

SECTION 1: Identification

1.1. Identification

Product form : Substance
 Trade name : Piperylene
 CAS-No. : 102110-15-6
 Produce code : P510
 Formula : Unspecified

1.2. Recommended use and restrictions on use

Use of the substance/mixture : Product for industrial use only

1.3. Supplier

US office:
 Braskem S.A.
 5100 Westheimer Rd - Suite 495
 Houston, 77056 - USA
 Tel: 713 255 4747
 Fax: 713 255 4740

Manufacturer:
 Braskem S.A.
 Rua Eteno, 1561
 Polo Petroquímico de Camaçari
 42810-000 – Camaçari – BA – Brasil

productsafety@braskem.com

1.4. Emergency telephone number

Emergency number : 1 800-424-9300
 Chemtrec (Outside USA) +1 703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable liquids Category 2	Highly flammable liquid and vapor
Acute toxicity (oral) Category 4	Harmful if swallowed
Acute toxicity (inhalation) Category 4	Harmful if inhaled
Skin corrosion/irritation Category 2	Causes skin irritation
Serious eye damage/eye irritation Category 2A	Causes serious eye irritation
Germ cell mutagenicity Category 1B	May cause genetic defects
Carcinogenicity Category 1B	May cause cancer
Reproductive toxicity Category 2	Suspected of damaging fertility or the unborn child
Specific target organ toxicity — Single exposure, Category 3, Narcosis	May cause drowsiness or dizziness
Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation	May cause respiratory irritation
Aspiration hazard Category 1	May be fatal if swallowed and enters airways

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :



Signal word (GHS US) : Danger
 Hazard statements (GHS US) : Highly flammable liquid and vapor
 Harmful if swallowed or if inhaled
 May be fatal if swallowed and enters airways
 Causes skin irritation
 Causes serious eye irritation

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Precautionary statements (GHS US)	<p>May cause respiratory irritation May cause drowsiness or dizziness May cause genetic defects May cause cancer Suspected of damaging fertility or the unborn child</p> <p>: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use explosion-proof electrical, lighting, ventilating equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Avoid breathing mist, spray, vapors. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear eye protection, protective gloves. If swallowed: Immediately call a doctor, a POISON CENTER. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. Call a poison center or doctor if you feel unwell. Rinse mouth. Do NOT induce vomiting. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash it before reuse. In case of fire: Use carbon dioxide (CO₂), dry extinguishing powder, foam to extinguish. Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up. Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.</p>
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2.3. Other hazards which do not result in classification

Other hazards which do not result in classification : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level. Burning liquid may float on water. May spread fire.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type	: UVCB
Name	: Hydrocarbons, C5-rich, dicyclopentadiene-containing
CAS-No.	: 102110-15-6

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Name	Product identifier	%	GHS US classification
Hydrocarbons, C5-rich, dicyclopentadiene-containing	CAS-No.: 102110-15-6	100	Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 Muta. 1B, H340 Carc. 1B, H350 Repr. 2, H361 STOT SE 3, H336 STOT SE 3, H335 Asp. Tox. 1, H304
1,3-Pentadiene, (E)-	CAS-No.: 2004-70-8	33 – 38	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Asp. Tox. 1, H304
1,3-Pentadiene, (Z)-	CAS-No.: 1574-41-0	20 – 23	Flam. Liq. 2, H225 Asp. Tox. 1, H304
Cyclopentene	CAS-No.: 142-29-0	14 – 17	Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Skin Irrit. 2, H315 Asp. Tox. 1, H304
Cyclopentane	CAS-No.: 287-92-3	8 – 11	Flam. Liq. 2, H225
2-Methyl-2-butene	CAS-No.: 513-35-9	>5	Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 Skin Irrit. 2, H315 Muta. 2, H341 Carc. 2, H351 STOT SE 3, H336 Asp. Tox. 1, H304
Cyclopentadiene	CAS-No.: 542-92-7	0 – 5	Flam. Liq. 3, H226 Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335
n-Pentane	CAS-No.: 109-66-0	< 5	Flam. Liq. 2, H225 STOT SE 3, H336 Asp. Tox. 1, H304
Dicyclopentadiene	CAS-No.: 77-73-6	0 – 4	Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H335
hydrocarbonates	CAS-No.: Not available	< 2	Not classified
1,3-Butadiene, 2-methyl-	CAS-No.: 78-79-5	< 1	Flam. Liq. 1, H224 Muta. 2, H341 Carc. 1B, H350

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3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general	: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).
First-aid measures after inhalation	: Remove person to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. Do not apply mouth-to-mouth resuscitation. Get medical advice/attention if you feel unwell.
First-aid measures after skin contact	: After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and soap. Immediately rinse with plenty of water (for at least 15 minutes). Wash contaminated clothing before reuse. Get medical advice if skin irritation persists.
First-aid measures after eye contact	: Rinse immediately and thoroughly, pulling the eyelids well away from the eye (15 minutes minimum). Avoid any direct contact with the product. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	: If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Do not induce vomiting. If swallowed, rinse mouth with water (only if the person is conscious). Keep victim warm and rested. Seek immediate medical advice.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects	: May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child.
Symptoms/effects after inhalation	: Harmful if inhaled. May cause drowsiness or dizziness. May cause respiratory irritation. Overexposure to vapors may result in cough.
Symptoms/effects after skin contact	: Causes skin irritation.
Symptoms/effects after eye contact	: Causes serious eye irritation.
Symptoms/effects after ingestion	: Harmful if swallowed. Ingestion may cause nausea, vomiting and diarrhea. May result in aspiration into the lungs, causing chemical pneumonia. May be fatal if swallowed and enters airways.

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media	: carbon dioxide (CO ₂), dry chemical powder, foam. Foam. Dry powder. Carbon dioxide. Sand.
Unsuitable extinguishing media	: Do not use water jet. Do not use a heavy water stream.

5.2. Specific hazards arising from the chemical

Fire hazard	: Highly flammable liquid and vapor. Material can accumulate some static charge during transfer. May mass explode in fire. Vapors are heavier than air and may travel considerable distance to an ignition source and flash back to source of vapors. Incomplete combustion releases dangerous carbon monoxide, carbon dioxide and other toxic gases.
Explosion hazard	: May mass explode in fire. 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. In case of fire: Stop leak if safe to do so. Hose down area with water. Cool adjacent tanks / containers / drums with water jet. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.
Protection during firefighting	: In case of hazardous fumes, wear autonomous breathing apparatus. Full protective flameproof clothing. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures	: Avoid ignition sources. Remove ignition sources. Use special care to avoid static electric charges. No open flames. No smoking.
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6.1.1. For non-emergency personnel

Protective equipment	: Complete protective clothing. For further information refer to section 8: "Exposure controls/personal protection".
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Emergency procedures : Eliminate all ignition sources if safe to do so. Do not drink, eat or smoke in the workplace. Impermeable protective equipment. Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Complete protective clothing. Do not enter fire area without proper protective equipment, including respiratory protection. Evacuate unnecessary personnel. Equip cleanup crew with proper protection. For further information refer to section 8: "Exposure controls/personal protection".

Emergency procedures : Eliminate all ignition sources if safe to do so. Evacuate unnecessary personnel. Ventilate area. Impermeable protective equipment.

6.2. Environmental precautions

Air. Use water curtains to contain the toxic clouds. In soil and sediments : Take up liquid spill into absorbent material, e.g.: sand, earth, vermiculite or powdered limestone. Absorb remaining liquid with sand or inert absorbent and remove to safe place. Water : Containment as appropriate. Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

For containment : Clean up any spills as soon as possible, using an absorbent material to collect it. Stop leak, if possible without risk. Keep away from sources of ignition - No smoking. Wear recommended personal protective equipment. Do not touch spilled material. Evacuate unnecessary personnel.

Methods for cleaning up : Depending on the local regulations it may be disposed of as solid waste or incinerated in a suitable installation. Absorb with liquid-binding material (e.g. sand, diatomaceous earth, acid- or universal binding agents). Stop leak if safe to do so. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For disposal of residues refer to section 13: "Disposal considerations".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.

Precautions for safe handling : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid ignition sources. Product can accumulate electrostatic charges that may cause fire by electrical discharges. Use only non-sparking tools. Use grounded electrical/mechanical equipment. Spilled product must never be returned to the original container for recycling. Provide good ventilation in process area to prevent formation of vapor. No open flames. No smoking. Wash contaminated clothing before reuse.

Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Keep container closed when not in use. Keep away from sources of ignition. Use only in well ventilated areas. Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical equipment.

Storage conditions : Keep away from open flames, hot surfaces and sources of ignition. Store in dry, cool, well-ventilated area. At room temperature the product is neither an irritant nor gives off hazardous vapors. Use only non-sparking tools. Keep in fireproof place. Keep container tightly closed.

Incompatible materials : Strong oxidizing agents. Halogens. Strong acids and oxidants. Reducing agents. Certain plastics, rubbers and coatings. Strong bases.

Storage area : Store in dry, cool, well-ventilated area. Keep away from sources of ignition. Keep away from heat and direct sunlight.

Packaging materials : Storage in steel recommended.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Piperylene (102110-15-6)

No additional information available

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1,3-Pentadiene, (E)- (2004-70-8)	
No additional information available	
1,3-Pentadiene, (Z)- (1574-41-0)	
No additional information available	
Cyclopentene (142-29-0)	
No additional information available	
2-Methyl-2-butene (513-35-9)	
No additional information available	
Cyclopentane (287-92-3)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Cyclopentane
ACGIH OEL TWA [ppm]	600 ppm
Remark (ACGIH)	TLV® Basis: URT, eye, & skin irr; CNS impair
Regulatory reference	ACGIH 2021
USA - NIOSH - Occupational Exposure Limits	
NIOSH REL (TWA)	1720 mg/m ³
NIOSH REL TWA [ppm]	600 ppm
hydrocarbonates (Not available)	
No additional information available	
Cyclopentadiene (542-92-7)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Cyclopentadiene
ACGIH OEL TWA [ppm]	0.5 ppm
ACGIH OEL STEL [ppm]	1 ppm
Remark (ACGIH)	TLV® Basis: URT, LRT, & eye irr; CNS eff
Regulatory reference	ACGIH 2021
USA - OSHA - Occupational Exposure Limits	
Local name	Cyclopentadiene
OSHA PEL (TWA) [1]	200 mg/m ³
OSHA PEL (TWA) [2]	75 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
USA - IDLH - Occupational Exposure Limits	
IDLH [ppm]	750 ppm
USA - NIOSH - Occupational Exposure Limits	
NIOSH REL (TWA)	200 mg/m ³
NIOSH REL TWA [ppm]	75 ppm

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Dicyclopentadiene (77-73-6)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Dicyclopentadiene, including Cyclopentadiene
ACGIH OEL TWA [ppm]	0.5 ppm
ACGIH OEL STEL [ppm]	1 ppm (including cyclopentadiene)
Remark (ACGIH)	TLV® Basis: URT, LRT, & eye irr; CNS eff
Regulatory reference	ACGIH 2021
USA - NIOSH - Occupational Exposure Limits	
NIOSH REL (TWA)	30 mg/m ³
NIOSH REL TWA [ppm]	5 ppm
n-Pentane (109-66-0)	
USA - ACGIH - Occupational Exposure Limits	
Local name	Pentane
ACGIH OEL TWA [ppm]	1000 ppm
Remark (ACGIH)	TLV® Basis: Narcosis; resp tract irr
Regulatory reference	ACGIH 2021
USA - OSHA - Occupational Exposure Limits	
Local name	Pentane
OSHA PEL (TWA) [1]	2950 mg/m ³
OSHA PEL (TWA) [2]	1000 ppm
Regulatory reference (US-OSHA)	OSHA Annotated Table Z-1
USA - IDLH - Occupational Exposure Limits	
IDLH [ppm]	1500 ppm (10% LEL)
USA - NIOSH - Occupational Exposure Limits	
NIOSH REL (TWA)	350 mg/m ³
NIOSH REL TWA [ppm]	120 ppm
NIOSH REL (Ceiling)	1800 mg/m ³
NIOSH REL C [ppm]	610 ppm
1,3-Butadiene, 2-methyl- (78-79-5)	
USA - AIHA - Occupational Exposure Limits	
WEEL TWA [ppm]	2 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Mechanical ventilation is recommended. Explosion-proof electrical equipment and grounded lighting.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Wear Protective gloves. VITON gloves. Protective gloves made of PVC. Do not use : butyl rubber gloves

Eye protection:

Full face piece respirator. Chemical goggles or safety glasses

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Skin and body protection:

Use chemically protective clothing. Wear suitable protective clothing

Respiratory protection:

Wear suitable respiratory equipment. Use self-contained breathing apparatus. Wear respiratory protection.

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Color	: Colorless
Odor	: Hydrocarbon-like
Odor threshold	: No data available
pH	: Not applicable
Melting point	: No data available
Freezing point	: -141 – -87.5 °C Information refers to cis-1,3-pentadiene and trans-1,3-pentadiene
Boiling point	: 42 – 44 °C Information refers to cis-1,3-pentadiene and trans-1,3-pentadiene
Flash point	: -29 – -28 °C (closed cup) Information refers to cis-1,3-pentadiene and trans-1,3-pentadiene
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Not applicable
Vapor pressure	: 405 mm Hg (25°C)
Relative vapor density at 20 °C	: 2.35
Relative density	: No data available
Density	: 0.676 g/m ³ (20°C)
Solubility	: Water: 690 mg/l Ethanol: Miscible Ether: Miscible Acetone: Miscible
Partition coefficient n-octanol/water (Log Pow)	: 2.44
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosion limits	: 2 – 8.3 vol %
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No dangerous reactions known under normal conditions of use.

10.2. Chemical stability

Stable at room temperature. May polymerize on exposure to temperature rise. Highly flammable liquid and vapor. Attacks some forms of plastics, rubber, and coatings. May form flammable/explosive vapor-air mixture.

10.3. Possibility of hazardous reactions

Strong oxidizing agents. Halogens. strong oxidants and strong acids. Reducing agents. Attacks some forms of plastics, rubber, and coatings. On burning: release of carbon monoxide - carbon dioxide. lead.

10.4. Conditions to avoid

No flames, no sparks. Eliminate all sources of ignition. Minimize exposure to air. Direct sunlight. Extremely high or low temperatures. Open flame.

10.5. Incompatible materials

Strong oxidizing agents. Halogens. Strong acids and oxidants. Certain plastics, rubbers and coatings. Reducing agents. Strong bases.

10.6. Hazardous decomposition products

On burning: release of carbon monoxide - carbon dioxide. fume. May release flammable gases. Explosive when mixed with oxidizing substances.

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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	: Harmful if swallowed.
Acute toxicity (dermal)	: Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	: Harmful if inhaled.

Piperylene (102110-15-6)	
ATE US (oral)	820 mg/kg body weight
ATE US (gases)	4500 ppmV/4h
ATE US (vapors)	11 mg/l/4h
ATE US (dust, mist)	1.5 mg/l/4h
Cyclopentene (142-29-0)	
LD50 oral rat	2140 µl/kg
LD50 dermal rabbit	1231 mg/kg
LC50 Inhalation - Rat	> 22.9 mg/l/4h
ATE US (oral)	500 mg/kg body weight
ATE US (dermal)	1100 mg/kg body weight
2-Methyl-2-butene (513-35-9)	
LD50 oral rat	700 – 2600 mg/kg
LD50 dermal rat	> 2000 mg/kg
LC50 Inhalation - Rat [ppm]	> 61000 ppm/4h
Cyclopentane (287-92-3)	
LD50 oral rat	11400 mg/kg
LC50 Inhalation - Rat	> 25.3 mg/l/4h
Cyclopentadiene (542-92-7)	
LD50 oral rat	113 mg/kg
LD50 dermal rabbit	430 mg/kg
LC50 Inhalation - Rat	39 mg/l (Exposure time: 1 h)
Dicyclopentadiene (77-73-6)	
LD50 oral rat	346.5 mg/kg
LD50 dermal rabbit	4380 mg/kg
LC50 Inhalation - Rat	1910 mg/m ³ (Exposure time: 6 h)
ATE US (gases)	1000 ppmV/4h
ATE US (vapors)	11 mg/l/4h
ATE US (dust, mist)	1.5 mg/l/4h
n-Pentane (109-66-0)	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rabbit	3000 mg/kg
LC50 Inhalation - Rat	364 g/m ³ (Exposure time: 4 h)

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1,3-Butadiene, 2-methyl- (78-79-5)	
LD50 oral rat	2043 mg/kg
LD50 dermal rat	> 1 ml/kg
LC50 Inhalation - Rat	180 mg/l/4h

Skin corrosion/irritation	: Causes skin irritation. pH: Not applicable
Serious eye damage/irritation	: Causes serious eye irritation. pH: Not applicable
Respiratory or skin sensitization	: Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	: May cause genetic defects.
Carcinogenicity	: May cause cancer.

1,3-Butadiene, 2-methyl- (78-79-5)	
IARC group	2B - Possibly carcinogenic to humans
National Toxicity Program (NTP) Status	Reasonably anticipated to be Human Carcinogen, Evidence of Carcinogenicity

Reproductive toxicity	: Suspected of damaging fertility or the unborn child.
STOT-single exposure	: May cause drowsiness or dizziness. May cause respiratory irritation.

2-Methyl-2-butene (513-35-9)	
STOT-single exposure	May cause drowsiness or dizziness.

Cyclopentadiene (542-92-7)	
STOT-single exposure	May cause respiratory irritation.

Dicyclopentadiene (77-73-6)	
STOT-single exposure	May cause respiratory irritation.

n-Pentane (109-66-0)	
STOT-single exposure	May cause drowsiness or dizziness.

STOT-repeated exposure	: Not classified (Based on available data, the classification criteria are not met)
Aspiration hazard	: May be fatal if swallowed and enters airways.
Viscosity, kinematic	: No data available
Symptoms/effects	: May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child.
Symptoms/effects after inhalation	: Harmful if inhaled. May cause drowsiness or dizziness. May cause respiratory irritation. Overexposure to vapors may result in cough.
Symptoms/effects after skin contact	: Causes skin irritation.
Symptoms/effects after eye contact	: Causes serious eye irritation.
Symptoms/effects after ingestion	: Harmful if swallowed. Ingestion may cause nausea, vomiting and diarrhea. May result in aspiration into the lungs, causing chemical pneumonia. May be fatal if swallowed and enters airways.
Other information	: Likely routes of exposure: ingestion, inhalation, skin and eye.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
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2-Methyl-2-butene (513-35-9)	
LC50 - Fish [1]	4.99 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static])
EC50 - Crustacea [1]	3 mg/l (Exposure time: 48 h - Species: Daphnia magna)

Cyclopentane (287-92-3)	
EC50 - Crustacea [1]	10.5 mg/l (Exposure time: 48 h - Species: Daphnia magna)

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Dicyclopentadiene (77-73-6)	
LC50 - Fish [1]	11.5 – 17.6 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
EC50 - Crustacea [1]	11 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 - Fish [2]	23 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus)

n-Pentane (109-66-0)	
LC50 - Fish [1]	9.87 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss)
EC50 - Crustacea [1]	9.74 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 - Fish [2]	11.59 mg/l (Exposure time: 96 h - Species: Pimephales promelas)

1,3-Butadiene, 2-methyl- (78-79-5)	
LC50 - Fish [1]	32.5 – 50.15 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [static])
EC50 - Crustacea [1]	140 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 - Fish [2]	58.75 – 95.32 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

Piperylene (102110-15-6)	
Partition coefficient n-octanol/water (Log Pow)	2.44
Bioaccumulative potential	Based on the n-octanol/water partition coefficient accumulation in organisms is not expected.

2-Methyl-2-butene (513-35-9)	
BCF - Fish [1]	(low potential to bioaccumulate)

Cyclopentane (287-92-3)	
Partition coefficient n-octanol/water (Log Pow)	2.05

Dicyclopentadiene (77-73-6)	
BCF - Fish [1]	53
Partition coefficient n-octanol/water (Log Pow)	2.89

n-Pentane (109-66-0)	
Partition coefficient n-octanol/water (Log Pow)	3.39

1,3-Butadiene, 2-methyl- (78-79-5)	
BCF - Fish [1]	(no bioaccumulation expected)
Partition coefficient n-octanol/water (Log Pow)	3.2 – 4.5 (at 20 °C)

12.4. Mobility in soil

Piperylene (102110-15-6)	
Ecology - soil	Product is volatile. Mobility in soil.

12.5. Other adverse effects

Effect on the ozone layer : No additional information available
Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Can be incinerated according to local regulations. Dispose of contents/container in accordance with licensed collector's sorting instructions.

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Product/Packaging disposal recommendations	: Dispose in a safe manner in accordance with local/national regulations.
Additional information	: Do not re-use empty containers. Handle empty containers with care because residual vapors are flammable.
Ecology - waste materials	: Avoid release to the environment. Hazardous waste due to toxicity.

SECTION 14: Transport information

In accordance with DOT / TDG / IMDG / IATA

DOT	TDG	IMDG	IATA
14.1. UN number			
3295	UN3295	3295	3295
14.2. Proper Shipping Name			
Hydrocarbons, liquid, n.o.s. (1,3-Pentadiene, (E)- ; 1,3-Pentadiene, (Z)- ; Cyclopentene)	HYDROCARBONS, LIQUID, N.O.S.	HYDROCARBONS, LIQUID, N.O.S. (1,3-Pentadiene, (E)- ; 1,3-Pentadiene, (Z)- ; Cyclopentene)	Hydrocarbons, liquid, n.o.s. (1,3-Pentadiene, (E)- ; 1,3-Pentadiene, (Z)- ; Cyclopentene)
14.3. Transport hazard class(es)			
3	3	3	3
			
14.4. Packing group			
II	II	II	II
14.5. Environmental hazards			
Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No
No supplementary information available			

SECTION 15: Regulatory information

15.1. US Federal regulations

No additional information available

15.2. International regulations

CANADA

1,3-Pentadiene, (E)- (2004-70-8)

Listed on the Canadian DSL (Domestic Substances List)

1,3-Pentadiene, (Z)- (1574-41-0)

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

Cyclopentene (142-29-0)

Listed on the Canadian DSL (Domestic Substances List)

2-Methyl-2-butene (513-35-9)

Listed on the Canadian DSL (Domestic Substances List)

Piperylene

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Cyclopentane (287-92-3)

Listed on the Canadian DSL (Domestic Substances List)

Cyclopentadiene (542-92-7)

Listed on the Canadian DSL (Domestic Substances List)

Dicyclopentadiene (77-73-6)

Listed on the Canadian DSL (Domestic Substances List)

n-Pentane (109-66-0)

Listed on the Canadian DSL (Domestic Substances List)

1,3-Butadiene, 2-methyl- (78-79-5)

Listed on the Canadian DSL (Domestic Substances List)

Toxic Substance (CEPA – Schedule I)

Yes

EU-Regulations

Piperylene (102110-15-6)

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

1,3-Pentadiene, (E)- (2004-70-8)

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

1,3-Pentadiene, (Z)- (1574-41-0)

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

Cyclopentene (142-29-0)

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

2-Methyl-2-butene (513-35-9)

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

Cyclopentane (287-92-3)

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

Cyclopentadiene (542-92-7)

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

Dicyclopentadiene (77-73-6)

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

Piperylene

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n-Pentane (109-66-0)

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

1,3-Butadiene, 2-methyl- (78-79-5)

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

National regulations

Piperylene (102110-15-6)

Listed on KECL/KECI (Korean Existing Chemicals Inventory)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

1,3-Pentadiene, (E)- (2004-70-8)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on KECL/KECI (Korean Existing Chemicals Inventory)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

1,3-Pentadiene, (Z)- (1574-41-0)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on KECL/KECI (Korean Existing Chemicals Inventory)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

Cyclopentene (142-29-0)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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 NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

Piperylene

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according to US HazCom 2012

2-Methyl-2-butene (513-35-9)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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 NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

Cyclopentane (287-92-3)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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 NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

Cyclopentadiene (542-92-7)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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 NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

Dicyclopentadiene (77-73-6)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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)
Japanese Pollutant Release and Transfer Register Law (PRTR Law)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

Piperylene

Safety Data Sheet

according to US HazCom 2012

n-Pentane (109-66-0)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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 NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

1,3-Butadiene, 2-methyl- (78-79-5)

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
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)
Japanese Pollutant Release and Transfer Register Law (PRTR Law)
Listed on NZIoC (New Zealand Inventory of Chemicals)
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on INSQ (Mexican National Inventory of Chemical Substances)
Listed on the TCSI (Taiwan Chemical Substance Inventory)
Listed on the NCI (Vietnam - National Chemicals Inventory)

15.3. US State regulations

No additional information available

SECTION 16: Other information

according to US HazCom 2012

Revision date : 28 October 2021
Data sources : Data arise from reference works and literature.
Other information : None.

Abbreviations and acronyms

ACGIH	ACGIH (American Conference of Government Industrial Hygienists)
CLP	CLP - Classification, Labelling and Packaging
EC	EC - European Community
EEC	EEC - European Economic Community
GHS	GHS - Globally Harmonised System
PVC	PVC (Polyvinyl chloride).
REACH	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals
SDS	SDS - Safety Data Sheet

Braskem - SDS_US_GHS_HazCom_2012 (modified 211028)

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. It warns that the handling of any chemical substance requires the previous knowledge of its hazards for the user. It is up to the user of the product company providing this SDS to and promote the training of its employees about possible risks come upon of the product. The information contained herein is not absolute, but only general information on the use of the chemical and indication of safety and security measures.