



1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Panther™ D
EPA Reg. No.: 71368-115
Product Type: Herbicide
Company Name: Nufarm Americas Inc
 11901 S. Austin Avenue
 Alsip, IL 60803
 1-800-345-3330

Telephone Numbers: For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident,
 Call CHEMTREC Day or Night: 1-800-424-9300
 For Medical Emergencies Only, Call 1-877-325-1840

This product is an EPA FIFRA registered pesticide. Some classifications on this SDS are not exactly the same as on the FIFRA label. Certain sections are superseded by federal law governed by EPA for a registered pesticide. Please see Section 15. REGULATORY INFORMATION for explanation.

2. HAZARDS IDENTIFICATION

PHYSICAL HAZARDS:

Not Hazardous

HEALTH HAZARDS:

Acute toxicity, oral	Category 4
Serious eye damage/eye irritation	Category 1
Skin Sensitization	Category 1

ENVIRONMENTAL HAZARDS:

Hazardous to aquatic environment, acute	Category 1
Hazardous to aquatic environment, chronic	Category 1

SIGNAL WORD

DANGER

HAZARD STATEMENTS

Causes serious eye damage. Harmful if swallowed. May cause an allergic skin reaction. Very toxic to aquatic life with long-lasting effects.



PRECAUTIONARY STATEMENTS

Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid breathing dust. Contaminated work clothing should not be allowed out of the workplace. Wear protective clothing, gloves and eye protection.

IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell. Rinse mouth.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor.

IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice. Wash contaminated clothing before reuse.

Avoid unintended release to the environment. Collect spillage.

Dispose of contents and container in accordance with local, state and federal regulations.

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS NO.	% BY WEIGHT
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	37.7 – 40.0
Flumioxazin	103361-09-7	2.4 – 2.7
Propylene Glycol	57-55-6	4.75 – 5.25
Other Ingredients	Trade Secret	Trade Secret

Synonyms: Mixture of 2,4-D (2,4-Dichlorophenoxyacetic acid) and Flumioxazin (2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isoindole-1,3(2H)-dione)

Ingredients not precisely identified are proprietary or non-hazardous. Values are not product specifications.

4. FIRST AID MEASURES

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. Get immediate medical attention. **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.

If on Skin or Clothing: Take off contaminated clothing. Wash with soap and water. Get medical attention if irritation or symptoms develop.

If Inhaled: Move person to fresh air. If symptoms develop, get medical advice.

Most Important symptoms/effects, acute and delayed: Harmful if swallowed. Eye exposure causes severe irritation and may cause irreversible damage. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

Indication of Immediate medical attention and special treatment if needed: Seek immediate medical attention for eye exposure.

Note to Physician: Probable mucosal damage may contraindicate the use of gastric lavage.

5. FIRE FIGHTING MEASURES

Extinguishing Media: Use extinguishing media suitable for surrounding materials. Dry chemical, carbon dioxide, foam, water spray or fog.

Special Fire Fighting Procedures: Firefighters should wear NIOSH 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 hydrogen chloride, fluorine compounds and oxides of carbon.

6. ACCIDENTAL RELEASE MEASURES

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

Environmental Precautions: 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: Pump free liquid into an appropriate container. Absorb residual with inert absorbent material. Wash entire spill area with a detergent slurry, absorb and sweep into container for disposal. 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 contact with skin, eyes or clothing. Do not breathe spray mist or vapors. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing/Personal Protective Equipment

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(PPE) immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. 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:

Store in original container in a dry, secured storage area. Keep container tightly closed when not in use. Store at temperature above 32°F. If allowed to freeze, warm to at least 40°F and remix before using. Freezing does not alter this product.

Do not contaminate water, foodstuffs, feed or seed by storage or disposal.

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. 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, and chemical-resistant gloves made of any waterproof material. Washing facilities should be readily accessible to the work area.

Respiratory Protection: Not normally required. If vapors, mists or dusts 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	
2,4-Dichlorophenoxyacetic acid	10	NE	10 (inhalable skin)	NE	mg/m ³
Flumioxazin	NE	NE	NE	NE	
Propylene Glycol	10 (WEEL)	NE	NE	NE	mg/m ³

NE = Not Established

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Milky light brown liquid
Odor:	Moderate bitter
Odor threshold:	No data available
pH:	2.93 (1% w/w dispersion in DIW @ 25° C)
Melting point/freezing point:	No data available
Initial boiling point and boiling range	No data available
Flash point:	Aqueous composition; >212° F (>100° C)
Evaporation rate:	No data available
Flammability:	No data available
Upper/lower flammability or explosive limits:	No data available
Vapor pressure:	No data available
Vapor density:	No data available
Relative density:	1.232 g/mL @ 24° C
Solubility(ies):	No data available
Partition coefficient: n-octanol/water:	No data available
Autoignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity:	908 cPs @ 24° C; 744 cPs @ 42 ° C (50 RPM, Brookfield)

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

Reactivity: Not reactive

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

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

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

Incompatible Materials: Strong oxidizing agents, such as chlorates, nitrates, and peroxides.

Hazardous Decomposition Products: Under fire conditions, may produce gases such as fluorine compounds, hydrogen chloride, and oxides of carbon and nitrogen.

11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Skin contact, Eye contact

Eye: Causes severe eye irritation and possible irreversible eye damage.

Skin: Slightly toxic and mildly irritating based on toxicity studies. Overexposure by skin absorption may cause symptoms similar to those for ingestion. May cause allergic skin reaction (sensitization).

Inhalation: Low inhalation toxicity based on toxicity studies. May be irritating to the respiratory tract. Overexposure by inhalation may cause symptoms similar to those from ingestion.

Ingestion: Harmful if swallowed. May cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, muscle spasms.

Delayed, immediate and chronic effects of exposure: Prolonged or frequently repeated skin contact may result in allergic reaction in some individuals. Adverse effects observed in animals exposed to high doses of flumioxazin technical for long periods of time included effects on blood, liver and kidney.

Toxicological Data:

Data from laboratory studies conducted are summarized below:

Oral: Rat LD₅₀: > 1,030 mg/kg (female)

Dermal: Rat LD₅₀: >5,000 mg/kg

Inhalation: Rat 4-hr LC₅₀: >2.08 mg/L

Eye Irritation: Rabbit: Severely irritating

Skin Irritation: Rabbit: Slightly irritating (PDII=1.4)

Skin Sensitization: Sensitizer based on the Local Lymph Node Assay (LLNA) in Mice.

Subchronic (Target Organ) Effects: Repeated overexposure to phenoxy herbicides (2,4-D) may cause effects to liver, kidneys, blood chemistry, and gross motor function. Rare cases of peripheral nerve damage have been reported, but extensive animal studies have failed to substantiate these observations, even at high doses for prolonged periods. 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.

Carcinogenicity / Chronic Health Effects: Prolonged overexposure to phenoxy herbicides can cause liver, kidney and muscle damage. The International Agency for Research on Cancer (IARC) lists exposure to chlorophenoxy herbicides as a class 2B carcinogen, the category for limited evidence for carcinogenicity in humans. However, more current 2,4-D lifetime feeding studies in rats and mice did not show carcinogenic potential. The U.S. EPA has given 2,4-D a Class D classification (not classifiable as to human carcinogenicity). Repeated exposures to Flumioxazin Technical in animals have produced anemia and other blood formation changes, organ weight changes and changes in blood chemistry. Flumioxazin Technical did not produce cancer in life-time feeding studies in laboratory animals.

Reproductive Toxicity: No impairment of reproductive function attributable to 2,4-D have been noted in laboratory animal studies. Reproductive effects were observed in rats exposed to Flumioxazin Technical.

Developmental Toxicity: Studies in laboratory animals with 2,4-D have shown decreased fetal body weights and delayed development in the offspring at doses toxic to mother animals. Birth defects were produced in the offspring of female rats exposed to Flumioxazin Technical. No effects were observed in rabbits.

Genotoxicity: There have been some positive and some negative studies, but the weight of evidence is that 2,4-D is not mutagenic. Not data available for flumioxazin.

Assessment Carcinogenicity:

This product contains substances that are considered to be probable or suspected human carcinogens as follows:

Regulatory Agency Listing As Carcinogen
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Component	ACGIH	IARC	NTP	OSHA
Chlorophenoxy Herbicides (2,4-D)	No	2B	No	No
Flumioxazin	No	No	No	No
Other Ingredients	No	No	No	No

12. ECOLOGICAL INFORMATION

Ecotoxicity: Flumioxazin technical is practically non-toxic to bees and avian species. It is slightly to moderately toxic to freshwater fish and moderately to highly toxic to aquatic invertebrates.

From studies conducted on 2,4-D Acid active ingredient:

96-hour LC ₅₀ Rainbow Trout:	100 mg/L	Mallard Duck LC ₅₀ :	>1,000 ppm
48-hour EC ₅₀ Daphnia Magna :	1.4 mg/L	Bobwhite Quail 8-day Dietary LC ₅₀ :	>5,000 ppm

From studies conducted on Flumioxazin active ingredient (M=1000):

96-hour LC ₅₀ Rainbow Trout:	2.3 mg/L	Bobwhite Quail Oral LD ₅₀ :	>2,250 mg/kg
96-hour LC ₅₀ Bluegill Sunfish	> 21 mg/L	Bobwhite Quail 8-day Dietary LC ₅₀ :	>5,620 ppm
48-hour EC ₅₀ Daphnia Magna :	> 5.5 mg/L	Mallard Duck Oral LD ₅₀ :	>2,250 mg/kg
96-hour LC ₅₀ Sheepshead Minnow:	>4.7 mg/L	Mallard Duck 8-day Dietary LC ₅₀ :	>5,620 ppm
96-hour LC ₅₀ Mysid Shrimp:	0.23 mg/L		
Acute Contact LC ₅₀ Honeybee:	105 µg/bee		

Environmental Fate:

In laboratory and field studies with 2,4-D acid the typical half-life ranged from a few days to a few weeks. 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:

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law and may contaminate ground water. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

Container Handling and Disposal:

Nonrefillable Containers 5 gallons or less: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available. Triple rinse container (or equivalent) 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. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or, if allowed by State and local authorities, by burning. If burned stay out of smoke.

Nonrefillable containers larger than 5 gallons: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available. If recycling or reconditioning not available, puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or, if allowed by State and local authorities, by burning. If burned stay out of smoke. Triple rinse or pressure rinse container (or equivalent) promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times.

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and

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continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers larger than 5 gallons: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

14. TRANSPORTATION INFORMATION

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

DOT

< 26 gallons per container

Non Regulated

≥ 26 gallons per container

UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (2,4-D ACID), 9, III, RQ

IMDG

UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, n.o.s., (2,4-D ACID), 9, III, Marine Pollutant

IATA

UN 3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, n.o.s., (2,4-D ACID), 9, III, Marine Pollutant

15. REGULATORY INFORMATION

EPA FIFRA INFORMATION

This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

DANGER. Corrosive. Causes irreversible eye damage. Harmful if swallowed. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

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):

Acute Health, Chronic Health

Section 313 Toxic Chemical(s):

Acetic Acid (2,4-D Acid) (CAS No. 94-75-7) 37.7 – 40.0% by weight in product

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

Acetic Acid, (2,4-D Acid) (CAS No. 94-75-7) 100 pounds

RCRA Waste Code:

Under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

State Information: Other state regulations may apply. Check individual state requirements.

California Proposition 65: Not Listed.

16. OTHER INFORMATION**National Fire Protection Association (NFPA) Hazard Rating:****Rating for this product: Health: 3 Flammability: 1 Reactivity: 0**

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

This Safety Data Sheet (SDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-ACCEPTED PRODUCT LABELING (attached to and accompanying the product container). This SDS 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 AND ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED.

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