

# SAFETY DATA SHEET

## 1. IDENTIFICATION

### PRODUCT IDENTIFIER

Product Name: ENB  
Reference Number: 91237

### SUPPLIER'S DETAILS

Name: ENEOS Materials Corporation  
Address: 1-5-2 Higashi-shimbashi Minato-ku, Tokyo 105-7109 Japan  
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(Available time; 9:00am - 5:00pm JST on Monday - Friday)

### RECOMMENDED USE OF THE CHEMICAL AND RESTRICTIONS OF USE

Chemical raw materials and Synthetic rubber materials, etc.  
Industrial use only. Do not use for medical or food without advice of experts.

## 2. HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see SDS Section 15).

### CLASSIFICATION OF THE SUBSTANCE OR MIXTURE:

Flammable liquids Cat 3  
Acute toxicity, Inhalation (Vapours) Cat 4  
Skin corrosion/irritation Cat 2  
Serious eye damage/eye irritation Cat 2B  
Skin sensitization Cat 1B  
Reproductive toxicity Cat 2  
Specific target organ toxicity-single exposure Cat 1 (Central nerves)  
Specific target organ toxicity-single exposure Cat 3 (Respiratory tract irritation)  
Specific target organ toxicity-repeated exposure Cat 2 (Liver)  
Aspiration hazard Cat 1  
Hazardous to the aquatic environment, short-term (Acute) Cat 2  
Hazardous to the aquatic environment, long-term (Chronic) Cat 2

### GHS LABEL ELEMENTS:

#### Pictogram:



Signal Word: Danger

**Hazard Statements:**

## Physical:

H226 : Flammable liquid and vapour

## Health:

H332 : Harmful if inhaled

H315 : Causes skin irritation

H320 : Causes eye irritation

H317 : May cause an allergic skin reaction

H335 : May cause respiratory irritation

H304 : May be fatal if swallowed and enters airways

H361 : Suspected of damaging fertility or the unborn child

H370 : Causes damage to organs (Central nerves)

H373 : May cause damage to organs through prolonged or repeated exposure (Liver)

## Environmental:

H401 : Toxic to aquatic life

H411 : Toxic to aquatic life with long lasting effects

**Precautionary Statements:**

## 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, hot surfaces, sparks, open flames and other ignition sources. No smoking

P233 : Keep container tightly closed.

P240 : Ground and bond container and receiving equipment.

P241 : Use explosion-proof electrical/ventilating/lightning/equipment.

P242 : Use non-sparking tools.

P243 : Take action to prevent static discharge.

P260 : Do not breathe mist/vapours.

P261 : Avoid breathing dust/fume/gas/mist/vapours/spray.

P264 : Wash mouth/skin/eyes thoroughly after handling.

P270 : Do not eat, drink, or smoke when using this product.

P271 : Use only outdoors or in a well-ventilated area.

P272 : Contaminated work clothing should not be allowed out of the workplace.

P273 : Avoid release to the environment.

P280 : Wear protective gloves/protective clothing/eye protection/face protection.

## Response:

P301+P310 : IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician.

P302+P352 : IF ON SKIN: Wash with plenty of water/soap

P303+P361+P353 : IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.

P362+P364 : Take off contaminated clothing and wash it before reuse.

P332+P313 : If skin irritation occurs: Get medical advice/attention.

P333+P313 : If skin irritation or rash occurs: Get medical advice/attention.

P304+P340 : IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305+P351+P338 : IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308+P313 : IF exposed or concerned: Get medical advice/attention.

P314 : Get medical advice/attention if you feel unwell.

P321 : Specific treatment (see first aid instruction in this label)

P331 : Do NOT induce vomiting.

P337+P313 : If eye irritation persists: Get medical advice/attention.

P370+P378 : In case of fire: Use foam, dry chemical or carbon dioxide(CO2) to extinguish.

P391 : Collect spillage.

## Storage:

P403+P233 : Store in a well-ventilated place. Keep container tightly closed.

P403+P235 : Store in a well-ventilated place. Keep cool.

P405 : Store locked up.

## Disposal:

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P501 : Dispose of contents/container in accordance with local regulations.

#### OTHER HAZARDS WHICH DO NOT RESULT IN CLASSIFICATION:

##### Physical/Chemical Hazards

Material can accumulate static charges which may cause an ignition. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited. Flammable

##### Health Hazards

No additional hazards.

##### Environmental Hazards

No additional hazards.

**Note:** Excessive exposure may result in respiratory irritation.

This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

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### 3. COMPOSITION / INFORMATION ON INGREDIENTS

This material is defined as a substance.

#### Hazardous Substance(s) or Complex Substance(s)

Name	CAS RN®	Concentration*	GHS Hazard Codes
5-Ethylidene-2-norbornene	16219-75-3	100 %	H226, H304, H320, H332, H335, H361, H370, H373, H401, H411

\* All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume. Concentration values may vary.

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### 4. FIRST-AID MEASURES

#### DESCRIPTION OF NECESSARY FIRST-AID MEASURE

##### Inhalation

Remove from further exposure. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation. When mouth-to-mouth resuscitation, responder should be careful to not expose material. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection.

##### Skin contact

Wash contact areas with soap and water. If skin irritation occurs, seek medical assistance. Remove contaminated clothing. Launder contaminated clothing before reuse.

##### Eye contact

Flush thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.

##### Ingestion

Seek immediate medical attention. Do not induce vomiting.

#### MOST IMPORTANT SYMPTOMS/EFFECTS, ACUTE AND DALAY

May cause eye or respiratory irritation.

#### INDICATION OF MEDICAL ATTENTION AND SPECIAL TREATMENT NEEDED, IF NECESSARY

None

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## 5. FIRE-FIGHTING MEASURES

### EXTINGUISHING MEDIA

**Suitable Extinguishing Media:** Foam, dry chemical, carbon dioxide (CO<sub>2</sub>)

**Inappropriate Media:** Straight streams of water

### SPECIFIC HAZARDS ARISING FROM THE CHEMICALS

**Specific Hazards Arising from the Chemicals:** Flammable liquid Material can release flammable vapours. Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger. As material is hazardous, firefighters should consider protective equipment indicated in Section 8.

**Hazardous Combustion Products:** Incomplete combustion products, carbon monoxide, smoke, fume

### SPECIFIC PROTECTIVE ACTIONS FOR FIRE-FIGHTERS

#### Specific protective actions for fire-fighter:

Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

#### Fire Fighting Instructions:

Evacuate non-emergency personal to safe area. Extinguish fire with appropriate media. Stop leak if you can do it without risk. Move container if you can do it without risk. Use water spray or fog for cooling tanks or containers surround fire. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect personnel attempting to stop a leak or to move container. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply.

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## 6. ACCIDENTAL RELEASE MEASURES

### PERSONAL PRECAUTIONS, PROTECTIVE EQUIPMENT AND EMERGENCY PROCEDURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for spilled material and, when applicable, Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended.

Work gloves that are resistant to oil are recommended. Note: gloves made of polyvinyl alcohol (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

#### Notification Procedures

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. Evacuate non-emergency personal to safe area. Material is toxic or combustible. Advise occupants surrounding or in downwind areas to warn them to evacuate, if needed.

### ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

### METHODS AND MATERIALS FOR CONTAINMENT AND CLEANING UP

**Land Spill:** Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Use explosion-proof equipment and non-sparking tools.

Do not touch or walk through spilled material. Collect with pump, absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Prevent spreading of vapors through sewers,

ventilation systems and confined areas. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor; but may not prevent ignition in closed spaces.

**Water Spill:** Stop leak if you can do it without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10°C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10°C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants. Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

**7. HANDLING AND STORAGE**

**PRECAUTIONS FOR SAFE HANDLING**

Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present. Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Potentially toxic/irritating fumes/vapors may be evolved from heated or agitated material. Use only with adequate ventilation. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges. When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present. Use proper bonding and/or ground procedures. Avoid contact with material.

**CONDITION FOR SAFE STORAGE, INCLUDING ANY INCOMPATIBILITIES**

Ample fire water supply should be available. A fixed sprinkler/deluge system is recommended. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Outside or detached storage preferred. Keep away from incompatible material. The container choice, for example storage vessel, may effect static accumulation and dissipation. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge.

**Suitable Materials and Coatings (Chemical Compatibility):** Stainless Steel, Steel, Teflon, Polyester  
**Unsuitable Materials and Coatings:** Rubber, Polystyrene, Ethylene-Propylene rubber, Polyethylene

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**CONTROL PARAMETERS**

**Occupational exposure limits/standards (Note: Exposure limits are not additive)**

Substance Name	Form	Limit / Standard		NOTE	Source
Ethylidene norbornene	Vapour	STEL	4ppm		ACGIH(2020)
		TWA	2ppm		

**Biological limit values**

No biological limits allocated

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

**APPROPRIATE ENGINEERING CONTROLS**

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider: Use explosion-proof ventilation equipment to stay below

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explosion limits.

### INDIVIDUAL PROTECTION MEASURES, SUCH AS PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage. Any specific protective equipment information provided is based on published literature and protective equipment manufacturer data.

#### Eye/Face Protection:

If contact is likely, safety face protections are recommended.

#### Skin and Body Protection:

The types of clothing to be considered for this material include: Chemical resistant clothing (non-permeable) is needed.

#### Respiratory Protection:

If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include: for organic vapour/gas

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, if concentration is high, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

#### Hand Protection:

Use suitable protective glove. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves(non-permeable) are needed. If contact with forearms is likely, wear gauntlet style gloves.

**Specific Hygiene Measures:** Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

### ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Note:** Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

<b>Physical State:</b>	Liquid
<b>Colour:</b>	Colorless/Clear
<b>Odour:</b>	Pungent
<b>Melting Point/Freezing Point:</b>	<-80°C
<b>Boiling Point or Initial Boiling Point and Boiling Range:</b>	148 °C
<b>Flammability :</b>	Flammable
<b>Lower and Upper Explosion Limit /Flammable Limits (Approximate volume % in air):</b>	LEL: 0.9 (vol%) UEL: 6.4 (vol%)
<b>Flash Point:</b>	33 °C
<b>Auto-ignition Temperature:</b>	255°C
<b>Decomposition Temperature:</b>	No data
<b>pH:</b>	N/A
<b>Kinematic Viscosity:</b>	No data @ 40 °C, 0.91 mPas @ 20 °C
<b>Solubility:</b>	Negligible(80 mg/L @ 25 °C)

<b>Partition Coefficient n-Octanol/Water (log value):</b>	3.82 @ 20 °C
<b>Vapor Pressure:</b>	560 Pa @ 20 °C
<b>Density and/or Relative Density (at 20 °C):</b>	0.90 g/cm <sup>3</sup> @20°C
<b>Relative Vapour Density (Air = 1):</b>	4.1 at 101 kPa
<b>Particle Characteristics:</b>	N/D

## 10. STABILITY AND REACTIVITY

**REACTIVITY:** Material may react with oxygen.

**CHEMICAL STABILITY:** Material is stable under normal conditions.

**POSSIBILITY OF HAZARDOUS REACTIONS:** Hazardous polymerization or reaction will not occur.

**CONDITIONS TO AVOID:** Heat, sparks, flame, and other ignition source

**INCOMPATIBLE MATERIALS:** Strong oxidizers, halogens, strong acids, strong bases

**HAZARDOUS DECOMPOSITION PRODUCTS:** Material does not decompose at ambient temperatures.  
In fire, carbon monoxide can be generated.

## 11. TOXICOLOGICAL INFORMATION

Information described here are based on the data for this material, structurally similar materials and/or components.

Information	Conclusion/Remarks
<b>Acute toxicity</b>	
Oral LD50(rat):2500mg/Kg	Not classified
Dermal LD50(rabbit):>2000mg/Kg	Not Classified
Inhalation (Vapour) LC50 (rat) : 13.3 mg/L	Category 4
<b>Skin corrosion/irritation</b> Slightly irritated	Category 2
<b>Serious eye damage/irritation</b> Irritated	Category 2B
<b>Sensitization</b>	
Respiratory No data available	Classification not possible
Skin It was determined to be positive in the mouse local lymph node test (LLNA) according to TG 429, and the EC3 was reported to be 41.7% (REACH registration information).	Category 1B
<b>CMR hazard</b>	
Germ cell mutagenicity in vivo test; negative, in vitro test; negative.	Classification not possible

Carcinogenicity No data available	Classification not possible
Reproductive toxicity Adverse effect was observed.	Category 2
Additional category for effects on or via lactation No data available	Classification not possible
<b>Specific target organ toxicity</b>	
Single exposure Adverse effect on central nerves, respiratory tract irritation were observed.	Category 1 (central nerves), Category 3 (respiratory tract irritation)
Repeated exposure Adverse effect on liver was observed.	Category 2 (liver)
<b>Aspiration hazard</b>	
This material is a hydrocarbon and has a dynamic viscosity (20.5 mm <sup>2</sup> /s) (40°C )	Category 1

**OTHER INFORMATION**  
IARC Classification:none

**12. ECOLOGICAL INFORMATION**

Information described here are based on the data for this material, structurally similar materials and/or components.

**TOXICITY**

Expected to be toxic to aquatic organisms.  
Expected to be toxic to aquatic organisms with long lasting effects.

**PERSISTENCE AND DEGRADABILITY**

- Biodegradation:**  
Expected to be persistent.
- Hydrolysis:**  
Transformation due to hydrolysis not expected to be significant.
- Photolysis:**  
Transformation due to photolysis not expected to be significant.
- Atmospheric Oxidation:**  
Expected to degrade rapidly in air

**BIOACCUMULATION POTENTIAL**

Expected that potential to bioaccumulate is low.

**MOBILITY IN SOIL**

Highly volatile will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

**OTHER ADVERSE EFFECTS**

**Hazard to the Ozone Layer**  
Not expected to be harmful to ozone layer.

**ECOLOGICAL DATA**

**Toxicity**

Test	Duration	Organism Type	Test Results
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Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	EC50 3.3 mg/l
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**Persistence, Degradability and Bioaccumulation Potential**

Media	Test Type	Duration	Test Results
	BOD		Degradation rate 0%

**13. DISPOSAL CONSIDERATIONS****DISPOSAL METHODS**

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

**Disposal Recommendations**

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

**Empty Container Warning**

Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions.

Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

**14. TRANSPORT INFORMATION****LAND - Precautionary Transportation Measures & Conditions:**

Comply with applicable laws and regulations.

**SEA (IMDG) / AIR (IATA)**

**UN Number:** 1993  
**UN Proper Shipping Name:** FLAMMABLE LIQUID, N.O.S.  
**Transport Hazard Class(es):** 3  
**Packing Group:** III  
**Environmental hazards:** Yes  
**EMS Number:** F-E, S-E

**15. REGULATORY INFORMATION**

This material is considered hazardous according to the Classification of Chemicals based on Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

**SAFETY, HEALTH AND ENVIRONMENTAL REGULATIONS SPECIFIC FOR THE PRODUCT IN QUESTION****National Laws and Regulations:**

Comply with applicable laws and regulations.

**16. OTHER INFORMATION**

N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

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H226 : Flammable liquid and vapour : Flammable liquids,Cat 3  
H304 : May be fatal if swallowed and enters airways : Aspiration hazard,Cat 1  
H315 : Causes skin irritation,Cat 2  
H320 : Causes eye irritation : Serious eye damage/eye irritation,Cat 2B  
H317 : May cause an allergic skin reaction,Cat 1B  
H332 : Harmful if inhaled : Acute toxicity, inhalation,Cat 4  
H335 : May cause respiratory irritation : Specific target organ toxicity, single exposure (Respiratory tract irritation),Cat 3  
H361 : Suspected of damaging fertility or the unborn child : Reproductive toxicity,Cat 2  
H370 : Causes damage to organs : Specific target organ toxicity-single exposure,Cat 1  
H373 : May cause damage to organs through prolonged or repeated exposure : Specific target organ toxicity-repeated exposure,Cat 2  
H401 : Toxic to aquatic life : Hazardous to the aquatic environment, short-term (Acute),Cat 2  
H411 : Toxic to aquatic life with long lasting effects : Hazardous to the aquatic environment, long-term (Chronic),Cat 2

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