

TriActor™

Herbicide Tank Mix

- TriCor® 75 DF Herbicide (PCP No 30661)
- Valtera™ Herbicide (PCP No 29230)
- Nu-Image™ Herbicide (PCP No 30420)



Nufarm

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MATERIAL SAFETY DATA SHEET

United Phosphorus, Inc.

NFPA	PPE	

Issued Date 13-Dec-2012

Revision date 31-Mar-2014

Revision Number: 2

1. PRODUCT AND COMPANY IDENTIFICATION

UPI 630 Freedom Business Center Suite 402 King of Prussia, PA 19406	Emergency telephone number Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887 Medical: Rocky Mountain Poison Control Center (866) 673-6671 (24hrs)		
<u>Company Information</u>	<u>Contact Information</u>	<u>Phone number</u>	<u>Available Hrs</u>
UPI	Customer Service R&D Technical Service	1-800-438-6071 610-878-6100	8:00 am to 5:00 pm EST 8:00 am - 5:00 pm (EST)

Product name	Tricor 75 DF Herbicide (CANADA)
EPA Reg #	PMRA PCP No. 30661
Recommended use	Herbicide
Product code	12U-144C

2. Hazards Identification

EMERGENCY OVERVIEW		
May cause eye and skin irritation		
May cause irritation to the respiratory tract. irritant		
May cause drowsiness and dizziness		
Very toxic in contact with skin		
Very toxic if swallowed		
corrosive		
DANGER		
appearance light, tan.	Physical state granular.	Odor sweet. Musty.
Potential health effects		

EYES	May cause slight irritation.
skin	May cause mild skin irritation. Very toxic in contact with skin.
Ingestion	Very toxic if swallowed.

3. Composition/information on Ingredients

Ingredients Name

Component	CAS-No	Weight %	OSHA PEL
Silicon dioxide 112926-00-8 (1)	112926-00-8	1	(vacated) TWA: 6 mg/m ³ TWA: 20 mppcf : (80)/(% SiO ₂) mg/m ³ TWA
Metribuzin technical 21087-64-9 (75)	21087-64-9	75	(vacated) TWA: 5 mg/m ³

4. First aid measures

Eye contact	Hold eye open and rinse slowly and gently with water for 15 - 20 minutes. Remove contact lenses, if present, after 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes
Skin contact	Take off contaminated clothing Rinse skin immediately with plenty of water for 15-20 minutes. Call poison control center or doctor for treatment advice. Call a physician immediately Wash off immediately with plenty of water for at least 15 minutes Remove and wash contaminated clothing before re-use
Inhalation	If breathing is irregular or stopped, administer artificial respiration MAY CAUSE ALLERGIC RESPIRATORY REACTION Call a physician or poison control center immediately
Ingestion	Call a physician or poison control center immediately May produce an allergic reaction Never give anything by mouth to an unconscious person Do not induce vomiting unless told to do so by a poison control center or doctor Call a physician immediately Do not induce vomiting without medical advice
Notes to physician	No information available Treat symptomatically

5. Fire-fighting measures

Flammable Explosive Properties

flash point	Not Applicable
Autoignition temperature	Not Available
Flammability Limits in Air	Not available
Extngushing Media	Dry chemical, Water.
Fire/Explosion Hazard	Dust clouds generated during handling and/or storage can form explosive mixtures with air. Dust explosion characteristics vary with the particle size, particle shape, moisture content, contaminants, and other variables.
Hazardous combustion products	Dust clouds generated during handling and/or storage can form

explosive mixtures with air. Dust explosion characteristics vary with the particle size, particle shape, moisture content, contaminants, and other variables.

As with any dry material, pouring this material or allowing it to free fall or be conveyed through chutes or pipes can accumulate and generate electrostatic sparks, potentially causing ignition of the material itself, or any flammable materials which may come into contact with the material or its container. Check that all equipment is properly grounded and installed to satisfy electrical classification requirements, Carbon dioxide (CO₂), Sulfur oxides, Methyl mercaptan, Amines.

NFPA

HEALTH 3

flammability 0 1

Instability -

6. Accidental release measures

Personal Precautions	Avoid contact with the skin and the eyes.
Environmental precautions	Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.
Methods for Clean-Up	Sweep up and shovel into suitable containers for disposal.

7. Handling and Storage

Handling	Keep out of reach of children. Provide adequate ventilation. Fine dust dispersed in air may ignite.
Storage	Store in cool/well-ventilated place. Keep containers tightly closed in a cool, well-ventilated place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure guidelines

Chemical name	ACGIH TLV	OSHA PEL
Silicon dioxide		(vacated) TWA: 6 mg/m ³ TWA: 20 mppcf : (80)/(% SiO ₂) mg/m ³ TWA
Metribuzin technical	TWA: 5 mg/m ³	(vacated) TWA: 5 mg/m ³

Engineering controls Investigate engineering techniques to reduce exposures. Local mechanical exhaust ventilation is preferred. Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems. PESTICIDE APPLICATORS & WORKERS. THESE WORKERS MUST REFER TO PRODUCT LABELING AND DIRECTIONS FOR USE IN ACCORDANCE WITH EPA WORKER PROTECTION STANDARD 40 CFR PART 170.

Personal protective equipment

Eye/Face Protection

Eye contact should be avoided through the use of chemical safety glasses, goggles, or a faceshield selected in regard to exposure potential.

Skin protection

Wear protective gloves/clothing. Socks and footwear.

Respiratory protection

Where airborne exposure is likely, use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. If exposures cannot be kept at a minimum with engineering controls, consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure, use an approved full face positive-pressure, self-contained breathing apparatus. Respiratory protection programs must comply with 29 CFR 1910.134.

General hygiene considerations

Do not eat, drink or smoke when using this product. Wash hands and face before breaks and immediately after handling the product. Remove and wash contaminated clothing before re-use.

9. Physical and Chemical Properties

appearance	light tan	Odor	sweet Musty
Physical state	granular	pH	8.9
Boiling Point/Range	Not Available	Melting Point/Range	9.9 °C / 50 °F
Specific gravity	Not Available	solubility	1100 ppm @ 20 C (metribuzin)
evaporation rate	Not Available	vapor pressure	1.2 X 10 ⁻⁷ mmHg @ 20 C
vapor density	Not Available	VOC Content	Not Available
viscosity	Not Available	molecular weight	No Data Available
Bulk density	No Data Available	Percent Solids	Not Available
Percent Volatiles	Not Available		

10. Stability and Reactivity

stability	Stable under normal conditions
Conditions to avoid	Sustained temperatures above 100 F
incompatible materials	ketones Aldehydes
Hazardous decomposition products	Carbon dioxide (CO ₂) Oxides of sulfur Amines Methyl mercaptans
Possibility of Hazardous Polymerization	None under normal processing

11. Toxicological Information

Acute toxicity

Product information

TriCor DF-

Acute oral LD50 rat = 2379 mg/kg (male) 2794 mg/kg (female)

Acute dermal LD50 rabbit = >5,000 mg/kg

Eye - rabbit = Minimal irritation to the conjunctiva was observed with all irritation resolving within 4 days.

Skin effects- rabbit = Not a dermal irritant Metribuzin -

In a three week dermal toxicity study, rabbits were treated with metribuzin at doses of 40, 200, and 1000 mg/kg for 6 hr/dy, 5 dys/wk. The high dose evidence of increased cholesterol levels and liver enzyme function was noted. Thyroxine levels were increased at doses of 200 mg/kg and above. All of these effects were slight and reversible. The NOEL was 40 mg/kg. In subacute inhalation studies, rats were exposed to aerosol concentrations of metribuzin ranging from 31 to 745 mg/cubic meter for 6 hr/dy, 5 dys/wk, for 3 weeks. Effects observed included behavioral changes, decreased body weight gains, liver enzyme induction and organ weight effects. The NOEC was 31 mg/cubic meter.

Oral LD50 (rat) = 2,194 mg/kg

Dermal LD50 (rat) = >5,000 mg/kg

Inhalation LC50 (4 hr rat) = 0.709 mg/L

Chronic toxicity

Carcinogenicity

The information below indicates whether any agency has listed any ingredient as a carcinogen.

Chemical name	ACGIH	IARC	NTP	OSHA
Silicon dioxide		Group 3		

12. Ecological Information

ecotoxicity

Metribuzin - can travel (seep or leach) through soil and can contaminate ground water which may be used as drinking water.

13. Disposal Considerations

Waste Disposal Method

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide or rinsate is a violation of Federal law. If the wastes cannot be disposed of by use or 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.

Contaminated packaging

Non refillable container. Do not reuse this container. (For plastic containers). 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 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. The offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration, or, if allowed by

state and local authorities, by burning. If burned, stay out of smoke. (For paper bags). Completely empty bag into application equipment. Then offer for recycling if available or dispose of empty bag in a sanitary landfill or by incineration or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

14. Transport Information

DOT	NOT REGULATED
ICAO	NOT REGULATED
IATA	NOT REGULATED
IMDG/IMO	NOT REGULATED
TDG	NOT REGULATED

15. Regulatory Information

International Inventories

Chemical name	TSCA	DSL	NDSL	EINECS/ ELINCS	ENCS	China	KECL	AICS
Silicon dioxide		X			Present	X	Present	X
Metribuzin technical				X		X	Present	X

USA

Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and and Title 40n of the Code of Federal Regulations, Part 372:

Chemical name	CAS-No	Weight %	SARA 313 - Threshold Values
Metribuzin technical	21087-64-9	75	1.0

SARA 311/312 Hazardous Categorization

Chronic health hazard	NO
Acute health hazard	yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

Clean Water Act

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain any HAPs.

CERCLA

SARA Product RQ 0

RCRA

Pesticide Information

Component	FIFRA - Restricted Use	FIFRA - Pesticide Product Other Ingredients	FIFRA - Listing of Pesticide Chemicals	California Pesticides - Restricted Materials
Silicon dioxide 112926-00-8 (1)			X	

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Metribuzin technical 21087-64-9 (75)			X	
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State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

State Right-to-Know

Chemical name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Silicon dioxide	X	X	X		
Metribuzin technical	X	X	X		

International regulations

Mexico - Grade Severe risk, Grade 4

Component	CATEGORY	Carcinogen Status	Exposure limits
Silicon dioxide 112926-00-8 (1)			Mexico: TWA 10 mg/m ³

CANADA

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

Not Determined

The preparation is classified as dangerous in accordance with Directive 1999/45/EC

16. Other Information

Revision date 31-Mar-2014

Revision Summary

Update section 14

UPI, Inc. believes that the information and recommendations container herein (including data and statements) are accurate as of the date hereof. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN. The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with other materials or in any process. Further, since the conditions and methods of use are beyond the control of UPI, Inc. UPI, Inc. expressly disclaims any and all liability as to any results obtained or arising from any use of the product or reliance on such information.

End of MSDS



Safety Data Sheet

Valtera™ Herbicide

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Valtera™ Herbicide
PCPA REGISTRATION NUMBER: 29230
VC NUMBER(S): 1420
SYNONYM(S): None
PRODUCT DESCRIPTION: Herbicide
Valtera is a trademark of Valent U.S.A. LLC

MANUFACTURER/DISTRIBUTOR
VALENT CANADA, INC.
3-728 Victoria Road South
Guelph, Ontario N1L 1C6
(519) 767-9262

EMERGENCY TELEPHONE NUMBERS
HEALTH EMERGENCY OR SPILL (24 hr.):
(800) 682-5368
TRANSPORTATION (24 hr.): CHEMTREC
(800) 424-9300 or (202) 483-7616

Product Information
AGRICULTURAL PRODUCTS: (800) 682-5368

The current MSDS is available through our website (www.valent.ca) or by calling the product information number(s) listed above.

2. HAZARDS IDENTIFICATION

Emergency Overview

CAUTION

- Avoid breathing dust or spray mist
- Avoid contact with eyes, skin and clothing
- Harmful if inhaled or absorbed through skin.
- Keep out of reach of children

POTENTIAL HEALTH EFFECTS

Acute Toxicity (Primary Routes of Exposure): None known

Acute Eye Contact: Based on an evaluation of the ingredients and/or similar products, this product may cause brief and/or minor eye irritation. The expected adverse health effects resulting from an exposure may include redness and possible swelling.

Acute Skin Contact: Based on an evaluation of the ingredients and/or similar products, this product may cause brief and/or minor skin irritation. The expected adverse health effects resulting from an exposure may include redness and possibly some minor swelling. This product may be slightly toxic when absorbed through the skin. This product is not expected to cause allergic skin reactions.

Acute Ingestion: Based on an evaluation of the ingredients and/or similar products, this product may be minimally toxic when ingested.

Acute Inhalation: Based on an evaluation of the ingredients and/or similar products, this product is expected to be slightly toxic when inhaled. Exposure to high concentrations of dust may result in respiratory irritation. Signs and

Emergency Telephone: (800) 682-5368
REVISION NUMBER: 8

SDS NO.: CAN-0344
REVISION DATE: 01/23/2018

symptoms may include, but not be limited to, nasal discharge, sore throat, coughing and difficulty in breathing.

Chronic Toxicity (including cancer): 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.

Developmental Toxicity (birth defects): Birth defects were produced in the offspring of female rats exposed to Flumioxazin Technical. No effects were observed in rabbits.

Reproductive toxicity: Reproductive effects were observed in rats exposed to Flumioxazin Technical.

Signs and Symptoms of Systemic Effects: No signs or symptoms occurred in animals exposed to high oral or dermal doses of Flumioxazin Technical. Exposure to very high concentrations of Flumioxazin Technical in the air resulted in breathing difficulties, decreased activity and some changes in the tissues of the respiratory system.

Potentially Aggravated Medical Conditions: Individuals with anemia or preexisting diseases of the blood may have increased susceptibility to the toxicity of excessive exposures.

For complete discussion of the toxicology data from which this evaluation was made, refer to Section 11. For Ecotox/Environmental Information, refer to Section 12. For Regulatory Information, refer to Section 15.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No	Weight-%	Purpose
Flumioxazin	103361-09-7	30 - 60	Active ingredient
Kaolin clay	1332-58-7	10 - 30	Carrier
Others	Various CAS#s	15 - 40	Other Ingredients

Other ingredients, which are maintained as trade secrets, are any substances other than an active ingredient contained in this product. Some of these may be hazardous, but their identity is withheld because they are considered trade secrets. The hazards associated with the other ingredients are addressed in this document. Specific information on other ingredients for the management of exposures, spills, or safety assessments can be obtained by a treating physician or nurse by calling **(800) 682-5368** at any time.

4. FIRST AID MEASURES

EMERGENCY NUMBER (800) 682-5368

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact **1-800-682-5368** for emergency medical treatment information.

Eye contact:

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

Skin contact:

Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control centre or doctor for treatment advice.

Ingestion:

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

Inhalation:

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 centre or doctor for further treatment advice.

Notes to physician:

None

5. FIRE FIGHTING MEASURES

FLASH POINT: Not applicable
EXTINGUISHING MEDIA: Water fog, carbon dioxide, foam, dry chemical
FLAMMABLE LIMITS IN AIR - LOWER (%): Not applicable
FLAMMABLE LIMITS IN AIR - UPPER (%): Not applicable

NFPA Rating:

Health:	1
Flammability:	1
Reactivity:	0
Special:	None

(Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using professional judgement. Values were not available in the guidelines or published evaluations prepared by the National Fire Protection Association, NFPA.

Fire fighting instructions: Will not burn but if involved in a fire toxic fumes may be evolved. Avoid breathing smoke and mists. Avoid personnel and equipment contact with fallout and runoff. Minimize the amount of water used for fire fighting. Do not enter any enclosed area without full protective equipment, including self-contained breathing equipment. Contain and isolate runoff and debris for proper disposal. Decontaminate personal protective equipment and fire fighting equipment before reuse. Read the entire document.

Hazardous decomposition products: Normal combustion forms carbon dioxide, water vapor and may produce Fluorine compounds. Incomplete combustion can produce carbon monoxide.

6. ACCIDENTAL RELEASE MEASURES

VALENT EMERGENCY PHONE NUMBER: (800) 682-5368
CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300
OBSERVE PRECAUTIONS IN SECTION 8: PERSONAL PROTECTION

Stop the source of the spill if safe to do so. Contain the spill to prevent further contamination of the soil, surface water, or ground water. For additional spill response information refer to the **North American Emergency Response Guidebook.**

UN/NA Number: Not applicable **Emergency Response Guidebook No.:** Not applicable

FOR SPILLS ON LAND:

CONTAINMENT: Reduce airborne dust. Avoid runoff into storm sewers or other bodies of water.

CLEANUP: Clean up spill immediately. Vacuum or sweep up material and place in a chemical waste container. Wash area with soap and water. Pick up wash liquid with additional absorbent and place in a chemical waste container.

FOR SPILLS IN WATER:

CONTAINMENT: This material will disperse or dissolve in water. Stop the source of the release. Contain and isolate to prevent further release into soil, surface water and ground water.

CLEANUP: Clean up spill immediately. Absorb spill with inert material. Remove contaminated water for treatment or disposal.

7. HANDLING AND STORAGE

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

Handling:

Avoid contact with eyes, skin or clothing. Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Do not contaminate water, food or feedstuffs by storage, handling or disposal. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Storage:

Do not contaminate water, food or feed by 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 store or transport near feed or food. Not for use or storage in or around the home. To prevent contamination, store this product away from food or feed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

END USER MUST READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL.

EYES & FACE: Do not get this material in your eyes. Eye contact can be avoided by wearing protective eyewear.

RESPIRATORY PROTECTION: Use this material only in well ventilated areas. If operating conditions result in airborne concentrations of this material, the use of an approved respirator is recommended.

SKIN & HAND PROTECTION: Avoid contact with skin or clothing. Skin contact can be minimized by wearing protective clothing including gloves.

Exposure limits

Chemical Name	Canadian OELs
Flumioxazin	None
Kaolin clay	None
Others	None

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL FORM:	Granule
COLOUR:	Beige to light brown
ODOUR:	Odourless
FLASH POINT:	Not applicable
MELTING POINT:	Not applicable
BULK DENSITY:	0.49 g/cc (33.2 lb./cu. ft.)
pH:	5.9 @ 25°C (1% suspension)
CORROSION CHARACTERISTICS:	Not corrosive to containers.
SOLUBILITY:	Dispersible in water

10. STABILITY AND REACTIVITY

Chemical stability:	This material is considered chemically and thermally stable.
Incompatibility:	May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Oxidation/Reduction properties:	Not an oxidizing or reducing agent.
Explosibility:	Not expected to be explosive
Hazardous decomposition products:	Normal combustion forms carbon dioxide, water vapor and

may produce Fluorine compounds. Incomplete combustion can produce carbon monoxide.

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

There is no toxicology information available for this specific formulation. The following information is based on data available for the technical material or a similar formulation.

Oral Toxicity LD ₅₀ (rats)	> 5000 mg/kg	EPA Tox Category	IV
Dermal Toxicity LD ₅₀ (rabbits)	> 2000 mg/kg	EPA Tox Category	III
Inhalation Toxicity LC ₅₀ (rats)	> 2.18mg/L	EPA Tox Category	IV
Eye Irritation (rabbits)	Slightly irritating	EPA Tox Category	III
Skin Irritation (rabbits)	Mildly irritating	EPA Tox Category	IV
Skin Sensitization (guinea pigs)	Non-sensitizer	EPA Tox Category	Not applicable

CARCINOGEN CLASSIFICATION

Chemical Name	IARC - Group 1 (carcinogenic to humans)	IARC - Group 2A (Probably carcinogenic)	IARC - Group 2B (Possibly carcinogenic)	NTP Carcinogen List
Flumioxazin	no	no	no	Not listed
Kaolin clay	No	No	No	Not listed
Others	No	No	No	Not listed

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 sacrococcygeal 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.

Mechanistic studies indicate that the effects seen in the rat are highly unlikely to occur in the human and that flumioxazin would not be a developmental toxicant in the human.

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.

For a summary of the potential for adverse health effects from exposure to this product, refer to Section 2. For information regarding regulations pertaining to this product, refer to Section 15.

12. ECOLOGICAL INFORMATION

AVIAN TOXICITY:

Based upon EPA designation, Flumioxazin Technical is practically non-toxic to avian species. The following results were obtained from studies with Flumioxazin Technical:

Oral LD₅₀ bobwhite quail: greater than 2250 mg/kg
Dietary LC₅₀ bobwhite quail: greater than 5620 ppm
Dietary LC₅₀ mallard duck: greater than 5620 ppm

No reproductive effects were observed in bobwhite quail exposed to 500 ppm Flumioxazin Technical in the diet. In mallard ducks, a slight, but not statistically significant reduction in hatchlings and 14-day old survivors was observed. Based on a possible, slight effect on egg production at 500 ppm, the NOEL for this study was 250 ppm.

AQUATIC ORGANISM TOXICITY: Based upon EPA designation, Flumioxazin Technical is slightly to moderately toxic to freshwater fish; moderately toxic to freshwater invertebrates; moderately toxic to estuarine/marine fish and moderately to highly toxic estuarine/marine invertebrates, based on the following tests:

96-hour LC₅₀ rainbow trout: 2.3 mg/L
96-hour LC₅₀ bluegill sunfish: greater than 21 mg/L
48-hour LC₅₀ Daphnia magna: 5.5 mg/L
96-hour LC₅₀ sheepshead minnow: greater than 4.7 mg/L
96-hour (shell deposition) EC₅₀ eastern oyster: 2.8 mg/L
96-hour LC₅₀ mysid shrimp: 0.23 mg/L
Fish early life-stage (rainbow trout): NOEC >7.7 µg/L, <16 µg/L
Chronic toxicity (mysid shrimp): NOEC >15 µg/L, <27 µg/L
Chronic toxicity (Daphnia magna): NOEC >52 µg/L, <99 µg/L

OTHER NON-TARGET ORGANISM TOXICITY:

OTHER ENVIRONMENTAL INFORMATION:

This product is toxic to non-target plants and aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below mean high water mark. Do not apply where runoff is likely to occur. Do not apply where weather conditions favor drift from areas treated. Do not contaminate water when cleaning equipment or disposing of equipment washwater or rinsate.

13. DISPOSAL CONSIDERATIONS

END USERS MUST DISPOSE OF ANY UNUSED PRODUCT AS PER THE LABEL RECOMMENDATIONS.

PRODUCT DISPOSAL: For information on disposal of unused, unwanted product, contact the provincial regulatory agency or manufacturer. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean-up of spills.

CONTAINER DISPOSAL: DO NOT REUSE THIS CONTAINER FOR ANY PURPOSE: This is a recyclable container and is to be disposed of at a container collection site. Contact your local distributor/dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site:

1. Triple- or pressure-rinse the empty container. Add the rinsings to the spray mixture in the tank.

Make the empty container unsuitable for further use.

If there is no container collection site in your area, dispose of the container in accordance with provincial requirements.

Disposal methods: Canadian formulators using this product should dispose of unwanted active ingredient and containers in accordance with municipal or provincial regulations. For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean-up of spills.

14. TRANSPORTATION INFORMATION

DOT (ground) shipping name: Not regulated for domestic ground transport by US DOT or Canada TDG.
Emergency Response Guidebook No.: Not applicable

ICAO/IATA proper shipping name: UN 3077 Environmentally Hazardous Substance, Solid, N.O.S. (Flumioxazin), 9, III, Marine Pollutant
Remarks: Single or inner packaging less than 5 L (liquids) or 5 kg net (solids) excepted from Dangerous Goods regulations -- see IATA Special Provision A197.

IMDG proper shipping name: UN 3077, Environmentally Hazardous Substance, Solid, N.O.S. (flumioxazin), Marine pollutant
EMS No.: F-A, S-F

15. REGULATORY INFORMATION

CANADIAN REGULATIONS:

WHMIS Hazard Class: Non-controlled
 This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations (CPR)* and the SDS contains all information required by the CPR.

Kaolin clay
 Canada DSL Inventory List - Present
 EINECS Inventory List - Present
Others
 Canada NDSL Inventory List - Not listed/Not Determined

For information regarding potential adverse health effects from exposure to this product, refer to Sections 2 and 11.

PESTICIDE REGULATIONS: All pesticides are governed under PCPA (Pest Control Products Act). Therefore, the regulations presented below are pertinent only when handled outside of the normal use and applications of pesticides. This includes waste streams resulting from manufacturing/formulation facilities, spills or misuse of products, and storage of large quantities of products containing hazardous or extremely hazardous substances.

PROVINCIAL REGULATIONS: This product did not trigger any provincial regulations.

16. OTHER INFORMATION

REASON FOR ISSUE: Updated inhalation toxicity data. Minor edits throughout for clarity.
SDS NO.: CAN-0344
PCPA REGISTRATION NUMBER: 29230
REVISION NUMBER: 8
REVISION DATE: 01/23/2018
SUPERCEDES DATE: December 12, 2014
RESPONSIBLE PERSON(S): Valent U.S.A. LLC, Corporate EH&S, (925) 256-2803

The information provided in this Safety Data Sheet (SDS) is provided in good faith and believed to be accurate at the time of preparation of the SDS. However, to the extent consistent with applicable law, Valent Canada, Inc. and its subsidiaries or affiliates extend no warranties, make no representations, and assume no responsibility as to the accuracy, suitability, or completeness of such information. Additionally, to the extent consistent with applicable law, neither Valent Canada, Inc. nor any of its subsidiaries or affiliates represents or guarantees that this information or product may be used without infringing the intellectual property rights of others. Except to the extent a particular use and particular information are expressly stated on the product label, it is the users' own responsibility to determine the suitability of this information for their own particular use of this product. If necessary, contact Valent Canada, Inc. to confirm that you have the most current product label and SDS.

The Safety Data Sheet (SDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE PMRA-APPROVED PRODUCT LABEL (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.

The product label provides information specifically for product use in the ordinary course. Use, storage and disposal of pesticide products is regulated by the PMRA under the authority of the *Pest Control Products Act* through the product label. All necessary hazard classification and appropriate precautionary use, storage, and disposal information is set forth on that label or labeling accompanying the pesticide or to which reference is made on the label. It is a violation of federal law to use a PMRA-registered pesticide product in any manner inconsistent with its labeling.

2018 Valent Canada, Inc.



Nu-Image Herbicide Safety Data Sheet

Issue Date: 2017-12-21

Supersedes Date: 2017-05-17

{Reserved}

1. Identification

Product Name: Nu-Image Herbicide

PCP Registration No.: 30420

Refer to the approved product label for handling and use instructions.

Product Type: Herbicide

Supplier: Nufarm Agriculture Inc.
Suite 350, 2618 Hopewell Place NE
Calgary, Alberta, T1Y 7J7, Canada
1-800-868-5444

Telephone Numbers: 24 Hour Emergency Response Number, Chemtrec, 1-800-424-9300.
For medical emergencies, ProPharma Group, 1-877-325-1840.
For product and use information, Nufarm Agriculture Inc.,
1-800-868-5444.

2. Hazard Identification

Classified according to UN GHS Version 5.

Physical Hazards:

None

Health Hazards:

Acute toxicity (Oral)	Category 5
Acute toxicity (Dermal)	Category 5
Acute toxicity (Inhalation)	Category 5
Eye irritation	Category 2B
Skin irritation	Category 3

Environmental Hazards:

Hazardous to aquatic environment, acute Category 3

Signal Word:

WARNING

Hazard Statements:

May be harmful if swallowed. May be harmful in contact with skin. May be harmful if inhaled. Causes eye irritation. Causes mild skin irritation. Harmful to aquatic life.

Precautionary Statements:

Causes eye irritation. Wear goggles or face shield during mixing/loading.

Nu-Image Herbicide Safety Data Sheet

Issue Date: 2017-12-21

Supersedes Date: 2017-05-17

{Reserved}

May be harmful if swallowed, in contact with skin or inhaled. Do not eat, drink or smoke when using this product.

Wear coveralls or a long-sleeved shirt and long pants, socks, shoes and chemical-resistant gloves. Rinse gloves before removal. After use, wash hands and other exposed skin. Remove and wash contaminated clothing before reuse.

Avoid breathing spray mist. Use only outdoors or in a well-ventilated area.

3. Composition / Information on Ingredients

Hazardous Components	CAS No.	Wt. %
Imazethapyr	81335-77-5	21.2-22.5
Chemical Synonyms: (±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-ethyl-3-pyridinecarboxylic acid		
Ammonium hydroxide	1336-21-6	5.1-5.5

Other ingredients are considered non-hazardous.

Content as Expressed on Product Label

Imazethapyr ... 240 g/L

4. First Aid Measures

If swallowed, call a poison control centre 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 a poison control centre or doctor. Do not give anything by mouth to an unconscious person.

If on skin or clothing, take off contaminated clothing. Rinse skin immediately with plenty of water for 15–20 minutes. Call a poison control centre or doctor for treatment advice.

In case of eye contact, hold eye open and rinse slowly and gently with water for 15–20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control centre or doctor for treatment advice.

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 centre or doctor for further treatment advice.

Take container, label or product name and Pest Control Product Registration Number with you, when seeking medical attention.

5. Fire-fighting Measures

Extinguishing Media: Water fog, alcohol foam, carbon dioxide, dry chemical.

Special Firefighting Procedures: Firefighters should wear self-contained breathing apparatus and full protective clothing when fighting chemical fires. Minimize and contain water runoff.

Flash Point: >100 C

Conditions of Flammability: None

Hazardous Decomposition Products: ... Prolonged thermal loading can result in products of degradation being given off. Possible thermal decomposition products: carbon monoxide, nitrogen dioxide, nitrogen oxide, hydrocarbons. If product is heated above decomposition temperature toxic vapours may be released.

National Fire Protection Association (NFPA) Hazard Rating:

Rating for this product: Health: 1 Flammability: 0 Reactivity: 0
Hazards Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

6. Accidental Release Measures

Use safety equipment and procedures appropriate to the size of the spill. Keep unnecessary people away. Avoid runoff to natural waters and sewers. Surround and absorb spills with inert material such as perlite, sawdust, clay granules, vermiculite, sand or dirt. Contain all affected material in a closed, labeled container for proper disposal. Isolate from other waste materials. Clean contaminated area such as hard surfaces with detergent and water, collecting cleaning solution for proper disposal. Large spills to soil or similar surfaces may necessitate removal of top soil.

7. Handling and Storage

Handling: Avoid contact with skin, eyes and clothing. Wear goggles or face shield during mixing/loading. Wear coveralls over a long-sleeved shirt and long pants, socks, shoes and chemical-resistant gloves. Rinse gloves before removal. After use, wash hands and other exposed skin. Remove and wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Avoid breathing spray mist. Use only outdoors or in a well-ventilated area.

Storage: Store the container tightly closed away from seeds, fertilizer, plants and foodstuffs. Do not store below 0C or above 40C. If the product is exposed to temperatures below 0°C during shipment or storage, make sure the product has thawed completely, and shake the container vigorously. Shake well before using.

8. Exposure Controls / Personal Protection

Engineering Controls: Use only outdoors or in a well-ventilated area.

Personal Protective Equipment: Goggles or face shield, coveralls or a long-sleeved shirt and long pants, socks, shoes and chemical-resistant gloves. Rinse gloves before removal.

Exposure Guidelines:

Component	TWA*	STEL**	Reference/Note
Imazethapyr	20 ppm	NE	ACGIH
Ammonium hydroxide	NE	NE	None found

*Time-weighted Average, 8-hour unless otherwise noted.

**Short Term Exposure Limit

NE = Not Established

Refer to approved product label for additional exposure control guidance.

9. Physical and Chemical Properties

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. If no value is determined for the formulation, the value listed is the most relevant value of the predominant ingredient(s).

Appearance (physical state, colour, etc.)	green liquid
Odour	musty
Odour threshold	not available
pH	6.6
Melting point / Freezing point	not available
Initial boiling point and boiling range	not available
Flash point	>100C
Evaporation rate	not available
Flammability (solids, gases)	not applicable
Upper / Lower flammability or explosive limits ...	not available
Vapour pressure	<1 x 10 ⁻⁷ mm Hg @ 60C (imazethapyr)
Vapour density	not available
Relative density	1.114 @ 20C
Solubility(ies)	1.4 g/L in water @ 25C (imazethapyr)
Partition coefficient: n-octanol/water	logP = 1.49 @ pH 7, 25C (imazethapyr)
Autoignition temperature	not available
Decomposition temperature	not available
Viscosity (kinematic)	4.244 cSt @ 20C

10. Stability and Reactivity

Reactivity: Not reactive.

Chemical Stability: Stable under normal handling and storage conditions.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Ignition sources, heat, spark or flame. Oxidizing agents and reducing agents. Avoid contact with mild steel and brass – corrosive.

Incompatible Materials: Oxidizing and reducing agents; unlined steel (except stainless steel).

Hazardous Decomposition Products: Prolonged thermal loading can result in products of degradation being given off. Possible thermal decomposition products: carbon monoxide, nitrogen dioxide, nitrogen oxide, hydrocarbons. If product is heated above decomposition temperature toxic vapours may be released.

11. Toxicological Information

Likely routes of exposure: Inhalation, ingestion, skin and eye contact.

Eye contact: Causes eye irritation.

Skin contact: Causes mild skin irritation.

Ingestion: May be harmful if swallowed. No significant adverse health effects are expected if only small amounts are swallowed.

Inhalation: May be harmful if inhaled.

Medical Conditions Aggravated by Exposure: Skin exposure may aggravate preexisting skin conditions. Inhalation of mist may aggravate preexisting respiratory conditions.

Toxicological Data:

Acute oral LD₅₀ (mg/kg) >5000 (Rat)

Acute dermal LD₅₀ (mg/kg) >5000 (Rat)

Acute inhalation LC₅₀ (mg/l) >5.06 (Rat, 4-hour exposure)

Skin corrosion/irritation Considered as slightly irritating to skin (Rabbit)

Serious eye damage/irritation Considered as mildly irritating to the eye (Rabbit)

Respiratory or skin sensitization ... Not considered to be a contact dermal sensitizer (Guinea Pig)

Germ cell mutagenicity Imazethapyr shows no evidence of genotoxicity.

Carcinogenicity Imazethapyr shows no evidence of carcinogenicity.

Reproductive toxicity Imazethapyr did not demonstrate adverse treatment related effects in a 2-generation rat reproduction study.

12. Ecological Information

Ecotoxicity:

Data are for imazethapyr technical and a similar formulation as indicated, from published sources.

Aquatic Invertebrate: 48-Hour EC₅₀ (mg a.e./L) ... >1000 (*Daphnia*) (imazethapyr)
>22.4 (*Daphnia*) (similar formulation)

Fish: 96-Hour LC₅₀ (mg a.e./L) .. 420 (Rainbow Trout), 340 (Bluegill Sunfish), 240 (Channel Catfish), >112 (Sheepshead Minnow) (imazethapyr)

Algae: 96-Hour EC₅₀ (mg a.e./L) 71 (*Selenastrum*) (imazethapyr)
>22.4 (*Selenastrum*), >22.9 (*Navicula*), >23.1 (*Skeletonema*),
>4.8 (*Anabaena*) (similar formulation)

Birds: Oral LD₅₀ (mg a.e./kg) >2150 (Bobwhite Quail, Mallard Duck); 8-Day Dietary LC₅₀
>5000 (Bobwhite Quail, Mallard Duck) (imazethapyr)

Bees: LD₅₀ >100 µg/bee (48 h contact), >24.6 µg/bee (48 h oral) (imazethapyr)

Persistence and Degradability: Imazethapyr is not susceptible to biotransformation and is persistent in soil and water under aerobic and anaerobic conditions. Reported DT₅₀'s in soil range from 19 to 309 days.

Mobility in Soil: The potential for leaching is prominent in low organic and coarse textured soils. Several field dissipation studies showed no detection of imazethapyr beyond 15 cm depth.

Bioaccumulation Potential: Negligible.

13. Disposal Considerations

For information on disposal of unused, unwanted product, contact the manufacturer or the provincial regulatory agency. Disposal should be made in accordance with federal, provincial and local regulations.

Do not reuse container for any purpose. If applicable, return container in accordance with return program. If a recyclable container, dispose of at a container collection site. Contact local distributor, dealer or municipality for the location of the nearest collection site. Before taking the container to the collection site, triple or pressure rinse the empty container adding rinsings to spray tank, and make container unsuitable for further use. If there is no container collection site in your area, dispose of the container in accordance with provincial requirements.

14. Transport Information

Canadian TDG Description (Road & Rail): Not regulated for transport by road/rail.

United States:

DOT Description:

Non Regulated

IMDG

Non Regulated

IATA

Non Regulated

15. Regulatory Information

Pest Control Products Act Registration Number: 30420

OPAC Schedule: 2

Read the approved label, authorized under the Pest Control Products Act, prior to using or handling the pest control product.

This chemical is a pest control product registered by Health Canada Pest Management Regulatory Agency and is subject to certain labelling requirements under the Pest Control Products Act. These requirements differ from the classification criteria and hazard information required for GHS-consistent safety data sheets. Following is the hazard information required on the pest control product label:

(None)

WHMIS exempt.

16. Other Information

**Nu-Image Herbicide
Safety Data Sheet**

Issue Date: 2017-12-21

Supersedes Date: 2017-05-17

{Reserved}

This Safety Data Sheet (SDS) is designed to comply with the Globally Harmonized System (GHS) of classification, and the *Hazardous Products Regulations*.

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. The product labeling provides that information specifically for product use as intended.

Company and published information is used in the development of this SDS. The information herein is presented in good faith and believed accurate at the date of publication. However, no warranty, expressed or implied, is given.

Revisions to the last issue: Addition of PMRA guidance info to Section 15.

Issue Date: 2017-12-21

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