

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS NO.	% BY WEIGHT
Flumioxazin	103361-09-7	51.0
Other Ingredients		49.0
Kaolin Clay	1332-58-7	

4. FIRST AID MEASURES

If Inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

If on Skin or Clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.

If in Eyes: Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flash Point: Not Applicable

Autoignition Temperature: Not Applicable

Flammability Limits: Not Applicable

Extinguishing Media: Recommended for large fires: foam or water spray. Recommended for small fires: dry chemical or carbon dioxide.

Special Fire Fighting Procedures: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full fire-fighting turn out gear. Dike area to prevent runoff and contamination of water sources. Dispose of fire control water later.

Unusual Fire and Explosion Hazards: If water is used to fight fire, contain runoff, using dikes to prevent contamination of water supplies. Dispose of fire control water later.

Hazardous Decomposition Materials (Under Fire Conditions): May produce gases such as nitrogen compounds, fluorine compounds, and oxides of carbon and nitrogen.

National Fire Protection Association (NFPA) Hazard Rating:

Rating for this product: Health: 1 Flammability: 1 Reactivity: 0

Hazards Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear appropriate protective gear for the situation. See Personal Protection information in Section 8.

Environmental Precautions: Reduce airborne dust. Prevent material from entering public sewer systems or any waterways. Do not flush to drain. Large spills to soil or similar surfaces may necessitate removal of topsoil. The affected area should be removed and placed in an appropriate container for disposal.

Methods for Containment: Dike spill using absorbent or impervious materials such as earth, sand or clay. Collect and contain contaminated absorbent and dike material for disposal.

Methods for Cleanup and Disposal: Avoid creation of dusty conditions. If dry, sweep or scoop up material and place into container for disposal. If wet, pump any free liquid into an appropriate closed container. Decontaminate tools and equipment following cleanup. See Section 13: DISPOSAL CONSIDERATIONS for more information.

Other Information: Large spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.

7. HANDLING AND STORAGE

Handling:

Avoid breathing dust and spray mist. Avoid contact with skin, eyes or clothing. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing/Personal Protective Equipment (PPE) immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If pesticide gets on skin, wash immediately with soap and water. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Storage:

Keep pesticide in original container. Store in a cool, dry, secure place. Do not put formulation or dilute spray solution into food or drink containers. Do not contaminate food or foodstuffs. Do not store or transport near feed or food. Not for use or storage in or around the home. Do not contaminate water, food, or feed by storage, disposal, or cleaning of equipment.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:

Where engineering controls are indicated by specific use conditions or a potential for excessive exposure, use local exhaust ventilation at the point of generation.

Personal Protective Equipment:

Eye/Face Protection: To avoid contact with eyes, wear chemical goggles or shielded safety glasses. An emergency eyewash or water supply should be readily accessible to the work area.

Skin Protection: To avoid contact with skin wear long sleeved shirt and long pants, shoes plus socks, chemical-resistant gloves made of any waterproof material. When mixing, loading, or cleaning equipment coveralls, a chemical-resistant apron, and chemical-resistant boots must be worn. An emergency shower or water supply should be readily accessible to the work area.

Respiratory Protection: Not normally required. If vapors or mists exceed acceptable levels, wear NIOSH approved air-purifying respirator with cartridges/canisters approved for use against pesticides.

General Hygiene Considerations: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material: 1) do not store, use and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored; 2) wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet.

Exposure Guidelines:

Component	OSHA		ACGIH		Unit
	TWA	STEL	TWA	STEL	
Flumioxazin	NE	NE	NE	NE	
Kaolin clay	5	NE	2*	NE	mg/m ³
Other (including particulates not otherwise classified) (No CAS #)	5*	NE	3*	NE	mg/m ³

*Respirable fraction

NE = Not Established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Light brown granule with slight odor.

Boiling Point:	Not Applicable	Solubility in Water:	Dispersible in water
Density:	0.49 g/cc (30.8 lb cu ft)	Specific Gravity:	Not determined
Evaporation Rate:	Not Applicable	Vapor Density:	Not Applicable
Freezing Point:	Not Applicable	Vapor Pressure:	Not Applicable
pH:	5.4 @ 25° C (1% suspension)	Viscosity:	Not Applicable

Note: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable under normal handling and storage conditions.

Conditions to Avoid: Excessive heat. Do not store near heat or flame.

Incompatible Materials: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.

Hazardous Decomposition Products: May produce gases such as nitrogen compounds, fluorine compounds, and oxides of carbon and nitrogen.

Hazardous Reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION**Toxicological Data:**

Eye Irritation: No product specific data available. Based on an evaluation of the ingredients and/or similar products, this product may cause brief and/or minor eye irritation. (Toxicity Category III).

Skin Irritation: Based on an evaluation of the ingredients and/or similar products, this product may cause brief and/or minor skin irritation. (Toxicity Category IV)

Oral Toxicity: No product specific data available. The oral LD₅₀ in rats for a similar product is > 5,000 mg/kg. (Toxicity Category IV)

Dermal Toxicity: No product specific data available. The dermal LD₅₀ in rabbits for a similar product is > 2000 mg/kg (Toxicity Category III).

Inhalation Toxicity: No product specific data available. No rats died in a 4-hour inhalation study with a similar product at the maximum attainable concentration of 0.969 mg/l. (Toxicity Category III) Exposure to very high concentrations in the air resulted in breathing difficulties, decreased activity and some changes in the tissues of the respiratory system.

Skin Sensitization: Based on an evaluation of the ingredients and/or similar products, this product is not expected to cause allergic skin reactions.

Toxicity of Flumioxazin Technical

Subchronic: Compound related effects of Flumioxazin Technical noted in rats following subchronic exposures at high dose levels were hematotoxicity including anemia, and increases in liver, spleen, heart, kidney and thyroid weights. In dogs, the effects produced at high dose levels included a slight prolongation in activated partial thromboplastin time, increased cholesterol and phospholipid, elevated alkaline phosphatase, increased liver weights and histological changes in the liver. The lowest no-observable-effect-level (NOEL) in subchronic studies was 30 ppm in the three-month toxicity study in rats.

Chronic/Carcinogenicity: In a one year dog feeding study, Flumioxazin Technical produced treatment-related changes in blood chemistry and increased liver weights at 100 and 1000 mg/kg/day. Minimal treatment-related histological changes were noted in the livers of animals in the 1000 mg/kg/day group. Based on these data the NOEL is 10 mg/kg/day. Dietary administration of Flumioxazin Technical for 18 months produced liver changes in mice of the 3000 and 7000 ppm groups. There was no evidence of any treatment-related oncogenic effect. The NOEL for this study is 300 ppm. Dietary administration of

Flumioxazin Technical for 24 months produced anemia and chronic nephropathy in rats of the 500 and 1000 ppm groups. The anemia lasted throughout the treatment period, however, it was not progressive nor aplastic in nature. No evidence of an oncogenic effect was observed. The NOEL for this study is 50 ppm.

Developmental Toxicity: Flumioxazin Technical produces developmental toxicity in rats in the absence of maternal toxicity at doses of 30 mg/kg/day by the oral route and 300 mg/kg/day by the dermal route. The developmental effects noted consisted primarily of decreased number of live fetuses and fetal weights, cardiovascular abnormalities, wavy ribs and decreased number of ossified sacrocoxygeal vertebral bodies. The developmental NOEL in the rat oral and dermal developmental toxicity studies were 10 and 100 mg/kg/day, respectively. The response in rabbits was very different from that in rats. No developmental toxicity was noted in rabbits at doses up to 3000 mg/kg/day, a dose well above the maternal NOEL of 1000 mg/kg/day.

Reproduction: Reproductive toxicity was observed in F1 males, P1 females and F1 females at 300 ppm Flumioxazin Technical, the highest dose tested and a dose that also produced signs of systemic toxicity. Toxicity was also observed in the F1 and F2 offspring at doses of 200 ppm and greater.

Mutagenicity: Flumioxazin Technical was not mutagenic in most *in vitro* assays: gene mutation and a chromosome aberration assay in the absence of metabolic activation. In three *in vivo* assays, chromosome aberration, unscheduled DNA synthesis and micronucleus assay, Flumioxazin Technical was not mutagenic. The only positive response was observed in the *in vitro* chromosome aberration assay in the presence of metabolic activation. Overall, Flumioxazin Technical does not present a genetic hazard.

Assessment Carcinogenicity: None listed with ACGIH, IARC, NTP or OSHA.

See Section 2: HAZARDS IDENTIFICATION for more information.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Data from studies conducted on Flumioxazin Technical:

96-hour LC ₅₀ Rainbow Trout:	2.3 mg/L	Oral LD ₅₀ Bobwhite Quail	> 2,250 mg/kg
96-hour LC ₅₀ Bluegill Sunfish:	> 21 mg/L	8-day Dietary LC ₅₀ Bobwhite Quail:	>5,620 ppm
48-hour EC ₅₀ Daphnia Magna :	> 6 mg/L	Oral LD ₅₀ Mallard Duck:	> 2,250 mg/kg
96-hour LC ₅₀ Sheepshead Minnow:>	4.7 mg/L	8-day Dietary LC ₅₀ Mallard Duck:	>5,620 ppm
96-hour LC ₅₀ Mysid Shrimp:	0.23 mg/L		
Acute Contact LC ₅₀ Honeybee:	105 µg/bee		

Environmental Fate:

Flumioxazin degrades rapidly in water and soil. Dissipation occurs by a combination of hydrolysis and microbial oxidation. Although flumioxazin dissipates rapidly, discrete intermediates do not accumulate and the ultimate environmental products are incorporated into soil organic matter and carbon dioxide. Based on column leaching studies and the short aerobic soil half-life, the potential for flumioxazin or its degradation products to leach in field agricultural soils is low. The low use rate and rapid soil dissipation results in low carryover potential to rotational crops.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Handling and Disposal:**Nonrefillable container with liner:**

Nonrefillable bag: Do not reuse or refill this bag. Completely empty bag by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into equipment. Do not reuse bag. Dispose of bag in a sanitary landfill or by incineration if allowed by State and local authorities. Offer for recycling if available. Liner: Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into equipment. Do not reuse liner. Dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities.

Nonrefillable drum with liner:

Nonrefillable container. Do not reuse or refill this container. Offer for recycling, if available. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times.

14. TRANSPORTATION INFORMATION

Follow the precautions indicated in Section 7: HANDLING AND STORAGE of this MSDS.

DOT**< 882 pounds per complete package**

Non Regulated – See 49 CFR 173.132(b)(3) & 171.4(c)

≥ 882 pounds per complete package

UN3077, Environmentally hazardous substance, solid, n.o.s.,
(Flumioxazin), 9 PG III, MARINE POLLUTANT

IMDG

UN3077, Environmentally hazardous substance, solid, n.o.s.,
(Flumioxazin), 9 PG III, MARINE POLLUTANT

IATA

UN3077, Environmentally hazardous substance, solid, n.o.s.,
(Flumioxazin), 9 PG III, MARINE POLLUTANT

15. REGULATORY INFORMATION**U.S. Federal Regulations:**

TSCA Inventory: This product is exempted from TSCA because it is solely for FIFRA regulated use.

SARA Hazard Notification/Reporting:**Hazard Categories under Criteria of SARA Title III Rules (40 CFR Part 370.66):**

Immediate, Delayed

Section 313 Toxic Chemical(s): None

Reportable Quantity (RQ) under U.S. CERCLA:

None

RCRA Waste Code:

None

State Information:

Other state regulations may apply. Check individual state requirements.

California Proposition 65: Not Listed

16. OTHER INFORMATION

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-ACCEPTED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of Federal law to use a pesticide product in any manner not prescribed on the EPA-accepted label.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Nufarm Americas Inc. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Nufarm Americas Inc. be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Panther is a trademark of Nufarm Americas Inc.