

## SAFETY DATA SHEET

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

**1.1. Product identifier** 2-Vinylpyridine  
**Synonyms:** Pyridine, 2-ethenyl-; 2-Ethenylpyridine; 2-VP  
**Chemical Abstracts Registry No:** 100-69-6  
**REACH Registration Number:** 01-2119475499-19-0000

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

chemical intermediate  
Polymer production.

**1.3. Details of the supplier of the safety data sheet**

Vertellus LLC  
201 North Illinois Street, Suite 1800  
Indianapolis, Indiana 46204 USA  
1-317-247-8141

**Only Representative for EU REACH Registration:**

Vertellus Specialties UK Ltd.  
Seal Sands Road, Seal Sands  
Middlesbrough, TS2 1UB  
England

**e-mail Address:** sds@vertellus.com

**1.4. Emergency telephone number** **Vertellus:** 1-317-247-8141  
**CHEMTREC (USA):** +1-800-424-9300 (collect calls accepted)  
**CHEMTREC (International):** +1-703-527-3887 (collect calls accepted)  
**NRCC (China):** +86 532 83889090

### SECTION 2: Hazards identification

**2.1. Classification of the substance or mixture** (According to Regulation (EC) No 1272/2008, 29 CFR 1910.1200 and the Globally Harmonized System)

Acute Toxicity Oral Category 4  
Acute Toxicity Dermal Category 3  
Environmental Chronic Category 2  
Flammable Liquids Category 3  
Serious Eye Damage Category 1  
Skin Corrosion Category 1B  
Skin Sensitization Category 1 EUH071 - Corrosive to the respiratory tract.

**2.2. Label elements**

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Hazard Symbols (Pictogram):



Signal Word:

Danger

Hazard Precautions:

H302 - Harmful if swallowed.  
 H311 - Toxic in contact with skin.  
 H226 - Flammable liquid and vapour.  
 H314 - Causes severe skin burns and eye damage.  
 H317 - May cause an allergic skin reaction.  
 H411 - Toxic to aquatic life with long lasting effects.  
 EUH071 - Corrosive to the respiratory tract.

Prevention Precautionary Statements:

P210 - Keep away from heat/sparks/open flames/hot surfaces. – No smoking.  
 P240 - Ground/bond container and receiving equipment.  
 P241 - Use explosion-proof electrical/ventilating/lighting/telecommunication/computer/ equipment.  
 P242 - Use only non-sparking tools.  
 P243 - Take precautionary measures against static discharge.  
 P260 - Do not breathe dust/fume/gas/mist/vapours/spray.  
 P270 - Do not eat, drink or smoke when using this product.  
 P273 - Avoid release to the environment.  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Precautionary Statements:

P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.  
 P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P310 - Immediately call a POISON CENTER or doctor/physician.  
 P333+P313 - If skin irritation or rash occurs: Get medical advice/attention.  
 P363 - Wash contaminated clothing before reuse.  
 P391 - Collect spillage.

Storage Precautionary Statements:

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

### 2.3. Other hazards

Other Hazards:

Hazardous polymerization may occur. Allowing the material to heat uncontrollably or to absorb water and/or impurities can promote autopolymerization to vinylpyridine polymer. It is recommended that the material be stored below -5°C (23°F) in a dry environment to preserve product quality.

## SECTION 3: Composition/information on ingredients

### 3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (weight %)	EC Number	CLP Inventory/ Annex VI	EU CLP Classification (1272/2008)
2-Vinylpyridine	100-69-6	~ 100	202-879-8	Not listed.	Aquatic Chronic 2; H411 Acute Tox. 3; H311 Acute Tox. 4; H302 Flam. Liq. 3; H226 Skin Corr. 1B; H314 Skin Sens. 1; H317

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Eye Dam. 1; H318

NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable).

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

Skin Contact:	Wash exposed area twice with soap and water. The exposed area should be examined by medical personnel if irritation or pain persists after the area has been washed. Due to this material's dermal toxicity, it is important to wash the exposed area without delay and GET MEDICAL ATTENTION as soon as possible. Vinegar may be used to ease irritation and to neutralize any remaining material after the area has been washed.
Eye Contact:	Rinse eyes immediately with large amounts of water for at least 15 minutes, occasionally lifting the eyelids. GET MEDICAL ATTENTION. Do not put vinegar in eyes.
Inhalation:	Remove from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Keep affected person warm and at rest. GET MEDICAL ATTENTION.
Ingestion:	Do NOT induce vomiting, this material is corrosive. Immediate dilution with milk or water is recommended, after which nothing should be administered orally until medical personnel have been contacted. Give oxygen if respiration is shallow. GET MEDICAL ATTENTION. Do not give anything by mouth to an unconscious person. Due to this material's corrosivity, it is essential to get medical attention as quickly as possible.

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

Acute:	2-Vinylpyridine is corrosive to skin, eyes and mucous membranes. Vapors may be irritating to the respiratory tract. 2-Vinylpyridine is readily absorbed through the skin and is considered toxic via the oral and dermal routes. Extended exposure (e.g. from saturated clothing) may lead to skin burns and/or systemic poisoning. Symptoms may include headache, dizziness, drowsiness, nausea, and other effects. Symptoms seen after inhalation overexposures are expected to be essentially the same as those listed previously. 2-Vinylpyridine is corrosive so damage to the mouth and throat is a possibility if large amounts are ingested. Ingestion is not likely to be a primary route of exposure.
Delayed Effects:	Due to the corrosive nature of this material, burns are likely to occur. Ongoing contact with contaminated clothing may cause burns to appear after an extended exposure period.

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

Note to Physician:	No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.
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### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Appropriate Extinguishing Media:	Water fog, Alcohol foam, Carbon dioxide, Dry chemical, Use water to cool and dilute from as far a distance as possible.
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#### 5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion:	Toxic vapors may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide).
Potential for Dust Explosion:	Not applicable.

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**Special Flammability Hazards:** Severe explosion hazard in the form of vapor (within flammability limits) when exposed to heat, flame or static discharge.

### 5.3. Advice for firefighters

**Basic Fire Fighting Guidance:** Wear self-contained breathing apparatus and full protective clothing (i.e., Bunker gear). Skin and eye contact should be avoided. Normal fire fighting procedures may be used.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

**Evacuation Procedures:** Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

**Special Instructions:** See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

### 6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

### 6.3. Methods and material for containment and cleaning up

Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. For small spills, use suitable absorbent material and collect for later disposal. For large spills, the area may require diking to contain the spill. Material can then be collected (eg., suction) for later disposal. After collection of material, flush area with water. Dispose of the material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws.

### 6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

**Precautions for Unique Hazards:** This material is shipped with an inhibitor to prevent hazardous autopolymerization in storage and handling. The presence of oxygen is necessary to extend the life of the polymerization inhibitor; nitrogen blanketing of this material is not recommended. Contact Vertellus for detailed recommendations regarding bulk and drum storage.

**Practices to Minimize Risk:** Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds.

**Special Handling Equipment:** Not applicable.

### 7.2. Conditions for safe storage, including any incompatibilities

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**Storage Precautions & Recommendations:**

Maintain dry, ventilated conditions for storage. Protect containers against physical damage. Outside or detached storage is preferable. Inside storage should be in standard flammable liquids storage room or cabinet. Keep away from strong acids and oxidizing agents. It is recommended that the material be stored below -5°C (23°F) in a dry environment to preserve product quality.

**Dangerous Incompatibility Reactions:**

Avoid excessive heat, strong acids and oxidizing agents.

**Incompatibilities with Materials of Construction:**

May cause some forms of plastics and rubbers to deteriorate.

### 7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

Country

Occupational Exposure Limit

Latvia

0.5 mg/m<sup>3</sup> as 8-hour time-weighted average

**Air Monitoring Method:** Collection media: Charcoal; Analysis Method: GC/FID

**Derived No Effect Levels (DNELs) – Workers:**

Route	DNEL
Acute - systemic effects (dermal)	1.5 mg/kg bw/day
Acute - systemic effects (inhalation)	5.28 mg/m <sup>3</sup>
Long-term - systemic effects (dermal)	0.5 mg/kg bw/day
Long-term - systemic effects (inhalation)	1.76 mg/m <sup>3</sup>
Acute and long-term - local effects (dermal, inhalation)	Qualitative assessment - skin/eye/respiratory irritant

**Derived No Effect Levels (DNELs) – General Population:**

Route	DNEL
Acute - systemic effects (oral, dermal, inhalation)	0.75mg/kg bw/day
Acute - systemic effects (inhalation)	1.32 mg/m <sup>3</sup>
Long-term - systemic effects (dermal)	0.25 mg/kg bw/day
Long-term - systemic effects (inhalation)	0.44 mg/m <sup>3</sup>
Long-term - systemic effects (oral)	0.25 mg/kg bw/day
Acute and long-term - local effects (dermal, inhalation)	Qualitative assessment - skin/eye/respiratory irritant. No applications involving general public

**Predicted No Effect Concentrations (PNECs):**

Route	PNEC
PNEC aqua (freshwater)	0.0065 mg/L

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PNEC aqua (marine water)	0.000065 mg/L
PNEC aqua (intermittent releases)	0.065 mg/L
PNEC aqua (STP)	3.2 mg/L
PNEC sediment (freshwater)	0.064 mg/kg sediment dw
PNEC sediment (marine water)	0.0064 mg/kg sediment dw
PNEC soil	0.0095 mg/kg soil dw
PNEC oral (wildlife exposures)	Derivation waived - no potential for bioaccumulation

### 8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

<b>Other Engineering Controls:</b>	All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.
<b>Personal Protective Equipment:</b>	Full face masks containing a suitable filter to remove specified gases & vapours and/or solid and liquid particles rated as APF 10 / 20 for applications requiring 90% and 95% respirator efficiency respectively. Chemical goggles should be worn at all times; use face shields as conditions warrant. Gloves to meet EN 374-1 or international equivalent. Fluororubber (Viton) or chemical-resistant laminate gloves are indicated for full-shift exposure. Neoprene, nitrile or PVC coated gloves provide short-term splash protection only (<30 mins). Impervious clothing and boots.
<b>Respirator Caution:</b>	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
<b>Thermal Hazards:</b>	Not applicable.
<b>Environmental Exposure Controls:</b>	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

<b>Appearance, State &amp; Odor (ambient temperature):</b>	Colorless liquid with a pungent, disagreeable odor.		
<b>Molecular Formula:</b>	C7H7N	<b>Molecular Weight:</b>	105.14
<b>Vapor Pressure:</b>	25.3 mm Hg @ 25°C	<b>Evaporation Rate:</b>	Not determined
<b>Specific Gravity or Density:</b>	0.998 @ 20 C	<b>Vapor Density (air = 1):</b>	Not available.
<b>Boiling Point:</b>	167 °C @ 760 mm Hg	<b>Freezing / Melting Point:</b>	-68 - -48 °C
<b>Solubility in Water:</b>	2.75 g/100 mL @ 20°C	<b>Octanol / Water Coefficient:</b>	1.54
<b>pH:</b>	pKa = 4.98 @ 20°C (aqueous solution)	<b>Odor Threshold:</b>	< 1 ppm
<b>Viscosity:</b>	1.17 mPa.s	<b>Autoignition Temperature:</b>	453-456 C

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Flash Point and Method:	122°F (50°C) Tag Closed Cup	Flammable Limits:	1.03% (LEL) –9.01% (UEL)
Flammability (solid, gas):	Not applicable.	Decomposition Temperature:	No data available.
Explosive Properties:	Not explosive.	Oxidizing Properties:	Not an oxidizer.

### SECTION 10: Stability and reactivity

<u>10.1. Reactivity</u>	Not classified as dangerously reactive.
<u>10.2. Chemical stability</u>	Hazardous polymerization may occur
<u>10.3. Possibility of hazardous reactions</u>	Self-accelerated decomposition/polymerization temperature (SADT/SAPT) testing has been performed on 2-Vinylpyridine. All packaging options for 2-Vinylpyridine were tested, and all had SADT/SAPT's higher than 54°C. Therefore, 2-Vinylpyridine is not regulated under 49 CFR 173.21.
<u>10.4. Conditions to avoid</u>	It is recommended that the material be stored below -5°C (23°F) in a dry environment to preserve product quality. Allowing the material to heat uncontrollably or to absorb water and/or impurities can promote autopolymerization into vinylpyridine polymer.
<u>10.5. Incompatible materials</u>	Avoid excessive heat, strong acids and oxidizing agents.
<u>10.6. Hazardous decomposition products</u>	Toxic vapors may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide).

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute Oral LD <sub>50</sub> :	336 mg/kg (rat) 951 mg/kg (rat) 673 mg/kg (rat)	KEY - Eastman Kodak 1983
Acute Dermal LD <sub>50</sub> :	640 mg/kg (rabbit)	KEY - Fitzgerald 1992
Acute Inhalation LC <sub>50</sub> :	9 mg/L (4h) (mouse) 0.46 mg/L (4h) (mouse)	Weight of Evidence - Bukhalovskii 1992 Weight of Evidence - Dukhovnaya 1966
Skin Irritation:	Corrosive to skin.	
Eye Irritation:	Severely irritating to eyes.	
Skin Sensitization:	Positive for sensitizing effects in guinea pig maximization test	
Mutagenicity:	The genotoxicity of 2VP has been investigated in both in vitro and in vivo tests. The majority of studies indicate that 2VP shows no evidence of mutagenicity or clastogenicity. One laboratory produced two studies which suggest genotoxicity. An in vivo study investigating the indirect mutagenicity (as tumor formation) of 2VP showed an absence of tumors. Two modeling exercises indicating that chemicals with structures similar to those found in the 2VP molecule are not associated with in vivo micronucleus formation or cancer development. The weight of evidence indicates that 2VP is not mutagenic or otherwise genotoxic. (Cunningham 2010) [Key]	
Reproductive / Developmental Toxicity:	2-Vinylpyridine was investigated in a validated SAR model for activity involving developmental reproductive toxicity (teratogenesis). This substance is similar to compounds which were not active. Thus, 2-vinylpyridine is concluded not to be a developmental toxicant. (Cunningham 2010) [KEY]	

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<b>Carcinogenicity:</b>	A weight of evidence approach was utilized to review experimental tumorigenicity data, modeled carcinogenicity predictions, and mutagenicity data on 2VP. The conclusion is that 2VP is not carcinogenic. 2-Vinylpyridine was not tumorigenic in the lungs of mice given 2VP by ip injection at a dose of 200 micromoles over 20 weeks. (Brunnemann et al 1982) [KEY]
<b>Target Organs:</b>	Several repeated dose oral toxicity studies on 2VP in rats are available which suggest a systemic NOAEL between 20 and 50 mg/kg bw/d. There is no evidence of specific target organ toxicity; rather only signs of generalized toxicity such as changes in food consumption, altered body weight gain, and changes in relative organ weights. Concerning local effects, 2VP displayed corrosive effects at the portal of entry, the nonglandular stomach. The LOAEL for this effect was 20 mg/kg bw/d in the 90-day study. (Vlaovic MS 1984) [KEY]
<b>Aspiration Hazard:</b>	Based on physical properties, not likely to be an aspiration hazard.
<b>Primary Route(s) of Exposure:</b>	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.
<b>Most important symptoms and effects, both acute and delayed</b>	2-Vinylpyridine is corrosive to skin, eyes and mucous membranes. Vapors may be irritating to the respiratory tract. 2-Vinylpyridine is readily absorbed through the skin and is considered toxic via the oral and dermal routes. Extended exposure (e.g. from saturated clothing) may lead to skin burns and/or systemic poisoning. Symptoms may include headache, dizziness, drowsiness, nausea, and other effects. Symptoms seen after inhalation overexposures are expected to be essentially the same as those listed previously. 2-Vinylpyridine is corrosive so damage to the mouth and throat is a possibility if large amounts are ingested. Ingestion is not likely to be a primary route of exposure. Delayed Effects: Due to the corrosive nature of this material, burns are likely to occur. Ongoing contact with contaminated clothing may cause burns to appear after an extended exposure period.
<b>Additive or Synergistic effects:</b>	None known.

### SECTION 12: Ecological information

<b><u>12.1. Toxicity</u></b>	LC50 (96h) <i>Oryzias latipes</i> (Medaka) = 6.48 mg/L NOEC <i>Oryzias latipes</i> (Medaka) = 0.938 mg/L EC50 (48h) <i>Daphnia magna</i> = 9.48 mg/L NOEC <i>Daphnia magna</i> = 3.23 mg/L EC50 (72h) <i>Selenastrum capricornutum</i> (algae) = 64.4 mg/L NOEC <i>Selenastrum capricornutum</i> (algae) = 30.9 mg/L	Chemical Evaluation & Research Institute 2002
<b><u>12.2. Persistence and degradability</u></b>	2 -Vinylpyridine (2VP) has undergone biodegradation testing in several different protocols (301E Ready Biodegradation screening test, 301C Ready Biodegradation by the MITI protocol, and an inherent biodegradation test protocol where evaporation is prevented (CONCAWE inherent biodegradation protocol). All test results indicate poor biodegradation. These results are in contrast with a model prediction (BIOWIN, U. S. EPA) based on chemical structure. (Clark 2010) [KEY]	
<b><u>12.3. Bioaccumulative potential</u></b>	The BCF for 2-Vinylpyridine was estimated as 4.82 L/kg wet weight (log BCF = 0.683), and indicates that this substance has a low potential for bioaccumulation in both aquatic and terrestrial habitats. (USEPA 2003)	
<b><u>12.4. Mobility in soil</u></b>	The Koc of 2-Vinylpyridine is 66.2 as calculated from Kow for the chemical class of nonhydrophobics. (European Chemicals Bureau Institute for Health and Consumer Protection 2003)	
<b><u>12.5. Results of PBT and vPvB assessment</u></b>	This substance is not a PBT or vPvB.	
<b><u>12.6. Other adverse effects</u></b>	Experimental data is available for photodegradation of 2-Vinylpyridine, showing a calculated lifetime of 3 hours, 4 hours or 1 day, due to reaction with OH radicals, NO <sub>3</sub> radicals and ozone, respectively. Basic chemistry principles indicate that there is no potential for hydrolysis.	



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### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

US EPA Waste Number:	D001
Waste Classification: (per US regulations)	Ignitable.
Waste Disposal:	NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

### SECTION 14: Transport information

*The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:*

14.1. UN number	UN3073	14.2. UN proper shipping name	Vinylpyridines, stabilized
14.3. Transport hazard class(es)	6.1(3,8)	14.4. Packing group	PG II
14.5. Environmental hazards	Marine Pollutant		
NA Emergency Guidebook Numbers:	131P	IMDG EMS:	S-C; F-E
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code			Not applicable.

### SECTION 15: Regulatory information

#### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

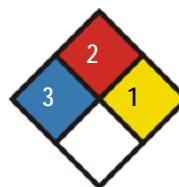
Chemical Inventory Lists:	Status:		
USA TSCA:	Listed	EINECS:	202-879-8
Canada(DSL/NDSL):	NDSL	Japan:	(5)-716
Korea:	KE-05-1351	Australia:	Listed
China:	Listed	Philippines:	Listed
Taiwan:	Listed	New Zealand:	Listed
German Water Hazard Classification:	WGK Class 2 (self-classification)		
SARA 313:	Not applicable.		
Reportable Quantities:	Not applicable.		
State Regulations:	Not applicable.		

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HMIS IV:

HEALTH	3
FLAMMABILITY	2
PHYSICAL HAZARD	1

NFPA:



### 15.2. Chemical safety assessment

A chemical safety assessment has been prepared for this product.

## SECTION 16: Other information

Key Data Sources:

- Brunnemann, KD, A Rivenson, SC Cheng, V Saa and D Hoffman, "A study of tobacco carcinogenesis XLVII. Bioassays of vinylpyridines for genotoxicity and for tumorigenicity in A/J mice", *Cancer Letters* 65: 107-113, 1992.
- Bukhalovskii AA and Bitkina AV, "Comparative Toxicity of Pyridine Dervative Isomers", *Gig. Sanit.* 9-10:64, 1992.
- Chemicals Evaluation and Research Institute, Japan, "Fish (*Oryzias latipes*), Acute Toxicity Test of 2-Vinylpyridine", Chemicals Evaluation and Research Institute, Japan, Kurume Laboratory, Report #92528, 92529, Sponsor: Ministry of the Environment, Japan, 2002.
- Chemicals Evaluation and Research Institute, Japan, "Daphnia magna, Reproduction Test of 2-vinylpyridine", Chemicals Evaluation and Research Institute, Japan, Kurume Laboratory, Report #92528, Sponsor: Ministry of the Environment, Japan, 2002.
- Chemicals Evaluation and Research Institute, Japan, "Alga (*Selenastrum capricornutum*), Growth Inhibition Test of 2-Vinylpyridine", Chemicals Evaluation and Research Institute, Japan, Kurume Laboratory, Report #92526, Sponsor: Ministry of the Environment, Japan, 2002.
- Cunningham AR, "Cat-SAR Human Developmental Toxicity-2-Vinylpyridine", James Graham Brown Cancer Center, University of Louisville, Louisville, KY, USA, Sponsor: Vertellus Specialties Inc, Raschig GmbH and Yuki Gosei Kogyo Co., Ltd., 2010.
- Dukhovnaya AI, "On the Toxicology of 2-Vinyl Pyridine", *Gigiena truda (Occupational Hygiene)* 3:9-13, 1966.
- Eastman Kodak Company, "Basic Toxicity of 2-Vinylpyridine", Corporate Health and Environment Laboratories, Report #180271Q, Sponsor: Eastman Kodak Company, 1983.
- Fitzgerald GB, "2-Vinylpyridine: Acute Dermal Toxicity", Toxikon Corporation, Report # 92G-0361, Sponsor: Reilly Industries, Inc., 1992.
- Vlaovic MS, "Subchronic Oral Toxicology of 2-Vinylpyridine", Eastman Kodak Company, Health and Environmental Laboratories, Report # 180295A, 1984.

Classification Method: On basis of test data  
Weight of evidence  
Expert judgment

Legend of Abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.  
CAS = Chemical Abstracts Service.  
CFR = Code of Federal Regulations.  
DSL/NDL = Domestic Substances List/Non-Domestic Substances List.  
EC = European Community.  
EINECS = European Inventory of Existing Commercial Chemical Substances.  
ELINCS = European List of Notified Chemical Substances.  
EU = European Union.

LD = Lethal Dose.  
NFPA = National Fire Protection Association.  
NIOSH = National Institute of Occupational Safety and Health.  
NTP = National Toxicology Program.  
OSHA = Occupational Safety and Health Administration  
PEL = Permissible Exposure Limit.  
RQ = Reportable Quantity.  
SARA = Superfund Amendments and Reauthorization Act of 1986.

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GHS = Globally Harmonized System.  
 LC = Lethal Concentration.

TLV = Threshold Limit Value.  
 WHMIS = Workplace Hazardous Materials Information System.

**Important Note:** Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.

Revision Date: 05 Oct 2017 (minor rev. June 2019)      Original Date of Issue: 28 March 1985  
 Issued by: Regulatory Management Department      Email: SDS@Vertellus.com  
 Revision Details: Revised Section 14 to remove reference to emergency and alarm temperatures.  
 Clarified text in Section 10.3.

### Annex 2-Vinylpyridine - Summary of Uses

ES Number	Name	SU	ERC	PROC	PC
1	Production of Polymers	3/8	6c	1,2,3,8a,8b	32
2	Use as a Pharmaceutical Intermediate	3/8	6a	3,8a,8b,15	29

### 2-Vinylpyridine Exposure Scenarios

Note: Guidance below is in addition to that indicated in sections 1-16 of the SDS

<p><b>Exposure Scenario (ES) 1</b>  <b>Title: Production of Polymers</b>          Exposure scenario covering the following  <b>Main Sector of Use Group</b></p> <ul style="list-style-type: none"> <li>• <b>SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites</b> <ul style="list-style-type: none"> <li>○ SU8: Manufacture of bulk, large scale chemicals</li> </ul> </li> </ul> <p><b>Process Categories</b></p> <ul style="list-style-type: none"> <li>• PROC 1: Production of Polymers (Use in closed process, no likelihood of exposure)</li> <li>• PROC 2: Production of Polymers (Use in closed, continuous process with occasional controlled exposure )</li> <li>• PROC 3: Production of Polymers (Use in closed batch process (synthesis or formulation))</li> <li>• PROC 8b: Unload of bulk substances outdoors (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities)</li> <li>• PROC 8b: Unload of containers outdoors (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)</li> <li>• PROC 8b: Unload of containers indoors (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)</li> </ul> <p><b>Environmental Release Categories</b></p> <ul style="list-style-type: none"> <li>• ERC 6c: Industrial use of monomers for manufacture of thermo-plastics</li> </ul>
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### Exposure Scenario (ES) 2

#### Title: Use as a Pharmaceutical Intermediate

Exposure scenario covering the following

#### Main Sector of Use Group

- **SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites**
  - SU8: Manufacture of bulk, large scale chemicals

#### Process Categories

- PROC 3 Production of Pharmaceutical Intermediates (Use in closed batch process (synthesis or formulation))
- PROC 8a Cleaning and Maintenance (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities)
- PROC 8b Unload of Containers (Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities)
- PROC 15: Quality Control Function (Use as laboratory reagent)

#### Environmental Release Categories

- ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates)

## 1. Control of Worker Exposure

### Product characteristic

- The material exists only in the liquid form.
- Concentration % of the substance in the product:

	PROC	ES 1	ES 2		PROC	ES 1	ES 2
	1	5-25			8a	100	<1
	2	5-25			8b	100	100
	3	5-25	<1		15	---	<1

### Amounts used

- Not relevant for human health risk assessment.

### Frequency and duration of use/exposure

Worker exposure per shift:

	PROC	ES 1	ES 2		PROC	ES 1	ES 2
	1	1-4 hours			8b bulk	< 15 min	
	2	1-4 hours			8b outdoors	> 4 hours	
	3	1-4 hours	> 4 hours		8b indoors	> 4 hours	> 4 hours
					15	---	15 min – 1 hour

### Human factors not influenced by risk management

- Exposure of head not covered by PPE

### Other given operational conditions affecting workers exposure

- All work assumed to be indoors except for ES 1 PROC 8b: bulk unloading and container loading outdoors.

### Technical conditions and measures at process level (source) to prevent release:

- See Section 7 of SDS

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### **Technical conditions and measures to control dispersion from source towards the worker:**

- See Section 7 and 8 of SDS
- Local ventilation is assumed for all PROCs except: ES 1 PROC 1 (production closed); PROC 8b (unload bulk) and ES 2 PROC 3 (production batch)

### **Organisational measures to prevent /limit releases, dispersion and exposure:**

- See SDS

### **Conditions and measures related to personal protection, hygiene and health evaluation:**

- See sections 7, 8 and 10 of SDS
- Respirators with 90% efficiency assumed for all PROCs except ES 2 PROC 3.
- Gloves with 95% efficiency assumed for all

## 2. Control of Environmental Exposure

### **Product characteristics**

- The substance is a liquid.

### **Frequency and duration of use**

- Continuous and Intermittent release possible

### **Environment factors not influenced by risk management**

- Default values of 18,000 m<sup>3</sup>/d for receiving waters are assumed

### **Other given operational conditions affecting environmental exposure**

- Operations are assumed to be indoors except ES 1 bulk unloading and container loading outdoors
- Production is in closed systems

### **Technical conditions and measures at process level (source) to prevent release**

- See sections 7 and 8 of the SDS

### **Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil**

#### **Water**

- Waste water discharge assumed to be > 50 m<sup>3</sup> per hour
- Waste water discharge treatment adequate to restrict discharge to < 0.125 kg /day
- Discharge to STP: ERC 6c: No; ERC 6a Yes
- Compliance with local water discharge regulations

#### **Air**

- Air treatment adequate to restrict discharge of substance to < 100 kg
- Compliance with local air discharge regulations

#### **Soil**

- No release to soil was assumed in the ECETOC TRA assessment.

### **Organizational measures to prevent/limit release from site**

- See Sections 6 and 7 of the SDS

### **Conditions and measures related to municipal sewage treatment plant disposal**

- The default STP value of 2000 m<sup>3</sup>/day was used.

### **Conditions and measures related to external treatment of waste for disposal**

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- See section 13 of the SDS
- Onsite WWTP sludge sent offsite for disposal (EU waste code 07 02 11)
- Empty raw material packaging containers (EU waste code: 15 01 10)
- Residual in shipping containers assumed to be < 0.1%
- Observe all regional, state and local environmental regulations

### **Conditions and measures related to external recovery of waste**

- There is no recovery at an external waste treatment site

### **3. Exposure estimation and reference to its source**

The human health risk assessment and the environmental risk assessment were performed using ECETOC TRA v2.0. Tables below summarize the calculated exposures and resulting Risk Characterization Ratios (RCR) at < 1.0. Note the worker exposures in ECETOC TRA are calculated by multiplying the full shift calculations by the following factors:

- > 4 hours: 1
- 1 - 4 hours: 0.6
- 15 minutes to 1 hour: 0.2
- < 15 minutes: 0.1

### **4. Guidance to DU - Operational conditions and Risk Management Measures**

The activities discussed above result in an acceptable exposure if individually performed by an industrial/professional worker, and considering the operational conditions and the risk management measures (RMM) as defined.

The downstream user may re-calculate the RCR values based on variations in the local operational conditions and application of RMM to confirm that operations are within the control limits.

#### **Predicted Exposure Concentrations – Environmental**

Compartment	Local PEC: ERC 6c	Local PEC; ERC 6a
Water: Fresh; mg/L	0.006	0.006
Water: Fresh Sediment; mg/kg	0.062	0.062
Water: Marine; mg/L	4.98E-4	6.12E-4
Water; Marine Sediment; mg/kg	0.005	0.006
Water: STP mg/L	0.05	0.0061
Air: mg/m <sup>3</sup>	0.021	7.64E-4
Soil: mg/kg	0.008	0.002

#### **Predicted Exposure Concentrations – Worker**

##### **Exposure Scenario 1:**

Route of exposure: ES 1	PROC 1	PROC 2	PROC 3	PROC 8a	PROC 8b bulk	PROC 8b cont. indoors	PROC 8b cont. outdoors
Inhalation: Acute Systemic: mg/m <sup>3</sup>	0.004	0.032	0.094	0.088	0.306	0.132	3.066
Inhalation: Long Term Local; mg/m <sup>3</sup>	0.002	0.016	0.047	0.044	0.153	0.066	1.533
Inhalation: Long Term Systemic: mg/m <sup>3</sup>	0.002	0.016	0.047	0.044	0.153	0.066	1.531
Dermal: Acute Systemic: mg/kg bw/day	0.002	0.007	0.002	0.007	0.343	0.034	0.034
Dermal: Long Term Local: mg/cm <sup>2</sup>	0.1	0.02	0.01	0.01	1	0.1	1

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Dermal: Long Term System: mg/kg/bw/day	0.002	0.007	0.002	0.007	0.343	0.034	0.034
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### Exposure Scenario 2:

Route of exposure: ES 2	PROC 3	PROC 8a	PROC 8b container indoors	PROC 15
Inhalation: Acute Systemic: mg/m <sup>3</sup>	2.614	0.052	0.132	0.008
Inhalation: Long Term Local; mg/m <sup>3</sup>	1.314	0.026	0.066	0.004
Inhalation: Long Term Systemic: mg/m <sup>3</sup>	1.314	0.026	0.066	0.004
Dermal: Acute Systemic: mg/kg bw/day	0.004	0.007	0.034	0.004
Dermal: Long Term Local: mg/cm <sup>2</sup>	0.1	0.01	0.1	0.01
Dermal: Long Term System: mg/kg/bw/day	0.002	0.007	0.034	0.002

### Risk Characterization Ratio – Environmental

Compartment	RCR: ERC 6c	RCR; ERC 6a
Water: Fresh; mg/L	0.935	0.942
Water: Fresh Sediment; mg/kg	0.97	0.977
Water: Marine; mg/L	0.766	0.942
Water; Marine Sediment; mg/kg	0.795	0.977
Water: STP mg/L	0.016	0.019
Air: mg/m <sup>3</sup>	0.047	0.0017
Soil: mg/kg	0.834	0.222

### Risk Characterization Ratio – Worker

#### Exposure Scenario 1:

Route of exposure: ES 1	PROC 1	PROC 2	PROC 3	PROC 8a	PROC 8b bulk	PROC 8b container indoors	PROC 8b container outdoors
Inhalation: Acute Systemic:	0.0006	0.0006	0.009	0.016	0.058	0.008	0.58
Inhalation: Long Term Local;	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative	Qualitative
Inhalation: Long Term Systemic:	0.0001	0.009	0.027	0.025	0.087	0.038	0.87
Dermal: Acute Systemic:	Qualitative	Qualitative	Qualitative	Qualitative	0.686	Qualitative	0.069
Dermal: Long Term Local:	0.003	0.014	0.003	0.014	Qualitative	0.069	Qualitative
Dermal: Long Term System:	0.003	0.014	0.003	0.014	0.686	0.069	0.069
Combined: Long Term Systemic	0.005	0.023	0.03	0.039	0.773	0.106	0.939

#### Exposure Scenario 2:

Route of exposure: ES 2	PROC 3	PROC 8a	PROC 8b Container indoors	PROC 15
Inhalation: Acute Systemic:	0.498	0.01	0.038	0.001

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Inhalation: Long Term Local	Qualitative	Qualitative	Qualitative	Qualitative
Inhalation: Long Term Systemic	0.747	0.015	0.038	0.002
Dermal: Acute Systemic	0.003	0.014	0.069	0.003
Dermal: Long Term Local	Qualitative	Qualitative	Qualitative	Qualitative
Dermal: Long Term Systemic	0.003	0.014	0.069	0.003
Combined: Long Term Systemic	0.75	0.028	0.106	0.006