1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: **ArmorTech Tetra® Selective Herbicide**
EPA Reg. No.: 228-741
Product Type: Herbicide
Company Name: Nufarm Americas Inc.
4020 Aerial Center Parkway
Morrisville, NC 27560
1-855-280-6609

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

2. HAZARDS IDENTIFICATION

HEALTH HAZARDS:

Acute toxicity, oral	Category 4
Acute toxicity, inhalation	Category 4
Eye Damage/Irritation	Category 2B
Reproductive Toxicity	Category 2

ENVIRONMENTAL HAZARDS:

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

SIGNAL WORD:
WARNING

HAZARD STATEMENTS:

Harmful if inhaled. Causes eye irritation. Suspected of damaging fertility or the unborn child. Very toxic to aquatic life with long lasting effects.

PRECAUTIONARY STATEMENTS

Harmful if swallowed. Avoid breathing mists, vapors or spray. Use only outdoors or in a well-ventilated area.

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective clothing, gloves and eye protection. Avoid release to the environment.

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

IF inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center if you feel unwell.

IF in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice.

IF exposed or concerned: Get medical advice.

Collect spillage.

Store locked up.

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

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENT	CAS NO.	% BY WEIGHT
2-ethylhexyl ester of 2,4-Dichlorophenoxyacetic Acid	1928-43-4	35.0 – 38.0
2-butoxyethyl ester of Triclopyr	64700-56-7	3.0 – 4.0
1-methylheptyl ester of Fluroxypyr	81406-37-3	3.0 – 4.0
Flumioxazin	103361-09-7	0.1 – 0.3
Water	7732-18-5	42.0 – 45.0
Other Ingredients	Trade Secret	12.0 – 14.0

Synonyms: None

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

4. FIRST AID MEASURES

If Swallowed: 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 symptoms develop, get medical 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. Get medical attention if irritation persists.
If on Skin: Take off contaminated clothing. Rinse skin with 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: May cause mild eye irritation. Slightly irritation to skin. Harmful if swallowed. May cause adverse reproductive effects.
Indication of Immediate medical attention and special treatment if needed: Immediate medical attention is generally not required. For ingestion there is no specific antidote available. Treat symptomatically.

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): Under fire conditions, this product may produce oxides of carbon, hydrogen chloride, hydrogen fluoride, oxides of nitrogen, ammonia, oxides of phosphorus, oxides of sulfur and hydrogen sulfide.

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 Clean-Up and Disposal:**
Pump any free liquid into an appropriate closed container. Collect washings for disposal. Decontaminate tools and equipment following cleanup. See Section 13: DISPOSAL CONSIDERATIONS for more information.

Other Information: 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 eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

STORAGE:
Always use original container to store pesticides in a secured warehouse or storage building. Store at temperatures above 32° F. If allowed to freeze, remix before using. This does not alter the product. Containers should be opened in well-ventilated areas. Keep container tightly sealed when not in use. Do not stack cardboard cases more than two pallets high. Do not store near open containers of fertilizer, seed or other pesticides. Do not contaminate water, food or feed by storage and 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 or shielded safety glasses. An emergency eyewash should be readily accessible to the work area.
Skin Protection: To avoid contact with skin, wear long pants, long-sleeved shirt, socks and shoes. Washing facilities 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:

	OSHA		ACGIH		
Component	TWA	STEL	TWA	STEL	Unit
ethylhexyl ester of 2,4-D	10*	NE	10 inhalable skin*	NE	mg/m^3
butoxyethyl ester of Triclopyr	NE	NE	NE	NE	
methylhepty ester of Fluroxypy	NE	NE	NE	NE	
Flumoxazin	NE	NE	NE	NE	
other ingredients	N/A	N/A	N/A	N/A	

*Based on adopted limit for 2,4-D

NE = Not Established
N/A= Not Applicable

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	White liquid
Odor:	Phenolic
Odor threshold:	No data available
pH:	4.90 (neat)
Melting point/freezing point:	No data available
Initial boiling point and boiling range	No data available
Flash point:	> 230º F
Evaporation rate:	No data available
Flammability (solid, gas):	No data available
Upper/lower flammability or explosive limits:	No data available
Vapor pressure:	No data available
Vapor density:	No data available
Relative density:	1.090 g/cc @ 25º C
Solubility(ies):	Forms emulsion in water
Partition coefficient: n-octanol/water:	No data available
Autoignition temperature:	No data available
Decomposition temperature:	No data available
Viscosity:	No data available

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: Will not occur.
Conditions to Avoid: Excessive heat. Do not store near heat or flame.
Incompatible Materials: Strong oxidizing agents: bases and acids.
Hazardous Decomposition Products: Under fire conditions may produce gases such as hydrogen chloride and oxides of carbon and nitrogen.

11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, Eye contact, Skin contact
Eye Contact: Mildly irritating.
Skin Contact: Slightly irritating.
Ingestion: Harmful if swallowed. May cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, muscle spasms.
Inhalation: Low inhalation toxicity.

Toxicological Data:
Data from laboratory studies on this product are not currently available. Toxicity data presented below is the most severe endpoints for the Technical grade active ingredients in the formulation.

Oral: Rat LD_{50}: 550 mg/kg (Triclopyr BEE)
Dermal: Rat LD_{50}: > 2,000 mg/kg (2,4-D EHE)
Inhalation: Rat 4-hr LC_{50}: >2.06 mg/l (Triclopyr BEE)
Eye Irritation: Rabbit: Moderately irritating
Skin Irritation: Rabbit: Mildly irritation
Skin Sensitization: Not a contact sensitizer in guinea pigs following repeated skin exposure.

Subchronic (Target Organ) Effects: Repeated overexposure to phenoxy herbicides 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. Excessive exposure to triclopyr may affect blood, kidneys and liver. Repeated exposure to fluroxypyr may cause effects to bone marrow, kidney, liver and respiratory tract.
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). Triclopyr did not cause cancer in laboratory studies. The U.S. EPA has given triclopyr a Class D classification (not classifiable as to human carcinogenicity). Fluroxypyr did not cause cancer in laboratory animals.
Reproductive Toxicity: No impairment of reproductive function attributable to 2,4-D has been noted in laboratory animal studies. For triclopyr, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. In animal studies, fluroxypyr has been shown not to interfere with reproduction.
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. For triclopyr, birth defects are unlikely. Exposures having no effect on the mother should have no effect on the fetus. Did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects to the mother. Fluroxypyr did not cause birth defects in animals; other effects were seen in the fetus only at doses which caused toxic effects in the mother.
Genotoxicity: There have been some positive and some negative studies, but the weight of evidence is that 2,4-D is not mutagenic. For triclopyr, *in-vitro* and animal mutagenicity studies were negative. Animal tests with fluroxypyr did not demonstrate mutagenic effects.

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

	Regulatory Agency Listing As Carcinogen			
Component	**ACGIH**	**IARC**	**NTP**	**OSHA**
2,4-Dichlorophenoxyacetic acid, EHE	No	2B	No	No

Triclopyr, BEE	No	No	No	No
Fluroxypyr, MHE	No	No	No	No
Flumioxazin	No	No	No	No
Other Ingredients	No	No	No	No

12. ECOLOGICAL INFORMATION

Environmental Hazards:
This product is toxic to fish and aquatic invertebrates.

Ecotoxicity:

Data on 2,4-D 2-EHE

96-hour LC_{50} Bluegill: > 5 mg/l
96-hour LC_{50} Rainbow Trout: 7.2 mg/l
48 hour EC_{50} Daphnia: > 5 mg/l
Bobwhite Quail Dietary LC_{50} > 5,620 ppm
Mallard Duck Dietary LC_{50} > 5,620 ppm

Data on Triclopyr 2-butoxyethyl Ester

96-hour LC_{50} Bluegill: 0.36 mg/l
96-hour LC_{50} Rainbow Trout: 0.98 mg/l
48-hour LC_{50} Daphnia magna: 0.34 mg/l
Bobwhite Quail 8-day Dietary LC_{50}: >5,401 ppm
Bobwhite Quail Oral LD_{50}: 344 mg/kg
Mallard Duck 8-day Dietary LC_{50}: >4,650 ppm

Data on Fluroxypyr 1-Methylheptyl Ester*:

Acute LC_{50} Bluegill: above water solubility
Acute LC_{50} Rainbow Trout: above water solubility
Acute Immobilization EC_{50} Daphnia Magna:> 499 µg/l (0.1-1 mg/L)
Bobwhite Quail Acute Oral LD_{50}:> 2,000 mg/kg
Mallard Duck Acute Oral LC_{50}:> 2,000 mg/kg

*Fluroxypyr 1-Methylheptyl Ester is highly insoluble in water.

Data on Flumioxazin:

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

Environmental Fate:

In laboratory and field studies, 2,4-D 2-ethylhexyl ester rapidly de-esterfied to parent acid in the environment. The typical half-life of the resultant 2,4-D acid ranged from a few days to a few weeks.

In laboratory and field studies, Triclopyr butoxyethyl ester hydrolyzes to parent acid in the environment. Triclopyr is moderately persistent and mobile. In soil, the predominant degradation pathway is microbial and the average half-life is 30 days. Half-lives tend to be shorter in warm, moist soils with a high organic content. The predominant degradation pathway for triclopyr in water is photodegradation and the average half-life is one day. Initially, triclopyr butoxyethyl ester may bind to suspended organic particles or sediments in the water and while bound effectively lengthen the half-life in water.

In laboratory and field studies, Fluroxypyr 1-Methylheptyl Ester rapidly de-esterfied to parent acid in the environment. Fluroxypyr has a hydrolysis half-life of 12.8 to 16.5 hours. Under aerobic and anaerobic soil conditions the half-life for Fluroxypyr is 7 days.

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 toxic. If container is damaged or if pesticide has leaked, contain all spillage. Absorb and clean up all spilled material with granules or sand. Place in a closed, labeled container for proper disposal. Improper

disposal of excess pesticide, spray mixtures, or rinsate is a violation of Federal law and may contaminate groundwater. 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 Container. Do not reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying. Then offer for recycling, if available, or puncture and dispose of in an approved sanitary landfill, or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. **Triple rinse as follows:** Empty the remaining contents into manufacturing equipment. 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. Empty the rinsate into manufacturing equipment, or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse as follows:** Empty the remaining contents into manufacturing equipment and drain for 10 seconds after the flow begins to drip. Hold container upside down over manufacturing equipment, 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 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 and, if possible, spray all sides while adding 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. Then offer for recycling if available or 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.

14. TRANSPORTATION INFORMATION

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

DOT
< 45 gallons per complete package
Non Regulated

≥ 45 but <119 gallons per complete package
UN 3082, Environmentally hazardous substance, liquid, n.o.s., (2,4-D Ester), 9, III, RQ

≥ 119 gallons per complete package
UN 3082, Environmentally hazardous substance, liquid, n.o.s., (2,4-D Ester), 9, III, Marine Pollutant, RQ

IMDG
≥ 119 gallons per complete package
UN 3082, Environmentally hazardous substance, liquid, n.o.s., (2,4-D Ester), 9, III, Marine Pollutant

IATA
Non Regulated

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):
Immediate and Delayed

Section 313 Toxic Chemical(s):
2,4-D 2-ethylhexyl ester (1928-43-4), 35.0 – 37.0% by weight in product

Reportable Quantity (RQ) under U.S. CERCLA:
2,4-D Ester (1928-43-4) 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: None listed.

16. OTHER INFORMATION

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

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.

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