

SAFETY DATA SHEET

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

1.1. Product identifier

EASY-FLO* DMAP

Synonyms:

DMAP; N,N-Dimethyl-4-aminopyridine; EASY-FLO* DMAP; 4-DMAP; Pyridine, 4-dimethylamino-

Chemical Abstracts Registry No:

1122-58-3

REACH Registration Number:

01-2120115012-81-0000

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

catalyst

1.3. Details of the supplier of the safety data sheet

Vertellus Integrated Pyridines 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
Phone: +44 1642 546 546

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)

Skin Irritation Category 2
Serious Eye Damage Category 1
Acute Toxicity Oral Category 3
Acute Toxicity Dermal Category 2
Acute Toxicity Inhalation Dust / Mist Category 3
Specific Target Organ Systemic Toxicity Single Exposure Category 1
Environmental Chronic Category 2

2.2. Label elements

Hazard Symbols (Pictogram):



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Signal Word:	Danger
Hazard Precautions:	H315 - Causes skin irritation. H318 - Causes serious eye damage. H301 - Toxic if swallowed. H310 - Fatal in contact with skin. H331 - Toxic if inhaled. H370 - Causes damage to organs (central nervous system). H411 - Toxic to aquatic life with long lasting effects.
Prevention Precautionary Statements:	P260 - Do not breathe dust/fume/gas/mist/vapours/spray. P261 - Avoid breathing dust/fume/gas/mist/vapours/spray. P262 - Do not get in eyes, on skin, or on clothing. P264 - Wash hands thoroughly after handling. P270 - Do not eat, drink or smoke when using this product. P271 - Use only outdoors or in a well-ventilated area. P273 - Avoid release to the environment. P280 - Wear protective gloves/protective clothing/eye protection/face protection.
First Aid Precautionary Statements:	P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302+P352 - IF ON SKIN: Wash with plenty of soap and water. P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P307 + P311: IF exposed: Call a POISON CENTER or doctor/physician. P310 - Immediately call a POISON CENTER or doctor/physician. P362 - Take off contaminated clothing and wash before reuse. P391 - Collect spillage.
Storage Precautionary Statements:	P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
Disposal Precautionary Statements:	P501 - Dispose of contents/container in accordance with local/regional/national/international regulation for hazardous wastes.

2.3. Other hazards

Other Hazards: WARNING! POWDERED DMAP MAY FORM COMBUSTIBLE DUST CONCENTRATIONS IN AIR (DURING PROCESSING). THE PASTILLE ("PRILL") FORM PRESENTS A SIGNIFICANTLY LOWER EXPLOSION HAZARD.

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)
4-Dimethylaminopyridine	1122-58-3	~ 100	214-353-5	Not listed.	Skin Irrit. 2; H315 Eye Dam. 1; H318 Acute Tox. 3; H301 Acute Tox. 2; H310 Acute Tox. 3; H331 STOT SE 1; H370 Aquatic Chronic 2; H411

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

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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. 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.
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 swallowed, contact physician or poison control center immediately. Give oxygen if respiration is shallow. GET MEDICAL ATTENTION. Do not give anything by mouth to an unconscious person. Due to this material's potential toxicity, it is essential to get medical attention as quickly as possible.

4.2 Most important symptoms and effects, both acute and delayed

Acute:	DMAP is irritating to the respiratory tract and severely irritating to the eyes and eyelids. Absorption can occur from the gastrointestinal tract, the skin and the respiratory tract. Although data on inhalation toxicity are unavailable, it may be assumed that this material is toxic via inhalation. Symptoms of overexposure may include headache, nausea, disorientation, weakness and convulsions. DMAP is HIGHLY TOXIC via the dermal route. Extended contact with this material could be fatal. More than ordinary care should be used to prevent skin and eye contact. This material is considered to be toxic via the oral route.
Delayed Effects:	This material is readily absorbed from the gastrointestinal tract, the skin and the respiratory tract. Extended contact with this material could result in severe health effects or death.

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

Note to Physician:	This material is highly toxic via dermal exposure and is readily absorbed through the skin. Rapid, complete decontamination of the patient is critical (material is slightly water-soluble). No specific antidote known. 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, Foam, Carbon dioxide, Dry chemical
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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:	4-Dimethylaminopyridine (DMAP) prills (pastilles) were tested for dust explosion characteristics and the following results were obtained: <ul style="list-style-type: none">- minimum ignition energy: > 500 mJ- Minimum ignition temperature of dust cloud: 640-600°C 4-Dimethylaminopyridine (DMAP) crystalline was tested for dust explosion characteristics and the following results were obtained: <ul style="list-style-type: none">- minimum ignition energy: 3-5 mJ- Minimum ignition temperature of dust cloud: 500-520°C

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Follow good engineering practice, such as NFPA 69 and NFPA 77, for the design, construction and operation of solids handling equipment, and for protection against static electricity. The crystalline or powder form exhibits a significantly HIGHER dust explosion hazard than the "prill" or pastille form. Refer to NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids, for safe handling. Refer to European standards: EN1127-1, EN14491, EN14797, EN14373, and EN15089 for safe handling of and controlling explosive atmospheres in the workplace.

Special Flammability Hazards: This product is an organic solid. As such, in its finely divided form, this product has the potential to present a dust explosion hazard under certain conditions. Please review the dust explosion data enclosed in this section. Handle this product in a manner that prevents dust generation and accumulation, and refer to National Fire Protection Association (NFPA) Standard 654 for further information on prevention of dust explosions.

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 must be avoided due to high toxicity. 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. Avoid dust generation during clean-up. Ensure thorough decontamination of the release area and clean-up personnel.

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. Material can then be collected 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. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Nonsparking tools should be used.

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

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Precautions for Unique Hazards: This material may present a dust explosion hazard in solid form and is sensitive to ignition by electrostatic discharge. Maintain areas below flammable vapor / explosive dust concentrations.

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

Storage Precautions & Recommendations: Protect containers against physical damage. Outside or detached storage is preferable. Keep away from strong acids and oxidizing agents. Should be periodically inspected. Recommended storage temperature not to exceed 75°F (24°C) to maintain product flowability. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Dry powders can build static electricity charges when subjected to friction of transfer and mixing operations. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres.

Dangerous Incompatibility Reactions: Avoid contact with strong acids and oxidizing agents.

Incompatibilities with Materials of Construction: None known

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
None established. Recommended Exposure Limit (based on structurally similar substance, 2-Aminopyridine)	0.5 ppm (2 mg/m ³) as 8-hour time-weighted average; 2 ppm (8 mg/m ³) as 15-minute short-term exposure limit

Air Monitoring Method: Gravimetric analysis for total particulate and respirable fraction (<10 microns).

Derived No Effect Levels (DNELs) – Workers:

Route	DNEL
Long-term - systemic effects (inhalation)	0.05 mg/m ³
Acute - systemic effects (inhalation)	0.1 mg/m ³
Acute and long-term - local effects (dermal, inhalation)	Medium hazard (no threshold derived) 0.01 mg/kg bw/day
Long-term - systemic effects (dermal)	High hazard (no threshold derived)
Acute - local effects (eyes)	High hazard (no threshold derived).
Acute - systemic effects (dermal)	

Derived No Effect Levels (DNELs) – General Population:

Route	DNEL

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No consumer uses.

Predicted No Effect Concentrations (PNECs):

Route	PNEC
PNEC aqua (freshwater)	0.004 mg/L
PNEC aqua (marine water)	0.0004 mg/L
PNEC aqua (intermittent releases)	0.04 mg/L
PNEC sediment (freshwater)	0.038 mg/kg sediment dry weight
PNEC sediment (marine water)	0.0038 mg/kg sediment dry weight
PNEC aqua (STP)	50 mg/L
PNEC soil	0.0036 mg/kg soil dry weight
PNEC oral (wildlife exposures)	No potential for bioaccumulation

8.2. Exposure controls

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

Other Engineering Controls:	All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).
Personal Protective Equipment:	For handling small quantities outside a laboratory setting: NIOSH-approved full-face chemical cartridge respirator with organic vapor cartridges and HEPA filters; impervious gloves (nitrile or neoprene), poly-coated Tyvek [®] coveralls, rubber boots, and face shield as necessary. For handling large quantities: supplied air breathing equipment; impervious gloves (nitrile or neoprene), Saranex [®] coveralls, rubber boots, and face shield as necessary. Laboratory handling should be done per prudent, safe laboratory practices, taking extra precautions to prevent inhalation or skin/eye contact.
Respirator Caution:	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Thermal Hazards:	Not applicable.
Environmental Exposure Controls:	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

Appearance, State & Odor (ambient temperature):	White solid prills with a musty, characteristic odor.		
Molecular Formula:	C7H10N2	Molecular Weight:	122.17
Vapor Pressure:	0.133 kPa @ 25°C	Evaporation Rate:	No data available
Specific Gravity or Density:	0.96 g/cm3	Vapor Density (air = 1):	No data available.
Boiling Point:	162 °C @ 50 mm Hg	Freezing / Melting Point:	112 °C

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Solubility in Water:	76 g/L @ 20°C	Octanol / Water Coefficient:	log Kow = 1.34
pH:	11.42 @ 22°C	Odor Threshold:	No data available.
Viscosity:	No data available.	Autoignition Temperature:	No autoignition observed
Flash Point and Method:	230°F (110°C) Tag Open Cup	Flammable Limits:	No data available. (LEL) – (UEL)
Flammability (solid, gas):	No data available.	Decomposition Temperature:	400 C @ 760 MMHG
Explosive Properties:	Not explosive.	Oxidizing Properties:	Not an oxidizer.

9.2. Other information

Not applicable.

SECTION 10: Stability and reactivity

<u>10.1. Reactivity</u>	Not classified as dangerously reactive.
<u>10.2. Chemical stability</u>	Stable
<u>10.3. Possibility of hazardous reactions</u>	Will not autopolymerize.
<u>10.4. Conditions to avoid</u>	Avoid static discharge and uncontrolled exposure to high temperatures.
<u>10.5. Incompatible materials</u>	Avoid contact with 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 ₅₀ :	Oral LD50 (rat) = 140 mg/kg Oral LD50 (rat) = 250 mg/kg Oral LD50 (rat) = 100 - 119 mg/kg	Key Study
Acute Dermal LD ₅₀ :	Dermal LD50 (rabbit) = 90 mg/kg Dermal LD50 (guinea pig) = 100 - 200 mg/kg Dermal LD50 (rabbit) = 167 - 250 mg/ kg Dermal LD50 (rabbit) = 50 - 200 mg/ kg	Key Study
Acute Inhalation LC ₅₀ :	No data available.	
Skin Irritation:	Irritating to the skin.	
Eye Irritation:	Corrosive to eyes.	
Skin Sensitization:	Not a sensitizer	
Mutagenicity:	This product was found to be non-mutagenic in various Ames assays, both with and without metabolic activation.	
Reproductive / Developmental Toxicity:	Validated QSAR models show DMAP is inactive for developmental toxic effects.	

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Carcinogenicity:	This material is not listed by IARC, NTP or OSHA as a carcinogen. No test data is available that indicates this material is a carcinogen.
Target Organs:	Central nervous system - DMAP and 4-Aminopyridine both stimulated the secretion of phosphatidylcholine from cultured rat type II pneumocytes in vitro. This is consistent with blockage of K ⁺ channels, which activates the secretory process through an increase in intracellular calcium ions.
Aspiration Hazard:	Based on physical properties, not likely to be an aspiration hazard.
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.
Most important symptoms and effects, both acute and delayed	DMAP is irritating to the respiratory tract and severely irritating to the eyes and eyelids. Absorption can occur from the gastrointestinal tract, the skin and the respiratory tract. Although data on inhalation toxicity are unavailable, it may be assumed that this material is toxic via inhalation. Symptoms of overexposure may include headache, nausea, disorientation, weakness and convulsions. DMAP is HIGHLY TOXIC via the dermal route. Extended contact with this material could be fatal. More than ordinary care should be used to prevent skin and eye contact. This material is considered to be toxic via the oral route. Delayed Effects: This material is readily absorbed from the gastrointestinal tract, the skin and the respiratory tract. Extended contact with this material could result in severe health effects or death.
Additive or Synergistic effects:	None known.

SECTION 12: Ecological information

<u>12.1. Toxicity</u>	Aquatic LC50 (48h) Daphnia > 100 mg/L Aquatic LC50 (96h) Brachydanio rerio (Zebra fish) = 11.6 mg/L Aquatic EC50 (72h) Pseudokirchneriella subcapitata (algae) = 4.22 mg/L NOEC (96-hr) Brachydanio rerio (Zebra fish) = 5 mg/L NOEC (72-hr) Pseudokirchneriella subcapitata (algae) = 0.4 mg/L	4-Dimethylaminopyridine
<u>12.2. Persistence and degradability</u>	Based on results from a ready biodegradability test, this material is expected to biodegrade very slowly (weeks to months).	
<u>12.3. Bioaccumulative potential</u>	Based on the log K _{ow} , bioconcentration is not expected to occur.	
<u>12.4. Mobility in soil</u>	Expected to be mobile in soil.	
<u>12.5. Results of PBT and vPvB assessment</u>	This substance is not a PBT or vPvB.	
<u>12.6. Other adverse effects</u>	No data available.	

SECTION 13: Disposal considerations

<u>13.1. Waste treatment methods</u>	
US EPA Waste Number:	Not applicable
Waste Classification: (per US regulations)	The waste may be classified as "special" or hazardous per State regulations.
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

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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	UN2811	14.2. UN proper shipping name	Toxic solid, organic, n.o.s. (4-Dimethylaminopyridine)
14.3. Transport hazard class(es)	6.1	14.4. Packing group	PG II
14.5. Environmental hazards	Marine Pollutant		
NA Emergency Guidebook Numbers:	154	IMDG EMS:	S-A; F-A
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code			Not applicable.

SECTION 15: Regulatory information

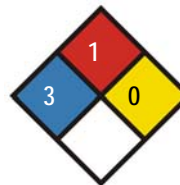
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Inventory Lists:	Status:		
USA TSCA:	Listed	EINECS:	Listed (214-353-5)
Canada(DSL/NDSL):	Listed (DSL)	Japan:	Listed ((5)-5479)
Korea:	Listed (KE-11197)	Australia:	Listed
China:	Listed	Philippines:	Listed
Taiwan:	Listed	New Zealand:	Listed
German Water Hazard Classification:	WGK 3 (<i>self-classification</i>)		
SARA 313:	Not listed. Not applicable.		
Reportable Quantities:	Not applicable.		

HMIS IV:

HEALTH	4
FLAMMABILITY	1
PHYSICAL HAZARD	0

NFPA:



15.2. Chemical safety assessment

A chemical safety assessment has been prepared for this product.

SECTION 16: Other information

Key Data Sources:	Unpublished toxicology reports owned by Vertellus.
Classification Method:	On basis of test data

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Weight of evidence
 Bridging principle - similar substance
 QSAR modeling

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.

GHS = Globally Harmonized System.

LC = Lethal Concentration.

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.

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: 19 May 2016 Original Date of Issue: 04 April 1985
 Issued by: Regulatory Management Department Email: SDS@Vertellus.com
 Revision Details: Revised all sections to REACH SDS format, including Section 1 information, Section 8 DNEL/PNEC information and SDS Annex.

Annex

N,N-Dimethyl 4-aminopyridine - Summary of Uses

ES Number	Name	ERC	PROC
ES1	Use at industrial site - Use as an intermediate in the manufacture of pharmaceuticals and fine chemicals	6a	1,3,8b,15
ES2	Use at industrial site-Industrial manufacture of bulk, large scale chemicals	6a	1,2,3,8b,15

Exposure Scenarios

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

ES1

Title: Use as an Intermediate in the manufacture of Pharmaceuticals and Fine Chemicals

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

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<ul style="list-style-type: none">• PROC 1: Use in closed process, no likelihood of release• PROC 3: Use in closed batch process (synthesis or formulation)• PROC 8b: Transfer of substance: dedicated facilities• PROC 15: Use as a laboratory reagent <p><u>Environmental Release Categories</u></p> <ul style="list-style-type: none">• ERC 6a: Use as an intermediate
<p>ES2</p> <p>Title: Industrial manufacture of bulk, large scale chemicals</p> <p><u>Main Sector of Use Group</u></p> <ul style="list-style-type: none">• SU3: Industrial uses: Uses of substances as such or in preparations-at industrial sites<ul style="list-style-type: none">○ SU8: Manufacture of bulk, large scale chemicals <p><u>Process Categories</u></p> <ul style="list-style-type: none">• PROC 1: Use in closed process, no likelihood of exposure• PROC 2: Use in closed continuous process, occasional controlled exposure• PROC 3: Use in closed batch process (synthesis or formulation)• PROC 8b: Transfer of substance dedicated facilities• PROC 15: Use as laboratory reagent <p><u>Environmental Release Categories</u></p> <ul style="list-style-type: none">• ERC 6a: Manufacture of bulk, large scale chemicals

Control of Worker Exposure

Product Characteristic

- Concentration: used as such
- Dustiness for solid: Low
- Physical Form: white solid prills

Amounts used

- Not relevant for human risk assessment

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Frequency and duration of use/exposure, PPE, Ventilation, local exhaust

ES	PRO C	Application	Local Exhaust %	Hours /Shift	Respirator	Gloves	Eye	Ventilation
1 W1	1	Use in closed process, no likelihood of exposure	no	8	no	90%	yes	Enhanced General (5-10 changes /hr)
W2	3	Use in closed batch process (synthesis or formulation)	90	1-4	no	90 %	yes	Enhanced General (5-10 changes /hr)
W3	8b	Transfer of substance : dedicated facilities	95	<1	no	95 %	yes	Enhanced General (5-10 changes /hr)
W4	15	Use as laboratory agent	no	< 1	95%	95 %	yes	General (1-3changes /hr)
W5	3	Use in closed batch process (synthesis	90	8	90	95	yes	Basic general ventilation(1-3 air changes per hour
2 W1	3	Use in closed batch process (synthesis or formulation	90	8	no	90 %	yes	Enhanced General (5-10 changes /hr)
W2	2	Used in closed continuous process, occasional controlled exposure	90	8	no	95 %	yes	Basic general ventilation(1-3 air changes per hour
W3	8	Transfer of substance : dedicated facilities	95	<1	no	95%	yes	Enhanced General (5-10 changes /hr)
W4	15	Use as Laboratory reagent	no	<1	95%	95%	yes	Basic general ventilation(1-3 air changes per hour
W5	1	Use in closed process, no likelihood of exposure	no	8	no	95%	yes	Enhanced General (5-10 changes /hr)

Other given operational conditions affecting workers exposure

- The work is performed indoors

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

- See Section 7 of SDSI

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

- See Section 7 and 8 of SDS
- See Ventilation comments above

Organisational measures to prevent /limit releases, dispersion and exposure: See SDS

- Covers non or low-dusty materials (prills).

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

- See sections 7, 8 and 10 of SDS
- Respirators: See Table above
- Wear chemically resistant gloves per Table above
- Use suitable eye protection

Control of Environmental Exposure

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Product characteristics

- The substance is a solid prill.

Frequency and duration of use

- Continuous and Intermittent release possible

ES	Emission days per year	Local Volume per day (kg)	STP Efficiency %	On site water treatment Efficiency %	Application sludge to soil
1	250	40	93.3	No	No
2	20	150	93.3	No	No

Environment factors not influenced by risk management

- Default values of 18,000 m³/d for receiving waters are assumed
- Discharge rate of STP: 2E3 m³/d

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

- The substance is an intermediate handled as a solid under strictly controlled conditions

Water / Air / Soil Release

ES	Air Release Fraction	Water Release Fraction	Soil Release Fraction	Local Release to air (kg/d)	Local release to sewage (kg/d)	Local Release to soil (kg/d)	Criteria
1	0	0.01	0	0	0.004	0	The substance is an intermediate handled under strictly controlled conditions. A modified water release rate of 0.01% represents a reasonable worst case.
2	0	0.01	0	0	0.015	0	

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

- Estimated substance removal from wastewater via STP: 93.3

Conditions and measures related to external treatment of waste for disposal

- See section 13 of the SDS
- Observe all regional, state and local environmental regulations
- Retain drain downs in sealed storage pending disposal

Conditions and measures related to external recovery of waste

- There is no recovery at an external waste treatment site

Exposure estimation and reference to its source

SAFETY DATA SHEET

The ECETOC Targeted Risk Assessment Tool (TRA) version 2.0 was used for the occupational exposure assessment. Details of the TRA may be found in the ECETOC Technical Report No. 93 (2004), and the accompanying Addendum Technical Report No. 107 (2009), or at <https://www.ecetoc-tra.org/>. The assessment of environmental exposure was carried out using EUSES v3.0. Documentation for EUSES 3.0 may be found at <http://ecb.jrc.ec.europa.eu/euses>.

The human health risk assessment and the environmental risk assessment were performed using Chesar with ECETOC TRA 3.0. 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

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 / Risk Characterization – Environmental

Compartment	Local PEC; Use 1	RCR*	Local PEC; Use 2	RCR*
Water: Fresh; mg/L	1.983E-4	0.05	7.431E-4	0.186
Water: Fresh Sediment; mg/kg	0.002	0.05	0.0007	0.188
Water: Marine; mg/L	1.983E-5	0.05	7.431E-5	0.186
Water; Marine Sediment; mg/kg	1.9902E-4	0.05	7.127E-4	0.188
Water: STP mg/L	0.002	< 0.01	0.0007	< 0.1
Soil: mg/kg	6.652E-9	<0.01	4.042E-4	0.112

*Risk Characterization Ratio

The default EUSES models show that, despite no risk for C_{local} , PEC_{local} can exceed the RCR at default settings, indicating that exposure estimates are governed by the Regional PEC ($PEC_{local} = C_{local} \cdot PEC_{regional}$).

Predicted Exposure Concentrations / Risk Characterization Ratio– Worker

Qualitative assessment was completed to demonstrate control considering alternate modes and the use of defined operational conditions and risk management measures for routes other than Systemic Inhalation Long-Term (LT), Systemic Inhalation Acute and Systemic Dermal LT.

ES	PROC	Application	Inhalation, Systemic LT mg/m ³	RCR	Inhalation, Systemic Acute, mg/m ³	RCR	Dermal, Systemic LT mg/kg bw/d	RCR
1 W1	1	Use in closed process, no likelihood of exposure	0.003	0.06	0.012	0.12	0.0003	0.34
W2	3	Use in closed batch process (synthesis or formulation)	0.003	0.06	0.012	0.12	0.007	0.69
W3	8b	Transfer of substance : dedicated	3E-4	<0.01	0.006	0.006	0.007	0.686

SAFETY DATA SHEET

		facilities						
W4	15	Use as Laboratory Agent	0.001	0.02	0.02	0.2	0.003	0.34
W5	3	Use in closed batch process (synthesis)	0.001	0.02	0.004	0.04	0.003	0.345
2 W1	3	Use in closed batch process (synthesis or formulation)	.003	0.06	0.012	0.12	0.007	0.69
W2	2	Used in closed continuous process, occasional controlled exposure	0.001	0.02	0.004	0.04	0.007	0.685
W3	8b	Transfer of substance: dedicated facilities	3E-4	<0.01	0.006	0.06	0.007	0.686
W4	15	Use as Laboratory Reagent	0.001	0.02	0.02	0.2	0.003	0.34
W5	1	Use in closed process, no likelihood of exposure	0.003	0.06	0.012	0.12	0.003	0.34

DMAP is irritating to the respiratory tract and severely irritating to the eyes and eyelids. Absorption can occur from the gastrointestinal tract, the skin and the respiratory tract. DMAP is toxic via the dermal, oral and, presumably, the inhalation route. Extended contact with this material could be fatal. More than ordinary care should be used to prevent skin and eye contact. Route(s) of Exposure: Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure. This material is readily absorbed from the gastrointestinal tract, the skin and the respiratory tract. Extended contact with this material could result in severe health effects or death.

The substance is an intermediate used under strict conditions of control. All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided. It is recommended that all dust control equipment such as local exhaust ventilation and material transport systems involved in handling of this product contain explosion relief vents or an explosion suppression system or an oxygen-deficient environment.

Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment).

All appropriate engineering controls should be used to minimize exposure potential. Use exhaust ventilation to keep airborne concentrations below exposure limits. Use only appropriately classified electrical equipment and powered industrial trucks.