



NUFARM AGRICULTURE INC.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUPPLIED BY:

Nufarm Agriculture Inc.
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Phone Number: 1-800-868-5444
Fax Number: (403) 219-2092

MANUFACTURED BY:

Nufarm Agriculture Inc.
Ste 350, 2618 Hopewell Pl NE
Calgary, AB T1Y 7J7
Phone Number: 1-800-868-5444
Fax Number: (403) 219-2092

PRODUCT:**Enforcer M Herbicide****PCP NUMBER:**

30691

DATE PREPARED:

April 4, 2017

PREPARER:

Nufarm Agriculture Inc.; Regulatory Affairs & Research Department

CHEMICAL FAMILY/USE:

Herbicide.

FORMULA: $C_{15}H_{17}Br_2NO_2$ and $C_{17}H_{25}ClO_3$ and $C_{15}H_{21}Cl_2FN_2O_3$ **CHEMICAL SYNONYMS:**

Bromoxynil octanoate ester; 3,5-dibromo-4-hydroxybenzotrile, octanoate ester;
octanoic acid ester of bromoxynil; 2,6-dibromo-4-cyanophenyl octanoate.

MCPA, 2-ethylhexyl ester; 2-methyl-4-chlorophenoxyacetic acid, 2-ethylhexyl ester;
(4-chloro-2-methylphenoxy) acetic acid, 2-ethylhexyl ester; MCPA 2EHE.

Note: The 2-ethylhexyl ester is one of several esters that have been previously known under the broader term "isooctyl ester".

fluroxypyr 1-methylheptyl ester; fluroxypyr-meptyl; 1-methylheptyl [(4-amino-3,5-dichloro-6-fluoro-2-pyridinyl)oxy]acetate; fluroxypyr MHE

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. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	Wt. %	CAS NO.
Bromoxynil octanoate ester	26-28	1689-99-2
MCPA, 2-ethylhexyl ester	27-30	29450-45-1
Fluroxypyr 1-methylheptyl ester	10-11	81406-37-3
Aromatic hydrocarbon solvent	23-25	64742-94-5
May contain:		
Naphthalene	< 1	91-20-3
Emulsifiers and other proprietary ingredients	9-11	NA

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: WARNING - POISON. Keep out of reach of children. Do not get into eyes, on skin, or on clothing. Do not inhale spray mist (e.g., during application). Eye and skin irritant. Potential skin sensitizer.

EFFECTS OF ACUTE EXPOSURE:

INGESTION: Harmful or fatal if swallowed. May cause headache, dizziness, nausea, vomiting, gastrointestinal irritation, weakness, central nervous system depression, unconsciousness, respiratory failure, or in extreme cases, death. Small amounts of liquid aspirated into the respiratory system during ingestion or from vomiting may cause mild to severe pulmonary injury and possibly death.



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SKIN CONTACT: Causes moderate skin irritation. Overexposure by skin absorption may cause symptoms similar to those for ingestion. May cause allergic reactions in sensitive individuals.

INHALATION: Inhalation toxicity by vapour is unlikely under normal conditions, however, high concentrations of vapours from undiluted product may cause headache, dizziness, respiratory tract irritation and symptoms similar to those from ingestion.

EYE CONTACT: Causes mild eye irritation.

MEDICAL CONDITIONS AGGRAVATED: Skin exposure may aggravate preexisting skin conditions. Inhalation of spray mist may aggravate preexisting respiratory conditions.

SUBCHRONIC (TARGET ORGAN) EFFECTS: (An adverse effect with symptoms that develop slowly over a long period of time): Repeated overexposure may cause effects to liver, kidneys, blood chemistry, blood forming organs and respiratory tract.

CHRONIC EFFECTS/CARCINOGENICITY: Bromoxynil phenol has been classified by U.S. EPA in Group C, limited evidence of carcinogenicity in animals. 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. Fluroxypyr did not cause cancer in laboratory animals. A possible minor ingredient in this product, naphthalene, has been reported by the U.S. National Toxicology Program to be associated with increased nose/lung tumors in laboratory animals via inhalation exposure.

REPRODUCTIVE TOXICITY: Animal studies on bromoxynil phenol did not indicate a pattern of reproductive toxicity, but a study on bromoxynil octanoate indicated possible mild male reproductive toxicity at high doses. For MCPA, testicular effects and lower male fertility have been noted in animal studies. Fluroxypyr has been shown not to interfere with reproduction.

DEVELOPMENTAL TOXICITY: Based on the results of studies in laboratory animals, bromoxynil phenol is considered to be a developmental toxicant. Women of childbearing age should avoid excessive exposure. MCPA studies in laboratory animals have shown decreased fetal body weights and delayed development in the offspring at doses toxic to mother animals. Fluroxypyr did not cause birth defects; however, in laboratory animals, other toxic effects to the fetus have been seen.

GENOTOXICITY: There have been some positive and some negative studies, but the weight of evidence is that bromoxynil and MCPA are not mutagenic. For fluroxypyr: *in vitro* and animal mutagenicity studies were negative.

PRINCIPLE ROUTES OF EXPOSURE: Eye contact. Skin absorption. Inhalation. Oral.

TOXICOLOGICALLY SYNERGISTIC MATERIALS: None known.

OTHER: None known.

4. FIRST AID MEASURES

If swallowed, call a poison control centre or doctor immediately for treatment advice. Do not induce vomiting unless told to do so by a poison control centre or doctor. Do not give **any** liquid to the person. 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.

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 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.

NOTE TO PHYSICIAN: This product contains petroleum distillates. If large amounts have been ingested, empty the stomach by gastric intubation with the aid of a cuffed endotracheal tube to prevent aspiration and possible chemical pneumonia.

No specific antidote. Treatment based on sound judgment of physician and individual reactions of patient. Overexposure to materials other than this product may have occurred.

5. FIRE FIGHTING MEASURES



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FLASH POINT: 100°C.
CONDITIONS OF FLAMMABILITY:..... Combustible mixture. When heated above the flash point, this material emits vapours which, when mixed with air, can burn or be explosive. Heavier than air vapours may travel to an ignition source.
FLAMMABLE LIMITS IN AIR - Upper (%):..... NA.
FLAMMABLE LIMITS IN AIR - Lower (%):..... NA.
AUTOIGNITION TEMPERATURE: NA.
SENSITIVITY TO MECHANICAL IMPACT (Y/N): NA. No sensitivity expected based on similar products.
SENSITIVITY TO STATIC DISCHARGE: NA. Sensitivity possible based on solvent data.
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.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Use safety equipment and procedures appropriate to the size of the spill. Keep potential ignition sources and unnecessary people away. Avoid runoff to natural waters and sewers. Surround and absorb spills with inert material such as perlite, 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

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: This product is not extremely combustible, but it is suggested to handle as a combustible liquid. Keep away from potential ignition sources. This material may accumulate a static charge that can discharge violently. Empty, unrinsed containers can retain combustible liquid product or vapours. Keep away from food and feed products. Avoid storage in close proximity to insecticides, fungicides, fertilizers, plants and seeds. Avoid contact with eyes, skin and clothing. Keep container tightly closed when not in use. If product is frozen, bring to room temperature and agitate before use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

Hazardous Ingredients	TWA*	ACGIH TLV®	STEL	Units
Fluroxypyr	10**	N/E	N/E	mg/m ³
Naphthalene	10	N/E	15	ppm
Total hydrocarbons (aromatic solvent)	15**	N/E	N/E	ppm

*8-hour TWA unless otherwise noted

**recommended by manufacturer

ENGINEERING CONTROLS: Use in a well ventilated area. General ventilation with a good source of make-up air recommended as minimum for indoor situations. Ventilation should be adequate to maintain air concentrations below exposure limits.

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

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



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RESPIRATORY PROTECTION EQUIPMENT: Use an approved pesticide respirator if ventilation is not adequate or exposure to sprays, mists or concentrated vapours is likely.

PROTECTIVE GLOVES: Chemical-resistant gloves such as nitrile.

EYE AND FACE PROTECTION: Goggles or face shield when handling concentrate.

OTHER PROTECTIVE EQUIPMENT: Coveralls over long sleeved shirt, long pants, socks and shoes suggested as minimum work clothing. Use other equipment appropriate to specific situation.

VENTILATION: Use only in well ventilated area.

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.

BOILING POINT:	NA.
VAPOR PRESSURE:	NA.
VAPOR DENSITY (air = 1):	NA.
FREEZING POINT:	NA.
MELTING POINT:	NA.
PHYSICAL STATE:	Liquid.
ODOUR:	Characteristic phenolic and hydrocarbon.
COLOUR:	Amber.
ODOR THRESHOLD (ppm):	NA.
EVAPORATION RATE (butyl acetate = 1):	NA.
SPECIFIC GRAVITY (water = 1):	1.135
DENSITY @ 25°C:	1.135
pH:	4.2 (1% w/w dilution)
SOLUBILITY IN WATER (20°C):	Product is emulsifiable in water.
COEFFICIENT OF WATER/OIL DISTRIBUTION:	NA. Product is oil soluble.

10. STABILITY AND REACTIVITY

STABILITY: Stable.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS: Hydrogen bromide, other bromine compounds, hydrogen chloride, other chlorine compounds, carbon dioxide, carbon monoxide, oxides of nitrogen, and other potentially toxic combustion products may be present.

INCOMPATIBILITY (MATERIALS TO AVOID): Avoid contact with strong acidic, basic or oxidizing agents.

CONDITIONS TO AVOID: None known.

11. TOXICOLOGICAL INFORMATION

ACUTE ORAL LD₅₀ (mg/kg):	550 (Rat)
ACUTE DERMAL LD₅₀ (mg/kg):	>5000 (Rat)
ACUTE INHALATION LC₅₀ (mg/l):	>2.1 mg/l (4-Hour Rat, nose only)
OTHER:	Moderate skin irritant and mild eye irritant (Rabbit).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:



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Data on bromoxynil octanoate:

96-HOUR LC₅₀ (mg/L):	0.1 (Rainbow Trout)
96-HOUR LC₅₀ (mg/L):	0.053 (Bluegill)
48-HOUR EC₅₀ (mg/L):	0.096 (Daphnia)
ACUTE ORAL LD₅₀ (mg/kg):	148 (Bobwhite Quail)
ACUTE ORAL LD₅₀ (mg/kg):	2050 (Mallard Duck)

Data on MCPA 2EHE:

96-HOUR LC₅₀ (mg/L):	3.2 (Rainbow Trout)
96-HOUR LC₅₀ (mg/L):	3.9 +/- 0.7 (Bluegill)
48-HOUR EC₅₀ (mg/L):	0.3 (Daphnia)
DIETARY LC₅₀ (ppm):	>5620 (Bobwhite Quail)
DIETARY LC₅₀ (ppm):	>5620 (Mallard Duck)

Data on Fluroxypyr 1-Methylheptyl Ester (fluroxypyr-meptyl):

Practically non-toxic to mallard ducks and bobwhite quail on an acute (LD₅₀ >2000 mg/kg) and dietary (LC₅₀ >5000 ppm) basis. Concentrations toxic to fish and aquatic invertebrates are not determined (LC₅₀ > water solubility).

Fluroxypyr-meptyl solubility in water is 0.09 mg/L.

Fluroxypyr-meptyl is not toxic to bees (>100 µg/bee).

Bio-concentration potential of fluroxypyr is low.

CHEMICAL FATE INFORMATION: Bromoxynil octanoate ester degrades readily to bromoxynil phenol in the environment. Representative soil half-lives are 2 days for the octanoate and 14 days for the phenol. MCPA 2EHE rapidly hydrolyzes to parent MCPA acid. In soil, MCPA is microbially degraded with typical half-life of approximately 10 to 14 days. Fluroxypyr-meptyl is rapidly converted to fluroxypyr in all soil types with a half-life of less than seven days. Fluroxypyr is then rapidly degraded by micro-organism in aerobic conditions. The half-life in laboratory studies is five to nine days at about 23°C. Lysimeter and field studies demonstrate that there is no evidence of any significant leaching in soil.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: 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. Contact the manufacturer and the provincial regulatory agency in case of a spill, and for clean up of spills.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. 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): UN3082, ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Bromoxynil), Class 9, PG III.

Section 1.45.1 of the TDG Regulations provides an exemption from documentation and safety marks only for this product and only when transported by a road or railway vehicle.



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15. REGULATORY INFORMATION

WHMIS HAZARD CLASS: D1B and D2B Toxic Materials.

WHMIS TRADE SECRET: Exempt. (This product is regulated under the Pest Control Products Act - WHMIS exempt.)

CANADIAN INVENTORY: This product is currently exempt from CEPA.

HAZARD RATING SYSTEMS:

HMIS: Not Available

National Fire Protection Association (NFPA®) Hazard Ratings:

Ratings for This Product		Key to Ratings	
2	Health Hazard	0	Minimal
1	Flammability	1	Slight
0	Instability	2	Moderate
		3	Serious
		4	Severe

16. OTHER INFORMATION

EMERGENCY TELEPHONE NUMBERS:

For spills or transportation accidents, Chemtrec, 1-800-424-9300.

For health or environmental emergencies, Prosar, 1-877-325-1840.

For product and use information, Nufarm Agriculture Inc., 1-800-868-5444.

REVISIONS:

The following has been revised since the last issue of this SDS: Section 1 & 14 revisions.

ADDITIONAL INFORMATION:

Abbreviations used throughout the SDS are: NA = Not available

NAp = Not applicable

N/E = None Established

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

Company and published references utilized in preparation of the SDS.

*****END OF SDS*****