1. IDENTIFICATION

Product name:	**WARFOX**
Chemical name of active ingredient(s):	**Flumioxazin:** 2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propynyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1*H*-isoindole-1,3(2H)-dione
Manufactured for:	Makhteshim Agan of North America, Inc. 3120 Highwoods Boulevard, Suite 100 Raleigh, NC 27604 Phone: 1-919-256-9300
For fire, spill, and/or leak emergencies, contact Infotrac:	Phone: 1-800-535-5053
For medical emergencies and health and safety inquiries, contact Prosar:	Phone: 1-877-250-9291

2. HAZARDS IDENTIFICATIONS

PHYSICAL PROPERTIES:

APPARANCE: Light brown granule
ODOR: Slight

EMERGENCY OVERVIEW: CAUTION Harmful if inhaled or absorbed through the skin. Causes moderate eye irritation. Avoid breathing dust and spray mist. Avoid contact with skin, eyes or clothing.

ACUTE HEALTH EFFECTS:

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.

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.

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

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 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.

POTENTIALLY AGGRAVATED MEDICAL CONDITIONS: Individuals with anemia or preexisting diseases of the blood may have increased susceptibility to the toxicity of excessive exposures.

HAZARDOUS COMBUSTION PRODUCTS: Normal combustion forms carbon dioxide, water vapor and may produce: Oxides of nitrogen. Combustion may produce toxic gases of: Nitrogen compounds. Fluorine compounds. Incomplete combustion can produce carbon monoxide.

3. COMPOSITION/INFORMATION ON INGREDIENTS

COMMON NAME	CAS NO.	%	OSHA PEL	ACGIH TLV	NIOSH	NTP/IARC/OSHA (Carcinogen)
Flumioxazin	103361-09-7	51	NE	NE	NE	NA
Kaolin clay	1332-58-7	16	15 mg/m^3 (respirable fraction total dust) 5 mg/m^3 (TWA)	2 mg/m^3 (TWA) (respirable fraction)	10 mg/m^3 (respirable fraction total dust) 5 mg/m^3 (TWA)	NA
Others (including particulates not otherwise classified)*	NA	32	15 mg/m^3 (TWA) (total dust) 5 mg/m^3 (TWA) (respirable fraction)	10 mg/m^3 (TWA) (inhalable particulate); 3 mg/m^3 (TWA) (respirable fraction)	NE	NA

NA: Not applicable; NE: Not established.

*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 1**-**877-250-9291 at any time.

4. FIRST AID MEASURES

FIRST AID	
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 15-20 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 15-20 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
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-877-250-9291 for emergency medical treatment information.	

5. FIRE FIGHTING MEASURES

FLASH POINT: Not applicable.
FLAMMABLE LIMITS: Not applicable
AUTOIGNITION TEMPERATURE: Not applicable

EXTINGUISHING MEDIA: Water fog, foam, CO_2, dry chemical

HAZARDOUS COMBUSTION PRODUCTS: Normal combustion forms carbon dioxide, water vapor and may produce: Oxides of nitrogen. Combustion may produce toxic gases of: Nitrogen compounds. Fluorine compounds. Incomplete combustion can produce carbon monoxide.

FIRE-FIGHTING PROCEDURES: Products of combustion from fires involving this material may be toxic. 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.

6. ACCIDENTAL RELEASE MEASURES

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

Do not contaminate water, food, or feed by storage or disposal.

PRECAUTIONS TO BE TAKEN IN HANDLING: Keep out of reach of children. Follow label directions carefully. Prevent eating, drinking, tobacco usage and cosmetic application in areas where there is a potential for exposure to the material. Wash thoroughly with soap and water after handling.

PRECAUTIONS TO BE TAKEN IN STORAGE: Keep pesticide in original container. Do not store or transport near food or feed. Do not contaminate food or feed. Do not put concentrate into food or drink containers. Do not dilute concentrate in food or drink containers. Store in a cool, dry place, out of direct sunlight.

STORAGE TEMPERATURE (MIN/MAX): Normal ambient temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

THE FOLLOWING RECOMMENDATIONS FOR EXPOSURE CONTROLS/PERSONAL PROTECTION EQUIPMENT (PPE) ARE INTENDED FOR THE MANUFACTURE, FORMULATION, PACKAGING AND USE OF THIS PRODUCT.

FOR COMMERCIAL APPLICATIONS AND/OR ON-FARM APPLICATIONS CONSULT THE PRODUCT LABEL.

HAND PROTECTION: Wear chemical-resistant gloves (such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyvinyl chloride [PVC] OR Viton).

SKIN PROTECTION: Coveralls over short-sleeve shirt and short pants, chemical-resistant footwear plus socks.
EYE PROTECTION: Not usually required. If necessary, use safety glasses or goggles.

ADDITIONAL PROTECTIVE MEASURES: Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS:

Users should:

- Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

EXPOSURE GUIDELINES: Refer to Section 3.
ENGINEERING CONTROLS: Use only in adequately ventilated areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Light brown granule
ODOR: Slight
FLASH POINT: Not applicable
pH: 5.4 @ 25^{o}C (1% suspension)
DENSITY: 0.49 g/cc (30.8 lbs/cu. ft.)
SOLUBILITY: Dispersible in water
CORROSION CHARACTERISTICS: Not corrosive to containers

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal use and storage conditions.
CONDITIONS TO AVOID: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
HAZARDOUS POLYMERIZATION: Not known to occur.
HAZARDOUS DECOMPOSITION PRODUCTS: None known.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY/IRRITATION STUDIES: (Data based on similar products)

Acute Oral LD_{50} (Rat):	>5,000 mg/kg
Acute Dermal LD_{50} (Rat):	>2,000 mg/kg
Acute Inhalation LC_{50} (Rat):	>0.969 mg/L (4-hours)
Eye Irritation (Rabbit):	Mildly irritating
Dermal Irritation (Rabbit):	Mildly irritating
Dermal Sensitization (Guinea Pig):	Not a skin sensitizer

SUBCHRONIC TOXICITY STUDIES: 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.

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.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL HAZARDS: 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 the mean high water mark. Drift or runoff may be hazardous to non-target plants and aquatic organisms in neighboring areas. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from treated areas. Do not contaminate water when disposing of equipment washwaters.

This pesticide is toxic to plants and should be used strictly in accordance with the drift and run-off precautions on this label in order to minimize off-site exposures.

AVIAN TOXICITY: Flumioxazin Technical is practically non-toxic to avian species.
Bobwhite quail LD_{50} (oral): > 2250 mg/kg;
Bobwhite quail LC_{50} (Dietary): > 5620 ppm;
Mallard duck LC_{50} (Dietary): > 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: 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:

Rainbow trout96-hour LC_{50}: 2.3 mg/l;
Bluegill sunfish LC_{50} (96-h): > 21 mg/l;
Daphnia magna LC_{50} (48-h): 5.5 mg/l;
Sheepshead minnow LC_{50} (96-h): > 4.7 mg/l;
Eastern oyster (96-h shell deposition) EC_{50}: 2.8 mg/l;
Mysid shrimp LC_{50} (96-h): 0.23 mg/l;
Fish early life-stage (rainbow trout): MATC >7.7 µg/l, < 16 µg/l;
Chronic toxicity (mysid shrimp): MATC > 15 µg/l, < 27 µg/l;
Chronic toxicity (Daphnia magna): MATC > 52 µg/l, < 99 µg/l.

OTHER NON-TARGET ORGANISM TOXICITY: Flumioxazin Technical is practically non-toxic to bees. The acute contact LC50 in bees was greater than 105 µg/bee.

13. DISPOSAL CONSIDERATIONS

PRODUCT DISPOSAL: Open dumping is prohibited. Wastes resulting from the use of this product are toxic. Improper disposal of unused pesticide, spray mixture, or rinsate is a violation of Federal law. Pesticide, spray mixture or rinsate that cannot be used according to label instructions must be disposed of according to Federal, state, or local procedures.

CONTAINER DISPOSAL: Dispose of product containers, waste containers, and residues according to label instructions and local, state, and federal health and environmental regulations.

14. TRANSPORT INFORMATION

DOT CLASSIFICATION:
Not regulated

INTERNATIONAL TRANSPORTATION

IMO (vessel): UN 3077, Environmentally hazardous substances, solid, N.O.S. (Flumioxazin), 9, PGIII, Marine pollutant

IATA (air): UN 3077, Environmentally hazardous substances, solid, N.O.S. (FIumioxazin), 9, PGIII, Marine pollutant

15. REGULATORY INFORMATION

SARA TITLE III CLASSIFICATION:

Section 302:	Not applicable.
Section 311/312:	Acute health hazard (immediate) Chronic health hazard (delayed)
Section 313:	Not applicable

CERCLA RQ: Not applicable.

RCRA CLASSIFICATION: 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.

TSCA STATUS: The ingredients of this product are listed on the TSCA inventory or are exempt.

CA PROPOSITION 65: Not applicable

16. OTHER INFORMATION

NFPA HAZARD RATINGS	**NFPA**	**HMIS**	
HEALTH:	1	1	0 MINIMAL
FLAMMABILITY:	1	1	1 SLIGHT
REACTIVITY:	0	0	2 MODERATE
			3 HIGH
			4 SEVERE

MSDS DATE: 3-5-13.

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