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(according to (EC) 1907/2006)

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

1.1. Product identifier — Pyridine

Synonyms: Azabenzene; Azine; Pyridine 1°; Pyridine ACS

REACh Registration No.: 01-2119493105-40-0000

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

chemical intermediate
Manufacture of substances, formulation of preparations, use as processing aid, use as intermediate; use in laboratory, use in closed systems.

1.3. Details of the supplier of the safety data sheet

Manufacturer Information: Vertellus Agriculture & Nutrition Specialties LLC, 1500 South Tibbs Avenue, Indianapolis, Indiana 46241 USA

Non-Emergency Phone Number: (317) 247-8141

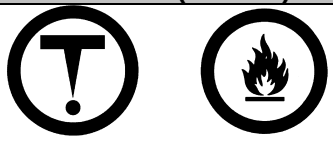
Non-Emergency Fax Number: (317) 248-6402

E-Mail Address: msds@vertellus.com

1.4. Emergency telephone number

Vertellus:
CHEMTREC (USA): (800) 424-9300
(collect calls accepted); (Int'l): (703) 527-3887
(collect calls accepted; 011 prefix not needed)

SECTION 2: Hazards identification

HMIS Rating	EC Classification	WHMIS (Canada)	Transportation
HEALTH 2 FLAMMABILITY 3 REACTIVITY 0			

2.1. Classification of the substance or mixture

(According to Regulation (EC) No 1272/2008)

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Serious Eye Damage/Eye Irritation Category 2
Skin Corrosion/Irritation Category 2
Acute Toxicity Inhalation Dust / MistCategory 4
Acute Toxicity Dermal Category 4
Acute Toxicity Oral Category 4
Flammable Liquids Category 2

Signal Word:
Danger

Hazard Precautions:
H319 - Causes serious eye irritation.
H315 - Causes skin irritation.
H302+H312+H332 - Harmful if swallowed, in contact with skin or if inhaled.
H225 - Highly flammable liquid and vapour.

2.2. Label elements

Hazard Symbols (Pictogram):

Prevention Precautions:
P271 - Use only outdoors or in a well-ventilated area.
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray.
P270 - Do not eat, drink or smoke when using this product.
P264 - Wash hands thoroughly after handling.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P243 - Take precautionary measures against static discharge.
P242 - Use only non-sparking tools.
P241 - Use explosion-proof electrical/ventilating/lighting/telecommunication/computer/ equipment.
P240 - Ground/bond container and receiving equipment.
P233 - Keep container tightly closed.
P210 - Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

First Aid Precautions:
P337+P313 - If eye irritation persists: Get medical advice/attention.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P362 - Take off contaminated clothing and wash before reuse.
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P321 - Specific treatment (see supplemental information on this label).
P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P363 - Wash contaminated clothing before reuse.
P322 - Specific measures (see supplemental information on this label).

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P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
P330 - Rinse mouth.
P301+P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P370+P378 - In case of fire: Use carbon dioxide/dry chemical/soda ash for extinction.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

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

Disposal Precautions:
P501 - Dispose of contents/container in accordance with local/regional/national/international regulation for hazardous wastes.

Single Exposure Target Organs:
Not applicable

Repeated Exposure Target Organs:
Not applicable

(According to Directive 67/548/EEC)

Symbol:	Xn, F
Risk Phrases:	R20/21/22: Harmful by inhalation, in contact with skin and if swallowed. R11: Highly Flammable.
Safety Phrases:	S2: Keep out of the reach of children. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S28: After contact with skin, wash immediately with plenty of soap and water.

2.3. Other hazards

Signs and Symptoms of Potential Overexposure:	Pyridine is moderately to severely irritating to skin, eyes and mucous membranes. Vapors may be irritating to the respiratory tract. Pyridine is readily absorbed through the skin. Extended exposure (e.g. from saturated clothing) may lead to 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. Ingestion of several ounces of pyridine has resulted in severe vomiting, diarrhea, high fever, delirium and death. Ingestion is not likely to be a primary route of exposure.
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.
Medical Conditions Aggravated by Exposure:	Persons with pre-existing skin, liver, or kidney disorders may be at increased risk from overexposure to this material. This is not likely to be a problem when appropriate procedures are used to minimize exposure.

SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

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Ingredient	CAS Number	Concentration (%)	EINECS / ELINCS	EU Symbol	Risk Phrases
Pyridine	110-86-1	100.000000	203-809-9	Xn, F	R20/21/22- R11

NOTE: See Section 8 of this MSDS for exposure limit data for these ingredients.
See Section 15 of this MSDS for trade secret information (where applicable).
See Section 16 of this MSDS for the full text of the R-phrases above.

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.

Eye Contact: Rinse eyes immediately with large amounts of water for at least 15 minutes, occasionally lifting the eyelids. GET MEDICAL ATTENTION.

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: If conscious, induce vomiting to prevent further absorption. Give oxygen if respiration is shallow. GET MEDICAL ATTENTION. Do not give anything by mouth to an unconscious person.

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

Acute: Pyridine is moderately to severely irritating to skin, eyes and mucous membranes. Vapors may be irritating to the respiratory tract. Pyridine is readily absorbed through the skin. Extended exposure (e.g. from saturated clothing) may lead to 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. Ingestion of several ounces of pyridine has resulted in severe vomiting, diarrhea, high fever, delirium and death. Ingestion is not likely to be a primary route of exposure.

Delayed Effects: None known.

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

Thermal Exposure: Not applicable.

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

SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media: Alcohol foam Carbon dioxide Dry chemical Use water to cool and dilute from as far a distance as possible.

5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion: Toxic fumes may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide).

Potential for Dust Explosion: Not applicable.

Special Flammability Hazards: Severe explosion hazard in the form of vapor (within flammability limits) when exposed to heat,

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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.

Flammability Classification (OSHA): Flammable Liquid - Class I B

NFPA Rating

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: 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

Containment Techniques and Clean-up Procedures: 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.

Special Reporting Requirements: Notify appropriate authorities if required by regulation. See Section 15 for additional information.

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: Not applicable.

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.

Special Handling Equipment: Not applicable.

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7.2. Conditions for safe storage, including any incompatibilities

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.
Dangerous Incompatibility Reactions:	Avoid contact with 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

Exposure Limits (United States): OSHA PEL: 5 ppm TWA; 15 mg/m3 TWA ACGIH TLV: 5 ppm TWA

8.2. Exposure controls

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

Personal Protective Equipment:	Use NIOSH approved chemical cartridge-respirator or supplied air breathing equipment. Chemical goggles should be worn at all times; use face shields as conditions warrant. Neoprene, nitrile or PVC-coated gloves. Impervious clothing and boots.
Respirator Caution:	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Ventilation:	All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.
Other Engineering Controls:	All appropriate engineering controls should be used to minimize exposure potential. Use exhaust ventilation to keep airborne concentrations below exposure limits. NIOSH has established an Immediately Dangerous to Life and Health (IDLH) level of 1000 ppm for pyridine.
Thermal Hazards:	Not applicable.
Additive or Synergistic Effects:	None known.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	Colorless to yellow liquid with a strong, unpleasant fish-like odor.		
Molecular Formula:	C5H5N	Molecular Weight:	79.10
Vapor Pressure:	20.00 mm Hg @ 25°C	Evaporation Rate:	Not determined
Specific Gravity or Density:	0.982	Vapor Density (air = 1):	2.72
Boiling Point:	115.2 °C	Freezing / Melting Point:	-41.6 °C
Solubility in Water:	miscible	Octanol / Water Coefficient:	0.64

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pH:	pKa = 5.2	Odor Threshold:	< 1 ppm (NOTE: Olfactory fatigue may occur; therefore, odor is an unreliable guide to concentration.)
Viscosity:	Not available	Autoignition Temperature:	900°F
Flash Point and Method:	66°F (19°C) (Tag Closed Cup)	Flammable Limits:	1.8 (LEL) – 12.4% (UEL)

9.2. Other information

Not applicable.

SECTION 10: Stability and reactivity

10.1. Reactivity	Not classified as dangerously reactive.
10.2. Chemical stability	Stable
10.3. Possibility of hazardous reactions	Will not occur.
10.4. Conditions to avoid	Uncontrolled exposure to high temperatures. Static discharge or any ignition source
10.5. Incompatible materials	Avoid contact with strong acids and oxidizing agents.
10.6. Hazardous decomposition products	Toxic fumes may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD_{50}:	Oral LD50 (rat) = 891 mg/kg
Acute Dermal LD_{50}:	Dermal LD50 (rabbit) = 1000 - 2000 mg/kg
Acute Inhalation LC_{50}:	Inhalation LC50 (1h) (rat) = 9010 - 9020 ppm Inhalation LC50 (4h) (rat) = 4900 - 6000 ppm Inhalation LC50 (4h) (rat) < 4000 ppm
Skin / Eye Irritation:	Moderately to severely irritating to skin. Severely irritating to eyes.
Sensitization:	No data available.
Target Organs:	Several repeated dose toxicity tests have been performed in mice and rats, both as gavage and drinking water studies. Most tests showed evidence of adverse liver effects after subchronic/chronic oral exposures; there were isolated reports of kidney, cardiac, blood and reproductive effects, but these endpoints were not as reproducibly observed as liver effects. NOAEL levels ranged from 1 to 15 mg/kg/day in gavage and drinking water studies conducted from 13 weeks to 2 years in duration. A single subchronic inhalation study showed development of olfactory lesions in rats exposed to levels exceeding regulatory exposure limits over a 4-day period.
Carcinogenicity:	In a two-year drinking water study in mice, pyridine was reported to increase the incidence of hepatocellular carcinomas and hepatoblastomas. In male Fischer 344 rats, pyridine was reported to increase the incidence of renal tubule adenomas, but this was not observed in male Wistar rats. (NOTE:

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	These studies were audited for data quality and several major concerns have been noted. Tumor incidence rates in control rats reached 76 to 84%. There is also evidence that normal metabolic pathways were saturated, leading to results of questionable biological significance.) No increase in tumor incidence at any site was observed in rats following subcutaneous injection of pyridine for one year. Two studies conducted with genetically modified mice showed no treatment-related increase in tumors. No scientific study supports an association between pyridine and cancer in humans. IARC recently reviewed all of the available carcinogenicity data and concluded that pyridine is not classifiable as to its carcinogenicity in humans (Group 3). Pyridine has NOT been listed in the NTP's Report on Carcinogens.
Teratogenicity/ Reproduction:	Mixed results have been noted in repeated dose studies where reproductive organs were evaluated. Some studies have noted decreased sperm motility, testicular adenomas and longer estrous cycles in mice and rats upon chronic oral overexposures, while other similar studies have shown no adverse effects to the reproductive system at all. One repeated dose study reported a statistically significant reduction in litter size. Reproductive toxicity NOAEL's range from 33 to 190 mg/kg/day in gavage and drinking water studies ranging from 13 weeks to 2 years in duration. No data available.
Neurotoxicity:	No data available.
Mutagenicity:	Genotoxic activity was absent (i.e., DNA lesions were not induced and mutagenic activity was not induced) when tested using the following tests: DNA single-strand breaks measurement in V79 cells, HGPRT gene mutation assay in V79 cells, and Salmonella/microsome test. The only exception was a positive response in one of nine Ames assays which was conducted using a single, unusual strain of Salmonella. Pyridine's lack of mutagenic effect is supported by a number of in vivo mutagenicity assays, such as chromosomal aberration, mouse micronucleus, unscheduled DNA synthesis, and sex-linked recessive lethal mutation assays.
Additional Toxicity Information:	The information above is a summary of the available information on pyridine. More detailed information can be obtained upon request from Vertellus Specialties, Inc.

SECTION 12: Ecological information

12.1. Toxicity	Aquatic LC50 (96h) Pimephales promelas (fathead minnow) = 93.8 - 106 mg/L Aquatic LC50 (48h) Daphnia = 1130 - 1755 mg/L
12.2. Persistence and degradability	Multiple tests have shown rapid biodegradation of pyridine in soil and water in acclimated aerobic systems. Degradation under anaerobic conditions may be slow. Based on environmental modeling, this material is not expected to be persistent in the environment, is not expected to bioaccumulate, and is not expected to be chronically toxic to fish.
12.3. Bioaccumulative potential	No data
12.4. Mobility in soil	No data
12.5. Results of PBT and vPvB assessment	Not available.
12.6. Other adverse effects	Environmental modeling predicts that this material will not present a significant toxicity risk to aquatic life. Not available.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

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US EPA Waste Number:	U196 D038 D001
Waste Classification: (per US regulations)	Ignitable. The waste may be a characteristic hazardous waste. NOTE: Generator is responsible for proper waste characterization. State (USA) hazardous waste regulations may differ substantially from federal (USA) regulations.
Waste Disposal:	Dispose of this material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

14.1. UN number	UN1282
14.2. UN proper shipping name	Pyridine
14.3. Transport hazard class(es)	3
14.4. Packing group	PG II
14.5. Environmental hazards	Not applicable
14.6. Special precautions for user	Not available.
NA Emergency Guidebook Numbers: 129	IMDG EMS: S-D 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

OSHA Hazards:	Irritant. Flammable Liquid.
WHMIS Classification:	Class B, Division 2: Flammable Liquid. Class D, Division 2, Subdivision B: Irritant.
Chemical Inventory Lists:	Status
TSCA:	Present
EINECS:	203-809-9
Canada(DSL/NDSL):	DSL
Japan:	(5)-710
Korea:	KE-29929
Australia:	Present
New Zealand:	Present
China:	Present
Philippines:	Present

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Switzerland:	G-2819
New Zealand GHS Classification:	3.1B, 6.1D dermal, 6.1D inhalation, 6.1D oral, 6.3A, 6.7B, 6.9B inhalation, 6.9B oral, 8.3A, 9.1C algal, 9.1C fish, 9.3C (Approval number: HSR001079)
Japan GHS Classification:	Flammable liquids - Category 2: H225 Highly flammable liquid and vapour; Acute toxicity - Oral - Category 4: H302 Harmful if swallowed; Acute toxicity - Dermal - Category 3: H311 Toxic in contact with skin; Acute toxicity - Inhalation - Vapour - Category 4: H332 Harmful if inhaled; Skin corrosion/irritation - Category 1: H314 Causes severe skin burns and eye damage; Serious eye damage/eye Irritation - Category 1: H318 Causes serious eye damage; Carcinogenicity - Category 2: H351 Suspected of causing cancer; Toxic to reproduction - Category 2: H361 Suspected of damaging fertility or the unborn child; Specific target organ toxicity - Single exposure - Category 1: H370 Causes damage to organs (nervous system, respiratory system); Specific target organ toxicity - Single exposure - Category 3: H336 May cause drowsiness or dizziness; Specific target organ toxicity - Repeated exposure - Category 1: H372 Causes damage to organs through prolonged or repeated exposure (kidneys, liver, nervous system); Specific target organ toxicity - Repeated exposure - Category 2: H373 May cause damage to organs through prolonged or repeated exposure (circulatory system); Hazardous to aquatic environment - acute hazard - Category 1: H400 Very toxic to aquatic life
Korea (MOL) GHS Classification:	Flammable liquids - Category 2: H225 Highly flammable liquid and vapour; Acute toxicity - Oral - Category 4: H302 Harmful if swallowed; Acute toxicity - Dermal - Category 3: H311 Toxic in contact with skin; Acute toxicity - Inhalation - Vapour - Category 4: H332 Harmful if inhaled; Skin corrosion/irritation - Category 1: H314 Causes severe skin burns and eye damage; Serious eye damage/eye Irritation - Category 1: H318 Causes serious eye damage; Carcinogenicity - Category 2: H351 Suspected of causing cancer; Reproductive Toxicity - Category 2: H361 Suspected of damaging fertility or the unborn child; Specific target organ toxicity - Single exposure - Category 1: H370 Causes damage to organs; Specific target organ toxicity - Single exposure - Category 3: H336 May cause drowsiness or dizziness; Specific target organ toxicity - Repeated exposure - Category 1: H372 Causes damage to organs through prolonged or repeated exposure; Hazardous to aquatic environment - acute hazard - Category 1: H400 Very toxic to aquatic life
Australia GHS Classification:	Not classified by this country.
Taiwan GHS Classification:	Flammable liquids - Category 2: H225 Highly flammable liquid and vapour; Acute toxicity - Oral - Category 4: H302 Harmful if swallowed; Skin corrosion/irritation - Category 2: H315 Causes skin irritation; Serious eye damage/eye Irritation - Category 1: H318 Causes serious eye damage; Specific target organ toxicity - Repeated exposure - Category 2: H373 May cause damage to organs through prolonged or repeated exposure; Hazardous to aquatic environment - acute hazard - Category 3: H402 Harmful to aquatic life
SARA 313:	Pyridine is listed on the US EPA's SARA 313 list.
Reportable Quantities:	1000 lbs. (121.5 gallons)
State Regulations:	Pyridine is listed on California's Proposition 65 list, requiring this warning: This chemical is known to the State of California to cause cancer. However, this listing was made based on an automatic regulatory listing, triggered solely by the publication of an NTP Technical Report. California did not undertake any risk analysis of pyridine, nor evaluate data quality of the report, before listing pyridine on Prop 65. As mentioned earlier in the Carcinogenicity section (Section 11), significant concerns have been raised

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regarding the relevance of the results of this study. Please contact Vertellus Agriculture & Nutrition Specialties LLC. for further information regarding our concerns with the NTP Technical Report and the California listing process.
This product contains chemicals listed on the Massachusetts Substance List for Right-to-Know Law.
This product contains chemicals listed on the Minnesota Hazardous Substances List.
This product contains chemicals listed on the New Jersey Department of Health Hazard Right-to-Know Program Hazardous Substance List.
This product contains chemicals listed on the New York State List of Hazardous Substances.
This product contains chemicals listed on the Pennsylvania Department of Labor and Industry Hazardous Substance List.
This product contains chemicals listed on the Rhode Island Hazardous Substance List.

Other Regulatory Listings: This material is listed as a Volatile Organic Compound (VOC) by U.S. EPA; see 40 CFR 60.

15.2. Chemical safety assessment

A chemical safety assessment has been prepared for this product.

SECTION 16: Other information

Full text of R phrases in Section 3: R20/21/22: Harmful by inhalation, in contact with skin and if swallowed.
R11: Highly Flammable.

Legend of abbreviations:
ACGIH = American Conference on Governmental Industrial Hygienists.
CAS = Chemical Abstracts Service.
CERCLA = Comprehensive Environmental, Response, Compensation and Liability Act (1990).
CFR = Code of Federal Regulations.
DSL/NDSL = Domestic Substances List/Non-Domestic Substances List.
EC = European Community.
EEC = European Economic Community.
EINECS = European Inventory of Existing Commercial chemical Substances.
ELINCS = European List of Notified Chemical Substances.
EU = European Union.
GHS = Globally Harmonized System.
LC = Lethal concentration.
LD = Lethal dose.
MOL = Ministry of Labor.
NEMA = National Emergency Management Agency.
NFPA = National Fire Protection Association.
NIOSH = National Institute of Occupational Safety and Health.
NTP = National Toxicological Program.
OSHA = Occupational Safely and Health Administration
PEL = Permissible exposure limit.
RQ = Reportable quantity.
SARA = Superfund Amendments and Reauthorization Act of 1986.
TLV = Threshold limit value.

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WHMIS = Workplace Hazardous Materials Information System.

Precautionary Statement: 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.

Revision Date:	5 November 2010	Original Date of Issue:	28 March 1985
Issued By:	Regulatory Management Department		
Revision Details:	Revised in all sections to GHS format.		

eSDS Annex

Pyridine - Summary of Uses

ES Number	Name	SU	ERC	PROC	PC	Highest Site Tonnage (tpa)
1	Manufacture of Substances	3/8,9	1	1, 2, 3, 4, 8a, 8b, 9, 15	19, 20, 21, 27, 29	216
2	Formulation of preparations	3/10	2	1, 2, 3, 4, 5, 8a, 8b, 9, 15	20, 21	216
3	Use as processing aid	3/9	4	1, 2, 3, 4, 8a, 8b, 9, 15	19, 20, 21, 27, 29	216
4	Use as intermediate	3/1	6a	1, 2, 3, 4, 8a, 8b, 9, 15	19	216
5	Use in laboratory	22/24	6b	9, 15	21	216
6	Use in closed systems	3/9	7	2, 3, 8b, 9	19, 20, 21	10

Pyridine Exposure Scenario

Title: Use in Chemical Synthesis, Formulation and Analytical Laboratories.

Exposure scenario covering the following activities:

Main Sector of Use Group

- **SU3:Industrial uses: Uses of substances as such or in preparations at industrial sites**

  Sector of end use

  - SU1: Agriculture, forestry, fishery
  - SU8: Manufacture of bulk, large scale chemicals
  - SU9: Manufacture of fine chemicals
  - SU10: Formulation [mixing] of preparations and/or re-packaging (excluding alloys)
- **SU22:** Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process categories:

- PROC 1: Use in closed process, no likelihood of exposure
- PROC 2: Use in closed, continuous process with occasional controlled exposure
- PROC 3: Use in closed batch process (synthesis or formulation)
- PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises
- PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
- PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities
- PROC 8b:-Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities
- PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
- PROC 15 Use in quality control

Product Category

- PC19: Intermediate
- PC20: Products such as ph-regulators, flocculants, precipitants, neutralization agents
- PC21: Laboratory chemicals
- PC27: Plant protection products
- PC29: Pharmaceuticals

Environmental Release category

- ERC1: Manufacture of substances
- ERC 2: Formulation of preparations
- ERC 4: Use of processing aids in processes and products, not becoming part of articles
- ERC 6a: Use resulting in manufacture of another substance (use of intermediates)
- ERC 6b: Use of reactive processing aids. Used as a laboratory reagent.
- ERC 7: Use of substances in closed systems

Processes, tasks, activities covered: See Tables ,5

Assessment Method: ECETOC TRA v2 supplemented for RMM

2. Control of worker exposure

Product characteristic

- The concentration ranges from <1% to 100%.
- The material exists only in the liquid form.

Amounts used

- Not relevant for human health risk assessment.

Frequency and duration of use/exposure

- Worker exposure is assumed to be up to 8 hours per day / 5 days per week

Human factors not influenced by risk management

- Head not covered by PPE

Other given operational conditions affecting workers exposure

- The work is performed indoors with local exhaust ventilation
- Keep away from heat, sparks and flame.
- Electrically ground all handling equipment

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

- Use Carbon dioxide, dry chemical, alcohol foam, water mist or fog as Extinguishing media
- Protect against physical damage.
- Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute.
- Keep away from heat as toxic fumes may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide)
- Outside or detached storage is preferred. Inside storage should be in standard flammable liquids storage room or cabinet.
- Containers to be bonded and grounded for transfers to avoid static sparks.
- Use non-sparking type tools and equipment

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

- Local exhaust ventilation systems. Not required for PROC 1. 2 and 3 based on ECETOC TRA assessment.
- Ensure that eyewash and safety showers are close to the work station.
- Use non-sparking tools and equipment.
- Store in cool dry and ventilated place away from heat, flame and sparks.
- Keep away from heat as toxic fumes may be released upon thermal decomposition.
- Protect against electrostatic charge, high temperature and incompatible substances (acids and oxidizing agents)
- Must have emergency showers and eyewash fountains
- Keep container closed.
- Keep away from heat, sparks and flame (thermal decomposition may form cyanides, nitrogen oxides, carbon monoxide).
- Electrically ground all handling equipment
- Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.
- Store in an area designed for storage of flammable liquids.

- Emptied containers should be handled in the same manner as when they were full

Organisational measures to prevent /limit releases, dispersion and exposure

- Substance specific training including proper selection and use of personal protective equipment
- Do not breathe vapors. Avoid contact with skin, eyes and mucous membranes.
- Wash thoroughly after handling
- Store in cool dry and ventilated place away from heat, flame and sparks.
- Keep container closed.
- Store in an area designed for storage of flammable liquids.
- Emptied containers should be handled in the same manner as when they were full
- 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 (e.g.: suction) for later disposal. After collection of material, flush area with water.

Conditions and measures related to personal protection, hygiene and health evaluation

- Personal protection should be worn.
- Practice good personal hygiene after using this material such as washing hands thoroughly before eating or smoking after handling this substance.
- Safety glasses/goggles/Face Shield
- NIOSH approved chemical cartridge-respirator or supplied air breathing equipment with at least 90% efficiency, except for PROC 15.
- Protective clothing with long sleeves and boots
- Impervious gloves such as Neoprene, Nitrile or PVC-coated gloves.
- Personal protective equipment must be worn when working with the substance.
- Practice good personal hygiene after using this material such as washing hands thoroughly before eating or smoking after handling this substance.

3. Control of Environmental exposure

Product characteristics

- The substance is a liquid.

Amounts used

- The amounts used in specific situations should be below or equal to the M-Safe figures (Table 5) for the respective ERCs. If local emission fractions differ from those of the respective ERC, M-Safe can be re-calculated (see Table 5 footnote).

Frequency and duration of use

- Continuous and Intermittent release possible (Table 5). Release on an intermittent basis requires higher efficiencies.

Environment factors not influenced by risk management

- Default values of 18,000 m3/d for receiving waters are assumed

Other given operational conditions affecting environmental exposure

- ECETOC TRA default release rate used in assessment (see Table 5)
- Indoors, with local exhaust ventilation.
- Protect from temperature extremes and sunlight
- Protect against ; static discharge or any ignition source
- Production is in closed and open systems.
- Do not discharge in to drains

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

- Store in a cool, dry well-ventilated location
- Keep away from heat sources; Static discharge or any ignition source
- Separate from incompatibles such as acids and oxidizing agents
- Protect containers against physical damage.
- Isolation of drainage to prevent drainage to soil
- Use appropriate container to avoid environmental contamination
- Impervious secondary containment to be greater than the largest vessel
- Use Alcohol foam Carbon dioxide Dry chemical as Extinguishing media Use water to cool and dilute from as far a distance as possible

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

Water

- Onsite Waste Water Treatment Plant where needed as shown in Table 5 was used prior to discharge to STP.
- Compliance with local water discharge regulations

Air

- Onsite collection of air emissions and treatment where needed as shown in Table 5.
- 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

- Do not allow to directly enter sewer system, the ground, drains or into any body of water.
- Dispose of this material and its container at hazardous or special waste collection point.
- Observe all regional, state and local environmental regulations
- 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 (e.g., suction) for later disposal. After collection of material, flush area with water.

Conditions and measures related to municipal sewage treatment plant disposal

- The default STP value of 2000 m3/d was used.
- The STP efficiency is 76%

Conditions and measures related to external treatment of waste for disposal

- Onsite WWTP sludge sent offsite for disposal (see Table 5; (EU waste code 06 05 02)
- Empty raw material packaging containers (EU waste code: 15 01 10)
- Residual in shipping containers assumed to be <0.1%
- Clean/dispose packaging container at approved facility
- Do not empty into drains, dispose of this material and its container at hazardous or special waste collection point
- 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

4. Exposure estimation and reference to its source

The human health risk assessment and the environmental risk assessment were performed using ECETOC TRA v2.0.

5. Guidance to DU - Operational conditions and Risk Management Measures

Worker

The following activities result in an acceptable exposure if individually performed by an industrial/professional worker, and considering the operational conditions and the risk management measures (Tables 1, 2, 3).

Table 1. Worker – Operational Conditions used in Assessment

PROC	**Frequency and Duration of work (hours)**	**LEV Efficiency (%)**	**Respirator Efficiency (%)**	**Gloves**
PROC 1: Use in closed process, no likelihood of exposure, Industrial setting	Daily, > 4	90	90	Chemically resistant gloves (Level B)
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. sampling), Industrial setting	Daily, > 4	90	90	Chemically resistant gloves (Level B)
PROC 3: Use in closed batch process (synthesis or formulation), Industrial setting	Daily, > 4	90	90	Chemically resistant gloves (Level B)
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises	Daily, > 4	90	90	Chemically resistant gloves with basic training (Level C)
PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	Daily, > 4	90	90	Chemically resistant gloves (Level B)
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	Daily, > 4	90	90	Chemically resistant gloves (Level B)

PROC 8b:-Transfer of chemicals from/to vessels/ large containers at dedicated facilities	Daily, > 4	90	90	Chemically resistant gloves with basic training (Level C)
PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	Daily, > 4	90	90	Chemically resistant gloves with basic training (Level C)
PROC 15: Use a laboratory reagent, Non-industrial setting	Daily, > 4	90	NA*	Chemically resistant gloves (Level B)

***Not Applicable**

Table 2. Worker DNELs

	DNEL
Chronic systemic oral/dermal	0.14 mg/kg bw/d
Chronic systemic Inhalation	7.6 mg/m^3

Table 3. Worker – Risk Characterization Ratio (RCR)

PROC	**Inhalation-RCR**	**Dermal-RCR**	**Inhalation + Dermal-RCR**
PROC 1: Use in closed process, no likelihood of exposure, Industrial setting	0.0004	0.05	0.05
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. sampling), Industrial setting	0.04	0.20	0.24
PROC 3: Use in closed batch process (synthesis or formulation), Industrial setting	0.11	0.05	0.16
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises	0.09	0.49	0.58
PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	0.22	0.10	0.32
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities	0.21	0.20	0.41

PROC 8b:-Transfer of chemicals from/to vessels/ large containers at dedicated facilities	0.06	0.49	0.56
PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0.22	0.49	0.71
PROC 15: Use a laboratory reagent, Non-industrial setting	0.43	0.05	0.48

Environment

The following activities result in a controlled exposure to the environment taking in to consideration the operational conditions and the risk management measures provided in this exposure scenario. Daily use of the substance is driven by the ability to control water and air discharge (see Tables 5).

Table 4. Environment PNECs

Media	**PNEC**
Freshwater Aquatic	0.3 mg/L
Marine water Aquatic	0.03 mg/L
Aquatic Intermittent	3 mg/L
Freshwater Sediment	3.2 mg/kg dw
Marine water Sediment	0.32 mg/kg dw
Soil:	4.6 mg/kg dw

Table 5. M-Safe results of ERCs with operational conditions*

ES No	ERC	Release Days/year	STP**	Default Release to air [%]	Default Release to water from process [%]	Air Scrubber Efficiency (%)	WWTP***Efficiency - Continuous release (%)	WWTP***Efficiency- Intermittent release (%)	Continuous release to water (kg/day)	Intermittent release to water (kg/day)	M-Safe (kg/day)****
1	ERC 1 - Manufacture of substances	350	Yes	5	6	NA	85	90	5.5	3.70	4236
2	ERC 2 - Formulation of preparations	350	Yes	2.5	2	NA	60	75	4.94	3.09	319443
3	ERC 4 - Industrial use of processing aids not becoming part of articles	350	Yes	100	100	95	99.5	99.5	3.09	3.09	5042
4	ERC 6a - Industrial use resulting in manufacture of another substance (use of intermediates)	350	Yes	5	2	NA	60	75	4.94	3.09	5089
5	ERC 6b – Laboratory	260	No	0.1	5	NA	NA	NA	1.43	1.43	170767

	use of reactive processing aids										
6	ERC 7 - Industrial use of substances in closed systems	350	No	5	5	NA	NA	NA	0	0	119

*No release to Soil

** STP effluent discharge = 2000 m3/day; Flow rate of effluent receiving river = 18000 m3/day

***Onsite **W**aste **W**ater **T**reatment **P**lant

****M-Safe describes the amount of substance that can be daily used under the conditions displayed

Table 6. Environment – RCR

	ERC 1	ERC 2	ERC 4	ERC 6a	ERC 6b	ERC 7
STP	0.22	0.00	0.18	0.18	No STP	No STP
Local fresh water	0.15	0.002	0.12	0.12	0.01	0.24
Local fresh water Sediment	0.06	0.001	0.05	0.05	0.003	0.10
Local Terrestrial environment	0.01	0.01	0.004	0.01	0.000	0.003
Local Marine water	0.62	0.002	0.52	0.52	0.01	0.24
Marine Sediment	0.26	0.001	0.21	0.21	0.003	0.10

Risk Assessment

The ECETOC TRA tool can be used for calculating the exposure to and risks from site specific conditions. Control of the use of the substance is demonstrated by application of the RMM mentioned above.