



8210 N. Austin Avenue, Morton Grove, IL 60053-3205, U.S.A.  
 847-967-6000 800-323-8144  
 (Monday - Friday: 7:30 a.m. - 4:00 p.m. CST)

**Emergency Contact:**  
 INFOTRAC 800-535-5053 [U.S.A.]

Name: 4-Aminopyridine  
 Code: 1-002054-100

..... **SAFETY DATA SHEET** .....

**SECTION 1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY** .....

- 1.1 Product Identifier
  - Name 4-Aminopyridine
  - Code 1-002054-100
- 1.2 Use of Substance/Mixture
  - Use Active Pharmaceutical Ingredient
- 1.3 Details of Manufacturer/Supplier
  - Company Regis Technologies, Inc.  
 8210 N. Austin Avenue  
 Morton Grove, IL 60053  
 847-967-6000; 800-323-8144 (toll free)  
 Email: cservice@registech.com  
 www.registech.com
- 1.4 Emergency Telephone
  - INFOTRAC 800-535-5053 [U.S.A.]

**SECTION 2 HAZARDS IDENTIFICATION** .....

2.1 Classification of the Substance or Mixture

OSHA Hazards Toxic, Target Organ Effect  
 Target Organs Nerves, Seizures

Hazard Indication (67/548/EEC or 1999/45/EC)  
 Symbol(s) T+ Very toxic  
 R-Phrase(s) R28 Very toxic if swallowed.  
 R36/37/38 Irritating to eyes, respiratory system and skin

GHS Classification

Acute toxicity (oral)	Category 2	H300
Acute toxicity (dermal)	Category 3	H311
Skin Corrosion/Irritation	Category 2	H315
Serious Eye Damage/Eye Irritation	Category 2	H319
STOT-SE (single exposure)	Category 3	H335

GHS Label Elements  
 Pictograms or hazard symbols



GHS06

Signal Word Danger

Hazard Statement  
 H300 - Fatal if swallowed  
 H311 - Toxic in contact with skin  
 H315 - Causes skin irritation  
 H319 - Causes serious eye irritation  
 H335 - May cause respiratory irritation

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Precautionary Statements

- [Prevention] P260-Do not breathe dust or vapor.  
 P262-Do not get in eyes, on skin, or on clothing.
- [Response] P301+P310-IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.  
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- [Storage] P308+P313-IF exposed or concerned: Get medical advice/attention.  
 P402+P404-Store in a dry place. Store in a closed container.

NFPA: Health 3 Flammability 0 Reactivity 0  
 HMIS: Health 3\* Flammability 0 Physical Hazards 0  
 Note: Chronic Health Hazard is present if there is an \* beside the HMIS Health rating number.

**SECTION 3 ..... COMPOSITION / INFORMATION ON INGREDIENTS .....**

Name	4-Aminopyridine	
Synonyms	p-Aminopyridine (DOT); 4-AP; 4-Pyridinamine; Dalfampridine; Fampridine; 4-Pyridylamine	
CAS No.	504-24-5	
EINECS No.	207-987-9	
Chem. Formula	C <sub>5</sub> H <sub>6</sub> N <sub>2</sub>	
Mol. Weight	94.13	
Ingredients	4-Aminopyridine (504-24-5).....	Concentration (%/wt) NLT 98.0 %/wt

**SECTION 4 ..... FIRST AID MEASURES .....**

4.1 Description of first aid measures

- General: Oral overexposure may cause delayed effects from 12-72 hours.
- Eye contact: Rinse eyes with plenty of water for at least 15 minutes; lift eyelids occasionally. If irritation persists, get medical attention.
- Skin contact: Immediately remove contaminated clothing and shoes, then wash skin with soap and plenty of water. If irritation persists, get medical attention.
- Inhalation: Remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration and keep person warm and at rest. Get medical attention.
- Ingestion: Rinse mouth with water. Avoid vomiting. Get medical attention.
- Physician note: Symptomatic and supportive care. See *Indication of special medical attention* below.

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

- Common: Nausea, vomiting, headache, hyperexcitability.
- Less common: Peripheral neuropathy (motor weakness), convulsions or seizures, and cyanosis, a blue discoloration of fingernails, lips, or skin caused by low oxygen due to methemoglobinemia requiring prompt treatment.

4.3 Indication of immediate medical attention and special treatment needed.

- Immediate: Exposure to 4-Aminopyridine may increase the risk of anemia, agranulocytosis, hemolysis or other related blood disorders. Overexposure may result in methemoglobin depression, convulsions and cyanosis requiring prompt treatment.  
 Seizures are a potential overdose-side-effect and may occur within 5 to 15 minutes of a large exposure, thus creating a possible aspiration hazard.
- Other: 4-Aminopyridine is excreted in breast milk and nursing mothers should avoid exposure to this material by observing all precautions indicated. May cause hemolysis in breast-fed infants

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**SECTION 5 ..... FIRE-FIGHTING MEASURES.....**

- 5.1 Suitable Extinguishing Media  
Water spray, carbon dioxide, dry chemical powder, or appropriate foam.
- 5.2 Specific hazards arising from the chemical.  
Avoid inhalation of material or combustion by-products.  
Emits toxic fumes under fire conditions: carbon oxides, nitrogen oxides
- 5.3 Advice for fire-fighters  
Wear personal protective equipment for flammable conditions. Wear self-contained breathing apparatus (SCBA) if necessary.

**SECTION 6 ..... ACCIDENTAL RELEASE MEASURES.....**

- 6.1 Personal precautions, protective equipment, and emergency procedures  
For non-emergency personnel - Do not breath dusts. Avoid material contact. Evacuate unnecessary personnel from area, observe emergency procedures, consult an expert.  
  
For emergency responders – Protective equipment. See Section 8.3.
- 6.2 Environmental precautions  
Prevent material from entering drains.
- 6.3 Methods of clean up  
Ventilate area. Isolate spilled material. If in solution, absorb using chemically compatible spill pillows, or similar adsorbent material. Sweep up, if not absorbed in pillow, seal in appropriate hazardous waste container, and hold for proper waste disposal. Keep out of water supplies and sewers. Wash spill site after material pickup is complete.

**SECTION 7 ..... HANDLING AND STORAGE.....**

- 7.1 Safe Handling Precautions  
Wear suitable protective equipment to avoid contact with skin, eyes, or inhalation of dust. Do not breathe dust. May be absorbed through skin. Wash thoroughly after handling. Immediately remove contaminated clothing. Handle only in area provided with appropriate exhaust ventilation.
- 7.2 Storage Conditions  
Store under inert gas in a tightly sealed container. Keep in a dry, cool and well-ventilated place. Protect from ignition sources and store away from incompatible materials (See Section 10.).

**SECTION 8 ..... EXPOSURE CONTROLS / PERSONAL PROTECTION.....**

- 8.1 Control parameters  
Exposure limits: 4-Aminopyridine (504-24-5) –  
OSHA – PEL None  
ACGIH – TLV None  
  
Environmental Do not empty into drains.
- 8.2 Appropriate engineering controls  
Safety shower and eye wash  
Local exhaust and mechanical ventilation required. Hood recommended. Fume scrubber.
- 8.3 Personal protection  
Eye/Face Chemical safety eyewear or goggles  
Hand Compatible chemical-resistant gloves: Rubber (e.g., natural rubber, neoprene, nitrile, or equivalent), Silver Shield®, Viton®

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Respiratory NIOSH/MSHA or European Standard EN 149 approved respirator for amine gas, dust, and mists if exposure limits are exceeded or irritation or other symptoms are experienced.  
Dermal (not hand) Protective Clothing (e.g., lab coat)--flame retardant anti-static material recommended.  
Hygiene Avoid inhalation, ingestion; contact with eyes, skin, and clothing; prolonged or repeated exposure. Wash thoroughly after handling. Wash contaminated clothing before reuse. Discard contaminated footwear.

**SECTION 9 ..... PHYSICAL AND CHEMICAL PROPERTIES .....**

9.1 Information on physical and chemical data

Chemical Formula	C <sub>5</sub> H <sub>6</sub> N <sub>2</sub>
Molecular Weight	94.13
Form	Powder
Appearance	White
Odor	Odorless
Odor threshold	No data available.
pH	No data available.
Melting/freezing point	157-162°C (314-323°F)
Boiling point:	273°C (523°F)
Flammability (liquid, solid)	
Flash Point	None      Method: Not Applicable
Flammable limits (%v/v)	UEL (upper explosive limit)      None LEL (lower explosive limit)      None
Autoignition temperature	640°C (1184°F)
Decomposition temperature	No data available.
OSHA Flammability Class	No data available.
Evaporation Rate (BuAc = 1.0)	No data available.
Vapor pressure (mmHg)	2.09 x 10 <sup>-4</sup> mm Hg (23°C)
Vapor density (air=1):	No data available.
Relative density (g/cm <sup>3</sup> )	1.203
Water Solubility	No data available.
Water reactive	Not reactive.
Solubility (other)	very soluble in ethanol; soluble in water, ethyl ether, benzene, oxygenated solvents; soluble in ligroin
Partition coefficient: N-octanol/water	Log Kow (Pow) = -0.76
Viscosity	No data available.
% Volatiles	No data available.
Refractive Index (n <sub>D</sub> <sup>20</sup> =):	No data available.
Dissociation constant (pKa)	pKa = 9.17
Henry's Constant	2.5 x 10 <sup>-9</sup> atm-m <sup>3</sup> /mol

**SECTION 10 ..... STABILITY AND REACTIVITY .....**

- 10.1 Reactivity  
Stable.
- 10.2 Chemical Stability  
Stable when stored protected from heat and ignition sources.
- 10.3 Possibility of hazardous reactions  
None.
- 10.4 Conditions to avoid  
Avoid incompatibilities.  
Protect from heat and ignition sources.  
Keep out of water supplies, sewers, and environment

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- 10.5 Incompatible materials  
 Strong oxidizers, Strong acids  
 Acid chlorides, Acid anhydrides  
 Excessive heat
- 10.6 Hazardous decomposition products  
 Combustion carbon oxides, nitrogen oxides

**SECTION 11 ..... TOXICOLOGICAL INFORMATION.....**

11.1 Toxicological Information		
Acute toxicity	orl man LDLo 590 ug/kg	(RTECS; Hallucinations, distorted perceptions, Dyspnea (shortness of breath), Nausea or vomiting.)
	orl wmn TDL0 120 ug/kg	(RTECS; Convulsions or effect on seizure threshold.)
	orl rat LD50 20 mg/kg	(RTECS and NCI; No available data.)
	scu rat LD50 19 mg/kg	(RTECS; No available data.)
	scu mus LD50 20 mg/kg	(RTECS; No available data.)
	200 mg/kg < dermal LD50 < 2000 mg/kg	(FIFRA: Tox. Category II)
Skin corrosion/irritation	Irritating to skin	(FIFRA: Tox. Category IV - Mild or slight irritation at 72 hours.)
Serious eye damage/irritation	Irritating to eyes	(FIFRA: Tox. Category III - No corneal opacity; Irritation reversible within 7 days.)
Respiratory irritation	No data available.	
Respiratory or skin sensitization	No sensitization data is available for 4-AP, however, severe allergic reactions and anaphylaxis may occur with oral doses of certain formulations containing 4-AP. (AHP)	
Germ cell mutagenicity	Not mutagenic in two studies found in literature. (NCI)	
Carcinogenicity	No data available	
IARC	No data available.	
NTP	No data available.	
OSHA	No data available.	
Other	U.S. EPA IRIS Classification D--not classifiable as a human carcinogen	
Reproductive toxicity	No data available.	
STOT-single exposure	May be irritating to mucous membranes.	(ECHA C&L)
STOT-repeated exposure	No data available.	
Aspiration hazard	No data available.	
RTECS Number	US1750000	(4-Aminopyridine record updated last: May 2009.)

11.2 Further Information 4-Aminopyridine is the active ingredient in the U.S. EPA registered avicide, Avitrol.

**SECTION 12 ..... ECOLOGICAL INFORMATION.....**

12.1 Ecotoxicity	
Bird Toxicity	orl quail LD50 7650 ug/kg; orl duck LD50 4200 mg/kg
Fish Toxicity	7560 ug/L 96 hour(s) LD50 (Mortality) Bluegill (Lepomis macrochirus) Channel catfish TLm = 2.43 - 5.80 mg/l at 12 - 22 deg°C 96 hr (static bioassay)
Invertebrate Toxicity	3200 ug/L 48 hour(s) EC50 (Immobilization) Water flea (Daphnia magna)
Aq. Plant Toxicity	No data available.
Bacteria Toxicity	No data available.
Other Toxicity	2400 ug/L 96 day(s) LC50 (Mortality) Leopard frog (Rana sphenoccephala)
12.2 Persistence and degradability	
	4-Aminopyridine released to the air as a vapor will remain as such at ambient temperature and degrade photochemically within about 19 hours. Biodegradability – aerobic – Material slowly hydrolyzes on contact with water. See NLM-HSDB (ref. a) (Hazardous Substance Database) No. 6037 <i>Environmental Fate &amp; Exposure</i> section for more details.

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- 12.3 Bioaccumulative potential                      BCF <0.2-0.6 and BCF <1.8-7.2 at a concentration of 50 and 5 mg/l; Log Kow = 0.79; 4-Aminopyridine released to water will have a low tendency to sorb to suspended sediments, biota, and sediments. It has a low tendency to bioconcentrate. Volatilization is expected to be low from water sources. Biodegradation in water is expected to be slow.
- 12.4 Motility in soil                                      4-Aminopyridine released to soil is expected to have a high mobility. It is expected to strongly absorb to organic carbon and clay. Aerobic and anaerobic biodegradation occurs at a slow rate. Volatilization from dry or moist soil surface is not expected..
- 12.5 Other adverse effects                              Highly toxic to aquatic life, birds, and mammals. U.S. EPA FIFRA use: avicide and bird repellent. Small quantities may be lethal to birds due to convulsions and other nervous system effects. It is excreted in urine and rapidly detoxified in the liver so that the flesh of dead birds is not toxic to predatory animals. If 4-AP is directly consumed by animals, it could be toxic. The terminal biological half-life (BHL) is about 4 hours.

**SECTION 13** ..... **DISPOSAL CONSIDERATIONS** .....

13.1 Disposal methods

U . S. EPA Waste Codes Reportable Quantity Waste Characterization (per U. S. regulations)  Waste Disposal	P008 RQ must be included in the shipping name if over RQ trigger quantity (10 lbs). RCRA Hazard Class (40CFR 261): Toxic. Generator is responsible for proper waste characterization. NOTE: U.S. state hazardous waste regulations may differ considerably from U. S. Federal regulations. That which cannot be recovered or recycled, should be disposed of in accordance with all applicable international, national, regional, state, and local laws. Do NOT dump into any sewer, on ground, or into any body of water. Empty containers or equipment rinsate may be considered hazardous under regulations. Refer to the European Waste Catalogue (EWC) for appropriate code for disposal in the EC.
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**SECTION 14** ..... **TRANSPORT INFORMATION** .....

DOT (US)			
UN number	UN 2671	Class	6.1                      Packing Group II
Proper shipping name		Aminopyridines (p-)	
Marine pollutant	no	Poison Inhalation hazard	no
IATA			
UN number	UN 2671	Class	6.1                      Packing Group II
Proper shipping name		Aminopyridines (p-)	
IMDG/IMO			
UN number	UN 2671	Class	6.1                      Packing Group II
Proper shipping name		Aminopyridines (p-)	
Marine pollutant	no		
ADR/RID			
UN number	UN 2671	Class	6.1                      Packing Group II
Proper shipping name		Aminopyridines (p-)	

**SECTION 15** ..... **REGULATORY INFORMATION** .....

15.1 Safety, health and Environmental regulations specific for the product in question.  
 No data available.



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15.2 Chemical Inventory Lists

.....4-Aminopyridine  
CAS Number..... 504-24-5  
TSCA: ..... Y  
This compound is sold strictly for pharmaceutical.  
EINECS:..... Y  
Number..... 207-987-9  
U.S. EPA FIFRA Status .....  
This chemical is being sold for strictly U.S. FDA defined pharmaceutical purposes and, as such, is exempt from FIFRA regulations.  
CERCLA [Section 103 (40 CFR 302.4)]:..... Y  
RQ (lbs) ..... 1,000  
RCRA Waste Code..... P008  
OSHA Process Safety [29 CFR 1910.119]: ..... NL  
TQ (lbs)..... NA  
Clean Air Act  
[Section 112r (40 CFR 68)]:..... NL  
TQ (lbs)..... NA  
Contains Ozone Depleters (Class I or Class II) ..... N  
[Section 103 (40 CFR 302.4)]: ..... NL  
SARA Title III Notification [40 CFR 302.4]:  
Section 302/304 (EHS) Ingredient [40 CFR 355.3]..... Y  
TPQ (lbs)..... 500/10,000  
RQ (lbs) ..... 1,000  
Section 313 Ingredient [40 CFR 372.65] ..... NL  
SARA Hazards Acute.....Y Chronic.....Y Fire.....N Pressure..... N Reactivity .....N  
State Lists: ..... Y  
States..... on CA, FL, MA, NJ, PA  
.....NL on MN  
On CA Prop. 65: Significant Risk Level ..... N

**SECTION 16** .....**OTHER INFORMATION**.....

16.1 Literature References

AHPI: AMPYRA® (dalfampridine) Highlights of Prescribing Information. Extended Release Tablets for Oral Human Use Initial U.S. Approval 2010 . Copyright 2013 Acorda Therapeutics, Inc. Last updated: 01/2013.  
ECHA C&L: ECHA REACH Pre-Registered Substance, Classification and Labelling (C&L) Inventory; EC No. 207-987-9; CAS No. 504-24-5; IUPAC Name 4-pyridylamine or 4-aminopyridine; last updated: 11/28/13.  
FIFRA: U.S. Environmental Protection Agency. Pesticide Registration Standard: 4 Aminopyridine: Avitrol. Office of Pesticides and Toxic Substances, Washington, DC, 1980.10-168. Also U.S. EPA FIFRA RED 4-Aminopyridine 070927 EPA 738-R-013.  
IRIS: U.S. Environmental Protection Agency's Integrated Risk Information System (IRIS) on 4-Aminopyridine (504-24-5) Available from: <http://www.epa.gov/ngispgm3/iris> on the Substance File List as of March 15, 2000.  
NCI: National Cancer Institute); Aminopyridines; A Review Report Prepared for NCI Division of Cancer Biology by Technical Resources International, Inc. to support chemical nomination under contract no. N02-CB-07007 (06/03; rev. 11/05; 03/06).  
NLM-HSDB: U. S. National Library of Medicine; Hazardous Substance Database (Toxnet®) Number: 6037; 4-Aminopyridine; CAS 75-77-4; Last Revision Date: 20030214; Verschueren, K. Handbook of Environmental Data of Organic Chemicals. 2nd ed. New York, NY: Van Nostrand Reinhold Co., 1983., p. 192.  
RTECS: RN US1750000; 4-Aminopyridine; Updated May 2009.

The above information is believed to be correct to the best of our present state knowledge, but does not purport to be all-inclusive and shall be used only as a guide. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product. ***This is the last page of this SDS.***

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