

SAFETY DATA SHEET

SAN-PETROCHEMICALS CO., LTD.

SDS NO. ENB-O1

PRODUCT IDENTITY : 5-Ethylidene-2-Norbornene (ENB)

General Use : The monomer to produce the EPDM rubbers
Product Description : A high purity, liquid diolefin

SECTION 1 COMPANY IDENTITY

Manufacturer's Name :

SAN-PETROCHEMICALS CO., LTD.

1-5-6 Nihonbashi-Hocho, Chuo-ku

Tokyo 103-0023, Japan

Emergency Telephone Number : +81-3-5200-3561(Japan)

Date Prepared : May 30, 2007

Date Revised : September 1, 2016

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENT

Ingredients :

5-Ethylidene-2-norbornene	> 99% (CAS No. 16219-75-3)
BHT as inhibitor (2,6-Di-tert-butyl-4-methylphenol)	80 ~ 150 ppm (CAS No. 128-37-0)

Exposure Limits :

ACGIH ceiling (1999)	5 ppm (25 mg/m3)
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SECTION 3 HAZARD IDENTIFICATON

EMERGENCY OVERVIEW

WARNING! FLAMMABLE

INHALATION CAUSE IRRITATION OF RESPIRATORY TRACT AND IS HARMFUL.

DIRECT CONTACT WITH LIQUID CAUSE EYE AND SKIN IRRITATION.

POTENTIAL HEALTH EFFECTS

EYE CONTACT :

Contact with liquid causes stinging eye irritation, redness and swelling of the conjunctiva.

Not likely to injury to the cornea. Vapor causes irritation with excess redness of the conjunctiva.

SKIN CONTACT :

Exposure causes irritation with possible local redness and swelling. Prolonged contact may cause

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severe irritation, redness, swelling and destruction of tissue.

SKIN ABSORPTION :

A single exposure is not likely to result in the material being absorbed through the skin in harmful amounts.

INGESTION :

Single does oral toxicity is moderate. May cause discomfort, nausea, vomiting and diarrhea.

INHALATION :

Inhalation of high vapor concentration and mist may causes severe symptoms, irritation of nose and throat, nasal discharge and coughing. Dizziness, drowsiness and headache may occur at high vapor concentration.

SECTION 4 FIRST-AID MEASURES

EYE CONTACT :

Irrigate immediately with large amounts of water until irritation subsides.
If irritation persists, seek medical attention.

SKIN CONTACT :

Remove contaminated clothing and wash affected area of skin with soap and water.
Get immediate medical attention if irritation develops and persists.

INGESTION :

If swallowed and patient is fully conscious, give two glasses of water. Induce vomiting.
If patient's consciousness is not clear, do not induce vomiting. Seek medical attention immediately.

INHALATION :

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen may be given by qualified personnel. Get medical attention immediately.

SECTION 5 FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (PMCC) : 32°C (89°F)

AUTOIGNITION TEMPERATURE : 255°C (491°F)

EXTINGUISHING MEDIA :

Apply foams for large fires and use CO₂ and dry chemical for small fires. Water spray is used to cool fire-exposed containers and structures.

SPECIAL FIRE FIGHTING PROCEDURE :

Firefighter should wear normal protective equipment (full bunker gear) and positive-pressure self-contained breathing apparatus. Water can be used to cool fire exposed containers, to protect personnel and to disperse vapors and spills.

SECTION 6 ACCIDENTAL RELEASE MEASURES

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Preventive measures for fire or explosion hazard are needed at first. Wear suitable protective equipment to avoid contact with this material.

SMALL SPILL :

Absorb spill with an inert material (e. g. clay, dry sand or earth), then place in chemical waste container.

LARGE SPILL :

Contain spilled liquid with sand and earth. Transfer absorbed waste material into drums. Prevent runoff from entering into storm sewers and ditches which lead to natural waterways.

SECTION 7 HANDLING AND STORAGE INFORMATION

HANDLING :

This material is flammable. General precaution for preventing fire and explosion hazard are required.

Avoid contact with eyes. Use in a well ventilated area.

Avoid prolonged or repeated breathing of vapor and contact with skin.

STORAGE :

Store in ventilated area. Keep in cool and dark place. Far from open flames and areas where danger of fire exists.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

RESPIRATORY PROTECTION :

Use self-contained breathing apparatus in high vapor concentrations.

SKIN PROTECTION :

Use impervious gloves and clean body-covering clothing.

EYE PROTECTION :

Use safety glasses or chemical goggles. If vapor exposure causes eye discomfort, use approved respirator.

VENTILATION :

Use with adequate ventilation. Local exhaust ventilation is recommended.

SECTION 9 PHYSICAL / CHEMICAL CHARACTERISTICS

BOILING POINT	: 148°C (298°F)
VAPOR PRESSURE	: 560 Pa at 20°C (68°F)
VAPOR DENSITY	: 4.1 (Air=1)
SOLUBILITY IN WATER	: 8.9mg/1L
logPow	: 3.82
DENSITY	: 0.9 (Water=1)

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FREEZING POINT : below -80°C (below -112°F)
APPEARANCE : Clear liquid
ODOR : Pungent odor

SECTION 10 STABILITY AND REACTIVITY DATA

STABILITY : Stable at normal temperatures and storage conditions.
Decomposition will be occurred at higher than 300°C.
INCOMPATIBLE MATERIAL : Oxidizing materials, mineral acids and halogens.
HAZARDOUS DECOMPOSITION PRODUCTS : Carbon monoxide and asphyxiants
HAZARDOUS POLYMERIZATION : This material may not polymerize alone but will with other reactive monomers. Avoid contamination with other reactive monomer.

SECTION 11 TOXICOLOGICAL DATA

ACUTE TOXICITY

ORAL : LD50, Rat: 2,276mg/kg
INHALATION : LC50, Rat: 2,717 ppm
CUTANEOUS : LD50, Rabbit: 8,253mg/kg

SKIN SENSITIZATION : 0.5ml applied to open rabbit skin , 4h ; mild to moderate erythema and edema

In a rat 9 days repeated exposure study with ENB vapor at 52, 148 and 350 ppm, there was a dose-related increase in liver weight with hepatocytomegaly.

ENB was devoid of genotoxic activity in an Ames test, forward gene mutation and sister chromatid exchange

studies in CHO cells, and an in vitro cytogenetics study. No effects were seen in a dominant lethal study with repeated exposure up to 254 ppm. In a rat developmental toxicity study at 254 and 100 ppm, there was maternal toxicity (body weight, food consumption, liver weight) , and a few skeletal variants.

There was no evidence for embryo-toxic or teratogenic effects. The no-effects concentration for developmental toxicity was 25 ppm.

SECTION 12 ECOLOGICAL INFORMATION

CHEMICAL FATE INFORMATION :

This product is not biodegradable and toxic to aquatic life. Avoid contaminated water runoff into public water. May not be good removal efficiency in a waste water treatment system.

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SECTION 13 DISPOSAL CONSIDERATION

If discarded in its purchased form, this material would not be considered at this time as a hazardous waste either by listing or by characteristics under Federal Hazardous Waste Regulations, 40 C.F.R. 261. However, we suggest to dilute it with other inert fuels and burn it in a furnace permitted under appropriate regulation. Because of ecological toxicity concerns, do not discharge into sewers, onto the ground, or into any body of water.

SECTION 14 TRANSPORT INFORMATION

DOT/IMO SHIPPING NAME	: Flammable Liquids, Toxic, N.O.S. (Ethylidene norbornene)
HAZARD CLASS	: DOT: 3, IMO: 3.3
UN NUMBER	: UN 1993
DOT/IMO LABEL	: Flammable liquid
PACKING GROUP	: III

SECTION 15 REGULATORY INFORMATION

U.S. REGULATIONS :

CERCLA SUPERFUND

This product contains no Reportable Quantity(RQ) Substance that is currently listed under 40 C.F.R. S 302.4.

SARA 313 INFORMATION

This product contains no substances that are currently subject to the reporting requirements of Section 313 of Title III of the Superfund, Amendments and Reauthorization Act of 1986 and 40 C.F.R. Part 372.

TOXIC SUBSTANCE CONTROL ACT (TSCA)

This material is on the TSCA Inventory list.

TO THE BEST OF OUR KNOWLEDGE, THE INFORMATION CONTAINED HEREIN IS ACCURATE, HOWEVER, NIPPON OIL CORPORATION DOES NOT ASSUME ANY LIABILITY WHATSOEVER FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION CONTAINED HEREIN. FINAL DETERMINATION OF SUITABILITY OF ANY MATERIAL IS THE SOLE RESPONSIBILITY OF THE USER. ALL MATERIAL SHOULD BE USED WITH CAUTION TO GUARD AGAINST UNKNOWN HAZARDS. ALTHOUGH CERTAIN HAZARDS ARE DESCRIBED HEREIN, WE CANNOT GUARANTEE THAT THESE ARE THE ONLY HAZARDS WHICH EXIST.