:

Isoprene:

Acute oral toxicity : LD 50 Rat, male: > 2,000 mg/kg
Method: Acceptable non-standard method.
Remarks: Based on available data, the classification criteria are not met.

Acute inhalation toxicity : LC 50 Rat: > 20 mg/m³
Exposure time: 4 h
Test atmosphere: vapour
Method: Literature data
Remarks: Based on available data, the classification criteria are not met.

Acute dermal toxicity : LD 50 Rat, male and female: > 2,000 mg/kg
Method: Test(s) equivalent or similar to OECD Test Guideline 402
Remarks: Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Components:

Isoprene:

Species: Rabbit
Method: Literature data
Remarks: Based on available data, the classification criteria are not met., Slightly irritating to skin.

Serious eye damage/eye irritation

Components:

Isoprene:

Method: Literature data
Remarks: Based on available data, the classification criteria are not met., Slightly irritating to the eye.

Respiratory or skin sensitisation

Components:

Isoprene:

Species: Guinea pig
Method: OECD Test Guideline 406
Remarks: Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Components:

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Isoprene:

Genotoxicity in vitro

: Method: Literature data

Remarks: Suspected of causing genetic defects.

: Test species: Mouse
Method: Test(s) equivalent or similar to OECD Test Guideline 474

Remarks: Suspected of causing genetic defects.

Germ cell mutagenicity-
Assessment

: This product does not meet the criteria for classification in categories 1A/1B.

Carcinogenicity

Components:

Isoprene:

Species: Mouse, (male and female)

Application Route: Inhalation

Method: Other guideline method.

Remarks: May cause cancer.

Species: Rat, (male and female)

Application Route: Inhalation

Method: Test(s) equivalent or similar to OECD Test Guideline 453

Remarks: May cause cancer.

Carcinogenicity -
Assessment

: May cause cancer.

Material	GHS/CLP Carcinogenicity Classification
Isoprene	Carcinogenicity Category 1B

Material	Other Carcinogenicity Classification
Isoprene	IARC: Group 2B: Possibly carcinogenic to humans

Reproductive toxicity

Components:

Isoprene:

: Species: Rat

Sex: male and female

Application Route: Inhalation

Method: OECD Test Guideline 421

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

Effects on foetal
development

: Species: Mouse, female

Application Route: Inhalation

Method: Other guideline method.

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

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Reproductive toxicity -
Assessment

: This product does not meet the criteria for classification in
categories 1A/1B.

STOT - single exposure

Components:

Isoprene:

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

STOT - repeated exposure

Components:

Isoprene:

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

Repeated dose toxicity

Components:

Isoprene:

Mouse, male and female:

Application Route: Inhalation

Test atmosphere: vapour

Method: Other guideline method.

Target Organs: No specific target organs noted

Aspiration toxicity

Components:

Isoprene:

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

Further information

Components:

Isoprene:

Remarks: Classifications by other authorities under varying regulatory frameworks may exist.

12. ECOLOGICAL INFORMATION

Basis for assessment

: Information given is based on product testing.
Unless indicated otherwise, the data presented is
representative of the product as a whole, rather than for
individual component(s).

Ecotoxicity

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Components:

Isoprene :

- Toxicity to fish (Acute toxicity) : LC50 (Oncorhynchus mykiss (rainbow trout)): 7.43 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Toxic
LL/EL/IL50 > 1 <= 10 mg/l
- Toxicity to crustacean (Acute toxicity) : EC50 (Daphnia magna (Water flea)): 5.77 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Toxic
LL/EL/IL50 > 1 <= 10 mg/l
- Toxicity to algae/aquatic plants (Acute toxicity) : EC50 (Selenastrum capricornutum (green algae)): 15.3 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Harmful
LL/EL/IL50 >10 <= 100 mg/l
- Toxicity to microorganisms (Acute toxicity) : Remarks: Data not available
- Toxicity to fish (Chronic toxicity) : NOEC: 1.1 mg/l
Exposure time: 32 d
Species: Pimephales promelas (fathead minnow)
Method: Based on quantitative structure-activity relationship (QSAR) modelling
Remarks: NOEC/NOEL > 1.0 - <= 10 mg/l
- Toxicity to crustacean(Chronic toxicity) : NOEC: 1.08 mg/l
Exposure time: 768 h
Species: Daphnia sp. (water flea)
Method: Based on quantitative structure-activity relationship (QSAR) modelling
Remarks: NOEC/NOEL > 0.1 - <=1.0 mg/l

Persistence and degradability

Components:

Isoprene :

- Biodegradability : Biodegradation: 61 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
Remarks: Not readily biodegradable.
Oxidises rapidly by photo-chemical reactions in air.

Bioaccumulative potential

Product:

- Partition coefficient: n-octanol/water : log Pow: 2.42

Components:

Isoprene :

- Bioaccumulation : Remarks: Does not bioaccumulate significantly.

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Mobility in soil

Components:

Isoprene :

Mobility : Remarks: Floats on water.

Other adverse effects

Components:

Isoprene :

Results of PBT and vPvB assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Recover or recycle if possible.
It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

Do not dispose into the environment, in drains or in water courses.
Waste product should not be allowed to contaminate soil or water.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.
Local regulations may be more stringent than regional or national requirements and must be complied with.

14. TRANSPORT INFORMATION

International Regulations

ADR

UN number : 1218
Proper shipping name : ISOPRENE, STABILIZED
Class : 3
Packing group : I
Labels : 3
Hazard Identification Number : 339
Environmentally hazardous : no

IATA-DGR

UN/ID No. : UN 1218

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Revision Date 14.03.2024

Print Date 21.03.2024

Proper shipping name : ISOPRENE, STABILIZED
Class : 3
Packing group : I
Labels : 3

IMDG-Code

UN number : UN 1218
Proper shipping name : ISOPRENE, STABILIZED
Class : 3
Packing group : I
Labels : 3
Marine pollutant : yes

Maritime transport in bulk according to IMO instruments

Pollution category : Y
Ship type : 2
Product name : Isoprene

Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

Additional Information : This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.
Transport in bulk according to Annex II of Marpol and the IBC Code

15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

Local Regulations

Workplace Safety and Health Act & Workplace Safety and Health (General Provision) Regulations	This product is subject to the SDS, Labelling, PEL and other requirements in the Act/ Regulations.
Fire Safety Act and Fire Safety (Petroleum & Flammable Materials) Regulations	This product is subject to the requirements in the Act/ Regulations.
Maritime and Port Authority of Singapore (Dangerous Goods, Petroleum and Explosives) Regulations	This product is subject to the requirements of this regulation.
Environmental Protection and Management Act and Environmental Protection and	This product is not subject to the requirements in the Act/Regulations.

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Management (Hazardous Substances) Regulations	
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The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Other international regulations

The components of this product are reported in the following inventories:

AIIC	: Listed
DSL	: Listed
IECSC	: Listed
ENCS	: Listed
ISHL	: Listed
KECI	: Listed
NZIoC	: Listed
PICCS	: Listed
TSCA	: Listed

16. OTHER INFORMATION

Full text of H-Statements

H224	Extremely flammable liquid and vapour.
H303	May be harmful if swallowed.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H411	Toxic to aquatic life with long lasting effects.

Full text of other abbreviations

Acute Tox.	Acute toxicity
Aquatic Chronic	Long-term (chronic) aquatic hazard
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
Muta.	Germ cell mutagenicity

Abbreviations and Acronyms

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from

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Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Further information

- Training advice : Provide adequate information, instruction and training for operators.
- Other information : A vertical bar (|) in the left margin indicates an amendment from the previous version.
- Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID data base, EC 1272 regulation, etc).

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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