

ENB

Safety Data Sheet

Prepared according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 04/28/2016

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Version: 2.0

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product name : ENB
 Product form : Mixture
 Formula : C9-H12

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

Use of the substance/mixture : Non aromatic hydrocarbons

1.3. Details of the supplier of the safety data sheet

JX NIPPON CHEMICAL TEXAS INC.
 10500 Bay Area Blvd.
 Pasadena, Texas 77507
 MRoot@jxncti.com

1.4. Emergency telephone number

Emergency number : 1-703-527-3887 (CHEMTREC)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Liq. 3	H226
Acute Tox. 4 (Inhalation:dust,mist)	H332
Skin Irrit. 2	H315
Skin Sens. 1	H317
STOT RE 2	H373
Asp. Tox. 1	H304
Aquatic Acute 2	H401
Aquatic Chronic 2	H411

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H226 - Flammable liquid and vapour
 H304 - May be fatal if swallowed and enters airways
 H315 - Causes skin irritation
 H317 - May cause an allergic skin reaction
 H332 - Harmful if inhaled
 H373 - May cause damage to organs (liver, testes, kidneys) through prolonged or repeated exposure
 H401 - Toxic to aquatic life
 H411 - Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) :

P210 - Keep away from heat, sparks, open flames. - No smoking
 P233 - Keep container tightly closed
 P240 - Ground/bond container and receiving equipment
 P241 - Use explosion-proof electrical, lighting, ventilating equipment
 P242 - Use only non-sparking tools
 P243 - Take precautionary measures against static discharge
 P260 - Do not breathe mist, vapours
 P261 - Avoid breathing mist, vapours
 P264 - Wash hands, forearms and face thoroughly after handling
 P271 - Use only outdoors or in a well-ventilated area
 P272 - Contaminated work clothing must not be allowed out of the workplace
 P273 - Avoid release to the environment
 P280 - Wear eye protection, protective clothing, protective gloves
 P301+P310 - IF SWALLOWED: Immediately call a doctor, a POISON CENTER

P302+P352 - If on skin: Wash with plenty of soap and water
 P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
 P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
 P312 - Call a doctor, a POISON CENTER if you feel unwell
 P314 - Get medical advice/attention if you feel unwell
 P321 - Specific treatment (see first aid instructions on this label)
 P331 - Do NOT induce vomiting
 P333+P313 - If skin irritation or rash occurs: Get medical advice/attention
 P362+P364 - Take off contaminated clothing and wash it before reuse
 P370+P378 - In case of fire: Use carbon dioxide (CO₂), dry extinguishing powder to extinguish
 P391 - Collect spillage
 P403+P235 - Store in a well-ventilated place. Keep cool
 P405 - Store locked up
 P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

No additional information available

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients**3.1. Substance**

Not applicable

3.2. Mixture

Name	Product identifier	%
Ethylidene norbornene	(CAS No) 16219-75-3	60 - 100

SECTION 4: First aid measures**4.1. Description of first aid measures**

First-aid measures general : If exposed or concerned, get medical attention/advice. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use. Never give anything to an unconscious person.

First-aid measures after inhalation : IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Get medical attention. If breathing is difficult, supply oxygen. If breathing has stopped, give artificial respiration.

First-aid measures after skin contact : IF ON SKIN (or clothing): Remove affected clothing and wash all exposed skin with water for at least 15 minutes. If irritation develops or persists, get medical attention.

First-aid measures after eye contact : IF IN EYES: Immediately flush with plenty of water for at least 15 minutes. Remove contact lenses if present and easy to do so. If pain, blinking, or irritation develops or persists, get medical attention. Continue rinsing.

First-aid measures after ingestion : IF SWALLOWED: rinse mouth thoroughly. Do not induce vomiting without advice from poison control center or medical professional. Get medical attention immediately.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : May be fatal if swallowed and enters airways. Causes skin irritation. May cause an allergic skin reaction. Harmful if inhaled. May cause damage to organs (liver, testes) through prolonged or repeated exposure.

Symptoms/injuries after inhalation : Harmful if inhaled.

Symptoms/injuries after skin contact : Causes skin irritation. May cause an allergic skin reaction.

Symptoms/injuries after eye contact : Direct contact with the eyes is likely to be irritating.

Symptoms/injuries after ingestion : May be fatal if swallowed and enters airways.

Chronic symptoms : May cause damage to organs (liver, testes) through prolonged or repeated exposure.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically. Droplets of the product aspirated into the lungs through ingestion or vomiting may cause a serious chemical pneumonia. Be aware that symptoms of chemical pneumonia (shortness of breath) may occur several hours after exposure.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

Suitable extinguishing media : Carbon dioxide. Dry powder. Water fog.

Unsuitable extinguishing media : Do not use direct water stream. May spread fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid and vapour.

Explosion hazard : Heating may cause an explosion.

- Reactivity : Vapours may form flammable and explosive mixture with air.
- 5.3. Advice for firefighters**
- Precautionary measures fire : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Do not dispose of fire-fighting water in the environment.
- Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.
- Other information : By heating and fire, harmful vapors/gases may be formed. Material will float and can be re-ignited on surface of water. Vapours may travel long distances along ground before igniting/flashing back to vapour source. May polymerize on exposure to temperature rise. Can decompose explosively at high temperature.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Evacuate area. Ventilate area. Keep upwind. Spill should be handled by trained clean-up crews properly equipped with respiratory equipment and full chemical protective gear (see Section 8).

6.1.1. For non-emergency personnel

- Protective equipment : Wear Protective equipment as described in Section 8.
- Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

- Protective equipment : Wear suitable protective clothing, gloves and eye or face protection. Approved supplied-air respirator, in case of emergency.

6.2. Environmental precautions

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 : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
- Methods for cleaning up : Eliminate ignition sources. Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Sweep or shovel spills into appropriate container for disposal. This material and its container must be disposed of in a safe way, and as per local legislation.

6.4. Reference to other sections

See Sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Do not get in eyes, on skin, or on clothing. Provide good ventilation in process area to prevent formation of vapour. Avoid breathing vapours, mist. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Store in nitrogen atmosphere, reacts with oxygen.
- Storage conditions : Store in dry, well-ventilated area. Keep only in original container. Keep the container tightly closed. Keep away from ignition sources. Keep under a nitrogen blanket. Store away from incompatible materials. Do not mix with: Peroxide catalysts. Strong oxidizers.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Ethylidene norbornene (16219-75-3)	
ACGIH TWA (ppm)	2
ACGIH STEL (ppm)	4
Remark (ACGIH)	eye and upper resp. tract irrit.
OSHA PEL (Ceiling) (mg/m ³)	25 (Enforcement indefinitely stayed)
OSHA PEL (Ceiling) (ppm)	5 (Enforcement indefinitely stayed)

8.2. Exposure controls

- Appropriate engineering controls : Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment with flammable materials. Ensure adequate ventilation, especially in confined areas.

Personal protective equipment : Gloves. Protective goggles. Wear chemically impervious apron over labcoat and full coverage clothing. Insufficient ventilation: wear respiratory protection.



Hand protection : Use gloves chemically resistant to this material when prolonged or repeated contact could occur. Gloves should be classified under Standard EN 374 or ASTM F1296. Suggested glove materials are: Neoprene, Nitrile/butadiene rubber, Polyethylene, Ethyl vinyl alcohol laminate, PVC or vinyl. Suitable gloves for this specific application can be recommended by the glove supplier.

Eye protection : Wear eye protection, including chemical splash goggles and a face shield when possibility exists for eye contact due to spraying liquid or airborne particles.

Skin and body protection : Wear long sleeves, and chemically impervious PPE/coveralls to minimize bodily exposure.

Respiratory protection : Wear a NIOSH-approved (or equivalent) full-facepiece airline respirator in the positive pressure mode with emergency escape provisions. In case of inadequate ventilation or risk of inhalation of vapors, use suitable respiratory equipment with gas filter (type A2). Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Molecular mass	: 120.21 g/mol
Color	: Colorless. White.
Odor	: Characteristic solvent.
Odor Threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: -80 °C (-112 °F)
Freezing point	: No data available
Boiling point	: 148 °C (298.4 °F)
Flash point	: 32 °C (89.6 °F)
Auto-ignition temperature	: 255 °C (491 °F)
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapour pressure	: 0.56 kPa @ 20 °C (68 °F)
Relative vapour density at 20 °C	: 4.14 (Air = 1)
Relative density	: 0.9 (15 °C)
Solubility	: Water: 8.9 mg/l
Log Pow	: 3.82
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: 1.1 cP @ 20 °C
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: 0.9 - 6.4 vol %

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Vapours may form flammable and explosive mixture with air.

10.2. Chemical stability

Stable under recommended handling and storage conditions (see section 7).

10.3. Possibility of hazardous reactions

If contact with oxygen in the air forms peroxide, ester, and occasionally polymer.

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10.4. Conditions to avoid

Avoid contact with : Incompatible materials. Heat. Open flame.

10.5. Incompatible materials

Strong oxidizers. Peroxides.

10.6. Hazardous decomposition products

Carbon monoxide. Asphyxiants.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Inhalation:dust/mist: Harmful if inhaled.

ENB	
LD50 oral rat	2276 mg/kg (male)
LD50 dermal rabbit	8253
LC50 inhalation rat (ppm)	2717 ppm/4h (male) 3015 ppm/4h (female)

Ethylidene norbornene (16219-75-3)	
LD50 oral rat	2830 µl/kg
LC50 inhalation rat (ppm)	1246 ppm/4h

Skin corrosion/irritation : Causes skin irritation.
(Moderate skin irritant in rabbit test)

Serious eye damage/irritation : Not classified
(Minimal irritation in rabbit test)

Respiratory or skin sensitisation : May cause an allergic skin reaction.
(Negative for sensitization in a Buehler Test (Guinea Pig))

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : May cause damage to organs (liver, testes, kidneys) through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

Symptoms/injuries after inhalation : Harmful if inhaled.

Symptoms/injuries after skin contact : Causes skin irritation. May cause an allergic skin reaction.

Symptoms/injuries after eye contact : Direct contact with the eyes is likely to be irritating.

Symptoms/injuries after ingestion : May be fatal if swallowed and enters airways.

Chronic symptoms : May cause damage to organs (liver, testes, kidneys) through prolonged or repeated exposure

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No information available.

ENB	
LC50 fishes 1	7 mg/L 96 hours (OECD TG203)
EC50 Daphnia 1	3.3 mg/L 48 hours (OECD TG202)

12.2. Persistence and degradability

ENB	
Persistence and degradability	No information available.

12.3. Bioaccumulative potential

ENB	
Log Pow	3.82
Bioaccumulative potential	No information available.

12.4. Mobility in soil

ENB	
Ecology - soil	No information available.

12.5. Other adverse effects

Other adverse effects : No data available.

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Waste treatment methods : Obtain the consent of pollution control authorities before discharging to wastewater treatment plants.
- Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations. Do not allow the product to be released into the environment. If discarded in its purchased form, ENB would be considered as a hazardous waste under Federal Hazardous Waste Regulations, 40 C.F.R. 261. Mix with fuel oil or a suitable solvent and incinerate a furnace. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal whether a material containing the product or derived from the product should be classified as a hazardous waste. 40 C.F.R. 261.20-24.

SECTION 14: Transport information

In accordance with DOT

- Transport document description : UN1993 Flammable liquids, n.o.s. (Contains: Ethylidene Norbornene), 3, III
- UN-No.(DOT) : 1993
- DOT NA no. : UN1993
- Proper Shipping Name (DOT) : Flammable liquids, n.o.s. (Contains: Ethylidene Norbornene)
- Department of Transportation (DOT) Hazard Classes : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
- Hazard labels (DOT) : 3 - Flammable liquid



- Packing group (DOT) : III - Minor Danger
- DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 60 L
- DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 220 L
- DOT Vessel Stowage Location : A - The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel.

Transport by sea

- Transport document description : UN1993 Flammable liquids, n.o.s. (Contains: Ethylidene Norbornene), 3, III, MP
- UN-No. (IMDG) : 1993
- Proper Shipping Name (IMDG) : FLAMMABLE LIQUID, N.O.S. (Contains: Ethylidene Norbornene)
- Class (IMDG) : 3 - Flammable liquids
- Hazard labels (IMDG)



- Packing group (IMDG) : III - substances presenting low danger
- Subsidiary risk (IMDG) : Marine Pollutant

Air transport

- Transport document description : UN1993 Flammable liquids, n.o.s. (Contains: Ethylidene Norbornene), 3, III, MP
- UN-No. (IATA) : 1993
- Proper Shipping Name (IATA) : Flammable liquid, n.o.s. (Contains: Ethylidene Norbornene)
- Class (IATA) : 3 - Flammable Liquids
- Hazard labels (IATA)



- Packing group (IATA) : III - Minor Danger
- Subsidiary risk (IATA) : Marine Pollutant

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SECTION 15: Regulatory information

15.1. US Federal regulations

ENB	
All components of this product are listed on the TSCA Inventory or are exempt	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Fire hazard

15.2. International regulations

No additional information available.

15.3. US State regulations

California Proposition 65

This product does not contain any substances known to the state of California to cause cancer and/or reproductive harm.

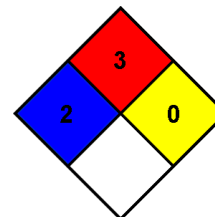
Ethylidene norbornene (16219-75-3)

U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Massachusetts - Right To Know List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Indication of changes : Revision 2.0
Revision date : 04/28/2016
Other information : Author: BCS.

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.
NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.
NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 2*
Flammability : 3
Physical : 0
Personal Protection :

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