

SAFETY DATA SHEET

1. IDENTIFICATION

PRODUCT IDENTIFIER

Product Name: VNB
Reference Number: 91238

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 2
Acute toxicity, Inhalation (Vapour) Cat 3

GHS LABEL ELEMENTS:

Pictogram:



Signal Word: Danger

Hazard Statements:

Physical:
H225 : Highly flammable liquid and vapour
Health:
H331 : Toxic if inhaled

Precautionary Statements:

Prevention:
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.

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

Response:

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

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

Storage:

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

Disposal:

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: No additional hazards.

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.

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-vinylnorborn-2-ene	3048-64-4	≥ 99 %	H225, H331

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

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 for resuscitation. Responder should not do mouth-to-mouth resuscitation, as responder may be poisoned by 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. If eye irritation persists, 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 NECESSARYNone

5. FIRE-FIGHTING MEASURES**EXTINGUISHING MEDIA****Suitable Extinguishing Media:** Foam, dry chemical, carbon dioxide (CO₂)**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.

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: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk. Do not confine in area of spill. Advise occupants and shipping in downwind areas of fire and explosion hazard and warn them to stay clear. Allow liquid to evaporate from the surface. 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 exposure to ignition sources. Material can accumulate static charges which may cause an electrical spark (ignition source). Use non-sparking tools and explosion-proof equipment. 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. Use only with adequate ventilation. Prevent small spills and leakage to avoid slip hazard.

Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Vapours can mix with air or oxygen and form flammable mixtures. Flammable mixtures may travel across the ground and reach remote ignition sources causing a flashback fire danger. 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)

No occupational exposure limits allocated

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 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 recommended.

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 are recommended. 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.

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.

Physical State:	Liquid
Colour:	Colorless/Clear
Odour:	Pungent
Melting Point/Freezing Point:	<-80°C
Boiling Point or Initial Boiling Point and Boiling Range:	140 °C
Flammability :	Flammable
Lower and Upper Explosion Limit /Flammable Limits (Approximate volume % in air):	No data
Flash Point:	22 °C
Auto-ignition Temperature:	427°C
Decomposition Temperature:	No data
pH:	N/A
Kinematic Viscosity:	No data @40 °C, 0.95 mPas @ 20 °C
Solubility:	Negligible(38 ppm @27 °C)

Partition Coefficient n-Octanol/Water (log value):	3.39 @ 20 °C
Vapor Pressure:	827 Pa @20 °C
Density and/or Relative Density (at 20 °C):	0.89 g/cm ³ @20°C
Relative Vapour Density (Air = 1):	5 at 101 kPa
Particle Characteristics:	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 may 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
Acute toxicity	
Oral LD50(rat):5700 mg/Kg	Not classified
Dermal LD50(rabbit):13000 mg/Kg	Not classified
Inhalation (Vapour) LC50(rat) : 2200ppm	Category 3
Skin corrosion/irritation Not enough information for classification	Classification not possible
Serious eye damage/irritation Not enough information for classification	Classification not possible
Sensitization	
Respiratory No data available	Classification not possible
Skin No data available	Classification not possible
CMR hazard	
Germ cell mutagenicity No data available	Classification not possible
Carcinogenicity No data available	Classification not possible

Reproductive toxicity No data available	Classification not possible
Additional category for effects on or via lactation No data available	Classification not possible
Specific target organ toxicity	
Single exposure No data available	Classification not possible
Repeated exposure No data available	Classification not possible
Aspiration hazard	
No data available	Classification not possible

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

No information to aquatic organisms.

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.

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:	II
Environmental hazards:	No
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):

H225 : Highly flammable liquid and vapour : Flammable liquids,Cat 2

H331 : Toxic if inhaled : Acute toxicity, inhalation,Cat 3

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