

Fosamine Ammonium

HERBICIDE FACT SHEET

U.S. DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION

This fact sheet is one of a series issued by the Bonneville Power Administration for their workers and the general public. It provides information on forest and land management uses, environmental and human health effects, and safety precautions. A list of definitions is included in Section VIII of this fact sheet.

I. BASIC INFORMATION

COMMON NAME: fosamine ammonium

CHEMICAL NAME: ammonium salt of fosamine; [ethyl hydrogen (aminocarbonyl) phosphonate]

CAS No. 25954-13-6

CHEMICAL TYPE: organophosphonate subclass of organophosphate

PESTICIDE CLASSIFICATION: herbicidal brush control agent; plant growth regulator

REGISTERED USE STATUS: "General Use."

FORMULATIONS: Commercial herbicide products generally contain one or more ingredients. An inert ingredient is anything added to the product other than an active ingredient. Because of concern for human health and the environment, EPA announced its policy on toxic inert ingredients in the Federal Register on April 22, 1987 (52FR13305). This policy focuses on the regulation of inert ingredients. EPA's strategy for implementing this policy included the development of four lists of inerts, based on toxicological concerns. Inerts of toxicological concern were placed on List 1. Potentially toxic inerts/high priority for testing were placed on List 2. Inerts of unknown toxicity were placed on List 3, and inerts of minimal concern were placed on List 4.

The inert ingredients of the fosamine ammonium formulation, Krenite™, are not classified by the USEPA as inert ingredients of toxicological concerns to humans or the environment.

The contents of the fosamine ammonium formulation is listed below:

Fosamine ammonium	41.5 %
Inert	58.5 %

RESIDUE ANALYTICAL METHODS: EPA 614, 8141A.

II. HERBICIDE USES

REGISTERED FORESTRY, RANGELAND AND RIGHT-OF-WAY USES: Fosamine ammonium as Krenite™ is registered for use in non-agricultural, uncultivated areas and non-agricultural rights-of-ways for the control of woody plants. For terrestrial use only.

OPERATIONAL DETAILS:

TARGET PLANTS: Fosamine ammonium is a selective, post-emergent herbicide for control of woody/brush and herbaceous plants, including, but not limited to: maple, birch, alder, blackberry, hawthorn, vine maple, ash, and oak.

MODE OF ACTION: Inhibits bud and leaf formation.

METHOD OF APPLICATION AND RATES: Foliar application by open pour, mix/load, high pressure hand wand, backpack, aerial and ultra low-volume equipment at rates of 6 to 24 pounds of active ingredient per acre.

SPECIAL PRECAUTIONS:

TIMING OF APPLICATION: The Krenite formulation is applied any time from full leaf in the spring to first fall coloration.

DRIFT CONTROL: Care should be exercised not to overspray or apply the herbicide to adjacent non-target areas. Drift control is achieved by observing weather conditions and following label and sprayer instructions.

Restrictions/Warnings/Limitations: Do not apply directly to water or areas where surface water is present, or to intertidal areas below the mean high water mark. May harm non-target plants. Not for use on crops. Do not plant crops or graze livestock within one year of application. Do not apply through irrigation systems. Do not cut treated brush until stems are dead, or sprouting may occur. Not registered for use in California or Arizona.

III. ENVIRONMENTAL EFFECTS/FATE

SOIL:

RESIDUAL SOIL ACTIVITY: The half-life of fosamine ammonium is 8 days.

ADSORPTION: The K(oc) of fosamine ammonium is 8 to 150 depending on soil pH and soil types.

PERSISTENCE AND AGENTS OF DEGRADATION: The field half-life of fosamine ammonium is 0.5 to 5 days and is dependent on rapid-microbial mediated dissipation.

METABOLITES/DEGRADATION PRODUCTS AND POTENTIAL ENVIRONMENTAL EFFECTS: Fosamine ammonium degrades to carbamoylphosphonic acid (CPA), carboxylphosphonic acid (ING-3003), and carbon dioxide. No fate data is available for CPA and ING-3003.

WATER:

SOLUBILITY: Completely miscible in water.

POTENTIAL FOR LEACHING INTO SURFACE AND GROUND WATER: The product has low potential to leach into surface and ground water due to rapid field and soil dissipation.

AIR:

VOLATILIZATION: 4×10^{-6} mm Hg at 25° C.

POTENTIAL FOR BYPRODUCTS FROM BURNING OF TREATED VEGETATION: Carbon dioxide may be formed.

IV. ECOLOGICAL TOXICITY EFFECTS ON NON-TARGET SPECIES

MICROORGANISMS:

ACUTE CONTACT TOXICITY: LD₅₀ (honey bee 48-hour) >200 µg/bee

OVERALL TOXICITY: Practically Non-Toxic

PLANTS: Contact will injure or kill target and non-target brush/woody plants.

AQUATIC VERTEBRATES:

ACUTE TOXICITY: LC₅₀ (rainbow trout 96-hour) 377 mg/l

ACUTE TOXICITY: LC₅₀ (bluegill sunfish 96-hour) 590 mg/l

ACUTE TOXICITY: LC₅₀ (coho salmon 96-hour) >200 mg/l

OVERALL TOXICITY: Practically Non-Toxic

AQUATIC INVERTEBRATES:

ACUTE TOXICITY: LC₅₀ (*Daphnia magna* 48-hour) 1524 mg/l

OVERALL TOXICITY: Practically Non-Toxic

TERRESTRIAL ANIMALS:

AVIAN ACUTE ORAL TOXICITY: LD₅₀ (bobwhite quail) >5000 mg/kg

AVIAN ACUTE ORAL TOXICITY: LD₅₀ (mallard duck) >5000 mg/kg

MAMMAL ACUTE ORAL TOXICITY: LD₅₀ (rat) >24,400 mg/kg

AVIAN SUBACUTE DIETARY TOXICITY: LC₅₀ (bobwhite quail) >5620 mg/kg

AVIAN SUBACUTE DIETARY TOXICITY: LC₅₀ (mallard duck) >5620 mg/kg

OVERALL TOXICITY: Practically Non-Toxic

BIOACCUMULATION POTENTIAL: Slight Potential

THREATENED AND ENDANGERED SPECIES: Federally listed plants may be adversely affected if the product is applied directly to the plants during budding and leafing until fall coloration.

V. TOXICOLOGICAL DATA

ACUTE TOXICITY:

ACUTE ORAL TOXICITY: LD₅₀ (rat) 24,400 mg/kg

ACUTE DERMAL TOXICITY: LD₅₀ (rabbit) >1682 mg/kg

LD₅₀ (rabbit) >5000 mg/kg (Krenite™)

PRIMARY SKIN IRRITATION: Rabbit - Low Potential

PRIMARY EYE IRRITATION: Rabbit – Low to Moderate Potential

ACUTE INHALATION: LC₅₀ (rat) >56.6 mg/l (male)

LC₅₀ (rat) >42 mg/l (female)

OVERALL TOXICITY: Category III – Caution – Causes Moderate Eye Irritation

CHRONIC TOXICITY:

CARCINOGENICITY: Not listed or classified by EPA or CAEPA as a carcinogen.

DEVELOPMENTAL/REPRODUCTIVE: No effects reported.

MUTAGENICITY: Krenite™ was clastogenic both with and without metabolic activation. Chromosome breakage was observed at final concentrations.

HAZARD: The end-use product label for Krenite™ carries the *Caution* signal word due to moderate eye irritation.

VI. HUMAN HEALTH EFFECTS

ACUTE TOXICITY (POISONING):

REPORTED EFFECTS: None reported.

CHRONIC TOXICITY:

REPORTED EFFECTS: None reported.

POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM CONTACTING OR CONSUMING TREATED VEGETATION, WATER OR ANIMALS: None reported.

POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM INERT INGREDIENTS CONTAINED IN THE FORMULATED PRODUCTS: Information not available.

HEALTH EFFECTS OF EXPOSURE TO FORMULATED PRODUCTS: Mild, temporary skin and eye irritation.

HEALTH EFFECTS ASSOCIATED WITH CONTAMINANTS: None reported.

HEALTH EFFECTS ASSOCIATED WITH OTHER FORMULATIONS: None reported.

VII. SAFETY PRECAUTIONS

SIGNAL WORD AND DEFINITION:

FOSAMINE AMMONIUM - **CAUTION** – CAUSES MODERATE EYE IRRITATION. AVIOD CONTACT WITH EYES OR CLOTHING. WASH THOROUGHLY WITH SOAP AND WATER AFTER HANDLING.

PROTECTIVE PRECAUTIONS FOR WORKERS: None.

MEDICAL TREATMENT PROCEDURES (ANTIDOTES):

EYES: Flush eyes with water; call physician if irritation persists.

SKIN: Wash all exposed areas with soap and water.

INGESTION: None.

INHALATION: None.

HANDLING, STORAGE AND DISPOSAL: Store at room temperature or cooler. Do not reuse container. Rinse container and dispose accordingly.

EMERGENCY SPILL PROCEDURES AND HAZARDS: Contain and sweep up material of small spills and dispose as waste. Do not contaminate water, food or feed by storage or disposal.

VIII. DEFINITIONS

adsorption – the process of attaching to a surface

avian – of, or related to, birds

CAEPA – California Environmental Protection Agency

carcinogenicity – ability to cause cancer

CHEMTREC – Chemical Transportation Emergency Center

dermal – of, or related to, the skin

EC₅₀ - median effective concentration during a bioassay

ecotoxicological – related to the effects of environmental toxicants on populations of organisms originating, being produced, growing or living naturally in a particular region or environment

FIFRA – Federal Insecticide, Fungicide and Rodenticide Act

formulation – the form in which the pesticide is supplied by the manufacturer for use

half-life – the time required for half the amount of a substance to be reduced by natural processes

herbicide – a substance used to destroy plants or to slow down their growth

Hg – chemical symbol for mercury

IARC – International Agency for Research on Cancer

K(oc) – the tendency of a chemical to be adsorbed by soil, expressed as: $K(oc) = \text{conc. adsorbed}/\text{conc. dissolved}/\% \text{ organic carbon in soil}$

LC₅₀ – the concentration in air, water, or food that will kill approximately 50% of the subjects

LD₅₀ – the dose that will kill approximately 50% of the subjects

leach – to dissolve out by the action of water

mg/kg – weight ratio expressed as milligrams per kilogram

mg/l – weight-to-liquid ratio expressed as milligrams per liter

microorganisms – living things too small to be seen without a microscope

mPa – milli-Pascal (unit of pressure)

mutagenicity – ability to cause genetic changes

NFPA – National Fire Protection Association

NIOSH - National Institute for Occupational Safety and Health

NOEL - no observable effect level

non-target – animals or plants other than the ones that the pesticide is intended to kill or control

OSHA - Occupational Safety and Health Administration

Pa – Pascal (unit of pressure)

persistence – tendency of a pesticide to remain to remain in the environment after it is applied

pesticides – substances including herbicides, insecticides, rodenticides, fumigants, repellents, growth regulators, etc., regulated under FIFRA

PPE – personal protective equipment

ppm – weight ratio expressed as parts per million

residual activity – the remaining amount of activity as a pesticide

T&E – Threatened and Endangered Species (from the Endangered Species Act)

µg – micrograms

volatility – the tendency to become a vapor at standard temperatures and pressures

IX. INFORMATION SOURCES

Du Pont Agricultural Products, Krenite[®] S Brush Control Agent, Specimen Product Label, H-63354, December 9, 1997

Du Pont Agricultural Products, Krenite[®] S Brush Control Agent, Material Safety Data Sheet M0000022, March 7, 1997

Du Pont Agricultural Products, Krenite[®] UT Brush Control Agent, Specimen Product Label, H-63353, December 9, 1997

Du Pont Agricultural Products, Krenite[®] UT Brush Control Agent, Material Safety Data Sheet M0000096, March 7, 1997

EPRI, Determination of the Effectiveness of Herbicide Buffer Zones in Protecting Water Quality, EPRI Final Report TR-113160, 1999

Extension Toxicology Network, Toxicology Information Briefs: Bioaccumulation, Revised 1993, <http://ace.orst.edu/info/extoxnet/tibs/bioaccum.htm>

Spray Drift Task Force, A Summary of Ground Application Studies, 1997 <http://www.agdrift.com/publications/Body.htm>

USEPA, Office of Pesticide Programs, Reregistration Eligibility Decision, Fosamine ammonium, EPA-738-R-95-004, January 1995, <http://www.epa.gov/oppsrrd1/REDs/>

USEPA, Office of Pesticide Programs, R.E.D. Facts, Fosamine ammonium, EPA-738-F-95-005, January 1995, <http://www.epa.gov/oppsrrd1/REDs/>

X. TOXICITY CATEGORY TABLES

TABLE I: HUMAN HAZARDS

Category	Signal Word	Route of Administration			Hazard	
		Acute Oral LD ₅₀ (mg/kg)	Acute Dermal LD ₅₀ (mg/kg)	Acute Inhalation LC ₅₀ (mg/l)	Eye irritation	Skin irritation
I (Highly Toxic)	DANGER (poison)	0-50	0-200	0-0.2	corrosive: corneal opacity not reversible within 7 days	corrosive
II (Moderately Toxic)	WARNING	>50-500	>200-2000	>0.2-2	corneal opacity reversible within 7 days; irritation persisting for 7 days	severe irritation at 72 hours
III (Slightly Toxic)	CAUTION	>500-5000	>2000-20.000	>2-20	no corneal opacity; irritation reversible within 7 days	moderate irritation at 72 hours
IV (Practically Non-toxic)	NONE	>5000	>20,000	>20	no irritation	moderate irritation at 72 hours

After *Pesticide User's Guide*, Ohio State University, Extension Bull. No. 745, 1998.

TABLE II: ECOTOXICOLOGICAL RISKS TO WILDLIFE (TERRESTRIAL AND AQUATIC)

Risk Category	Mammals	Avian	Avian	Fish or Aquatic Invertebrates
	Acute Oral LD ₅₀ (mg/kg)	Acute Oral LD ₅₀ (mg/kg)	Acute Dietary LC ₅₀ (mg/kg)	Acute Concentration LC ₅₀ (mg/l)
Very Highly Toxic	<10	<10	<50	<0.1
Highly Toxic	10-50	10-50	50-500	0.1 – 1
Moderately Toxic	51-500	51-500	501-1,000	>1 – 10
Slightly Toxic	501-2,000	501-2,000	1,001-5,000	>10 – 100
Practically Non-toxic	>2,000	>2,000	>5,000	>100

Table II created from information contained in *Pesticides and Wildlife*, Whitford, Fred, et al., Purdue University Cooperative Extension Service PPP-30, 1998.

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