

SAFETY DATA SHEET

1. PRODUCT

1.1 Product identifiers

Name: 5-Ethylidene-2-norbornene

CAS-No.: 16219-75-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226

Acute toxicity, Inhalation (Category 4), H332

Skin irritation (Category 2), H315

Specific target organ toxicity - repeated exposure, Inhalation (Category 2), Liver, Testes, H373


Aspiration hazard (Category 1), H304

Acute aquatic toxicity (Category 2), H401

Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram	
Signal word	Danger
Hazard statement(s)	H226 Flammable liquid and vapour. H304 May be fatal if swallowed and enters airways. H315 Causes skin irritation. H332 Harmful if inhaled. H373 May cause damage to organs (Liver, Testes) through prolonged or repeated exposure if inhaled. H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)	<p>P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.</p> <p>P233 Keep container tightly closed.</p> <p>P240 Ground/bond container and receiving equipment.</p> <p>P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.</p> <p>P242 Use only non-sparking tools.</p> <p>P243 Take precautionary measures against static discharge.</p> <p>P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.</p> <p>P264 Wash skin thoroughly after handling.</p> <p>P271 Use only outdoors or in a well-ventilated area.</p> <p>P273 Avoid release to the environment.</p> <p>P280 Wear protective gloves/ eye protection/ face protection.</p> <p>P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.</p> <p>P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.</p> <p>P304 + P340 + P312 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.</p> <p>P314 Get medical advice/ attention if you feel unwell.</p> <p>P331 Do NOT induce vomiting.</p> <p>P332 + P313 If skin irritation occurs: Get medical advice/ attention.</p> <p>P362 Take off contaminated clothing and wash before reuse.</p> <p>P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.</p> <p>P391 Collect spillage.</p> <p>P403 + P235 Store in a well-ventilated place. Keep cool.</p> <p>P405 Store locked up.</p> <p>P501 Dispose of contents/ container to an approved waste disposal plant.</p>
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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula:	C ₉ H ₁₂
Molecular weight:	120.19 g/mol
CAS-No.:	16219-75-3
EC-No.:	240-347-7

Hazardous components

Component	Classification	Concentration
5-Ethylidene-2-norbornene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; STOT RE 2; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2; H226, H304, H315, H332, H373, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.
If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.
In case of skin contact
Wash off with soap and plenty of water. Consult a physician.
In case of eye contact
Flush eyes with water as a precaution.
If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

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

4.2 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

No data available

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
5-Ethylidene-2norbornene	16219-75-3	C	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC)		
		C	5.000000 ppm 25.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Due to its reactivity, ENB may be stabilized with tert-butyl catechol.		
		TWA	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation 2015 Adoption		
		STEL	4 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation 2015 Adoption		
		C	5 ppm 25 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection	Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin protection	Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. Splash contact Material: Fluorinated rubber Minimum layer thickness: 0.7 mm Break through time: 120 min Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M) data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374 If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.
Body Protection	Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.
Respiratory protection	Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).
Control of environmental exposure	Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance	Form: liquid Colour: colourless
Odour	No data available
Odour Threshold	No data available

pH	No data available
Melting point/freezing point	Melting point/range: -79.99 °C (-111.98 °F) at 1,013 hPa (760 mmHg)
Initial boiling point and boiling range	146 °C (295 °F) - lit.
Flash point	28.5 °C (83.3 °F) - closed cup
Evaporation rate	No data available
Flammability (solid, gas)	No data available
Upper/lower flammability or explosive limits	Upper explosion limit: 6.4 %(V) Lower explosion limit: 0.9 %(V)
Vapour pressure	6.1 hPa (4.6 mmHg) at 20 °C (68 °F)
Vapour density	4.15 - (Air = 1.0)
Relative density	0.893 g/cm ³ at 25 °C (77 °F)
Water solubility	0.08 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - slightly soluble
Partition coefficient: n-octanol/water	log Pow: 3.82 at 20 °C (68 °F)
Auto-ignition temperature	227 °C (441 °F) at 1,012.0 hPa (759.1 mmHg)
Decomposition temperature	No data available
Viscosity	1.02 mm ² /s at 20 °C (68 °F) -
Explosive properties	No data available
Oxidizing properties	No data available

9.2 Other safety information

Relative vapour density: 4.15 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

Contains the following stabiliser(s):

BHT (>=100 - <=200 ppm)

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male - 2,276 mg/kg (OECD Test Guideline 401) LC50 Inhalation - Rat - male - 4 h - 13.5 mg/l (OECD Test Guideline 403) LD50 Dermal - Rabbit - > 7,168 mg/kg (OECD Test Guideline 402) No data available
Skin corrosion/irritation
Skin - Rabbit Result: Irritating to skin. - 4 h (OECD Test Guideline 404)
Serious eye damage/eye irritation
Eyes - Rabbit Result: No eye irritation (OECD Test Guideline 405)
Respiratory or skin sensitisation
in vivo assay - Mouse Result: May cause sensitisation by skin contact. (OECD Test Guideline 429)
Germ cell mutagenicity
Hamster ovary Result: negative Rat - male Result: negative
Carcinogenicity
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive toxicity
No data available No data available
Specific target organ toxicity -single exposure
No data available
Specific target organ toxicity -repeated exposure
Inhalation - May cause damage to organs through prolonged or repeated exposure. - Liver, Testes
Aspiration hazard
No data available
Additional Information
Repeated dose toxicity Rat - male - Inhalation - NOAEL : < 300 mg/m3 - LOAEL : 300 mg/m3 - OECD Test Guideline 407 RTECS: RB9450000

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Danio rerio (zebra fish) - 7.6 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Daphnia magna (Water flea) - 7.3 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata (algae) - 8.93 mg/l - 96 h (OECD Test Guideline 201)
Toxicity to bacteria	No data available

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: < 1 % - Not readily biodegradable.
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12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 56 d - 0.1 mg/l Bioconcentration factor (BCF): 70 - 160 (OECD Test Guideline 305C)
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12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1993 Class: 3 Packing group: III

Proper shipping name: Flammable liquids, n.o.s. (5-Ethylidene-2-norbornene)

Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG

UN number: 1993 Class: 3 Packing group: III EMS-No: F-E, S-E

Proper shipping name: FLAMMABLE LIQUID, N.O.S. (5-Ethylidene-2-norbornene)

Marine pollutant:yes

IATA

UN number: 1993 Class: 3 Packing group: III

Proper shipping name: Flammable liquid, n.o.s. (5-Ethylidene-2-norbornene)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

Component	CAS-No.	Revision Date
5-Ethylidene-2-norbornene	16219-75-3	1994-04-01

Pennsylvania Right To Know Components

Component	CAS-No.	Revision Date
5-Ethylidene-2-norbornene	16219-75-3	1994-04-01

New Jersey Right To Know Components

Component	CAS-No.	Revision Date
5-Ethylidene-2-norbornene	16219-75-3	1994-04-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute Acute aquatic toxicity

Aquatic Chronic Chronic aquatic toxicity

Asp. Tox. Aspiration hazard

Flam. Liq. Flammable liquids

H226 Flammable liquid and vapour.

H304 May be fatal if swallowed and enters airways.

H315 Causes skin irritation.

H332 Harmful if inhaled.

H373 May cause damage to organs through prolonged or repeated exposure if inhaled.

H401 Toxic to aquatic life.

H411 Toxic to aquatic life with long lasting effects.

Skin Irrit. Skin irritation

STOT RE Specific target organ toxicity - repeated exposure

HMIS Rating

Health hazard: 2

Chronic Health Hazard:

Flammability: 3

Physical Hazard 0

NFPA Rating

Health hazard: 2

Fire Hazard: 3

Reactivity Hazard: 0