



NUFARM AGRICULTURE INC.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUPPLIED BY:

Nufarm Agriculture Inc.
5507 1st Street, SE
Calgary, AB. T2H 1H9

Phone Number: (403)-253-8471

Fax Number: (403)-253-8478

MANUFACTURED BY:

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Calgary, AB T2H 1H9

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PRODUCT:**Calmix® Pellets Weed Killer and Soil Sterilant****PCP NUMBER:**

9342

DATE PREPARED:

September 10, 2008

PREPARER:

Brent R. McLennan

CHEMICAL FAMILY/USE:

Herbicide.

FORMULA:

C₈H₆Cl₂O₃ and C₉H₁₃BrN₂O₂

CHEMICAL SYNONYMS:

2,4-D; 2,4-Dichlorophenoxyacetic acid.

Bromacil; 5-bromo-6-methyl-3-(1-methylpropyl)-2, 4(1*H*,3*H*) pyrimidinedione;

5-brom-3-*sec*-butyl-6-methyluracil; 5-bromo-6-methyl-3-(1-methylpropyl) uracil.

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients	Wt. %	CAS NO.
2,4-D	4.5-5.5	94-75-7
Bromacil	2.5-3.5	314-40-9
Proprietary ingredients	3-5	NA

Note: The other major ingredient in this product is limestone.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: ATTENTION-POISON. Keep out of reach of children. Avoid contact with skin, eyes and clothing. May cause irritation of eyes, nose, throat and skin.

EFFECTS OF ACUTE EXPOSURE:

INGESTION: May be harmful if swallowed. May cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, muscle spasms.



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SKIN CONTACT: May cause moderate irritation. Overexposure by skin absorption may cause nausea, vomiting, abdominal pain, decreased blood pressure, muscle weakness, muscle spasms.

INHALATION: Inhalation is not a likely route of exposure unless specific handling conditions generate dust. In such case, nose and upper respiratory irritation may occur. Other symptoms of overexposure similar to those from ingestion.

EYE CONTACT: Causes severe eye irritation possibly including corneal opacity and irreversible eye damage. Causes redness and tearing. If specific handling conditions generate dust, the likelihood of irritation is increased.

MEDICAL CONDITIONS AGGRAVATED: Skin exposure may aggravate preexisting skin conditions. Inhalation of dust, if present, 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, thyroid, 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 of 2,4-D for prolonged periods.

CHRONIC EFFECTS/CARCINOGENICITY: 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. Bromacil has been evaluated for potential carcinogenic activity in rats and mice. Incidences of liver tumors in male mice and a trend for thyroid tumors in male rats are considered as only limited evidence of a carcinogenic response. This product contains limestone, which may include a small amount of crystalline silica (e.g., quartz) as a naturally-occurring component. Inhalation of crystalline silica may cause pulmonary fibrosis (silicosis). IARC has classified crystalline silica as a probable human carcinogen, class 2A.

REPRODUCTIVE TOXICITY: No impairment of reproductive function attributable to 2,4-D or bromacil has been noted in laboratory animal studies.

DEVELOPMENTAL TOXICITY: Studies in laboratory animals with 2,4-D have shown decreased fetal body weights and delayed development in the offspring, but these findings were at doses toxic to mother animals. Bromacil developmental toxicity studies also produced only findings that were attributed to maternal toxicity rather than to specific developmental toxicity.

GENOTOXICITY: There have been some positive and some negative studies, but the weight of evidence is that 2,4-D is not mutagenic. Bromacil does not produce heritable genetic damage in animals. Most studies on bromacil for genetic damage in mammalian and bacterial cells (in culture) were also negative.

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

TOXICOLOGICALLY SYNERGISTIC MATERIALS: None known.

OTHER: None known.

4. FIRST AID MEASURES

INGESTION: Take patient to hospital or contact a Poison Control Centre. If swallowed, induce vomiting by touching back of throat with finger. Never give anything by mouth to an unconscious person.

SKIN: In case of contact, wash skin thoroughly with soap and water.

INHALATION: If inhaled, remove to fresh air and get medical attention or contact a Poison Control Centre.

EYES: For eye contact, flush with plenty of water for at least 15 minutes. Get medical attention.

NOTE TO PHYSICIAN: 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.



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5. FIRE FIGHTING MEASURES

FLASH POINT:NAp.
CONDITIONS OF FLAMMABILITY:NAp.
FLAMMABLE LIMITS IN AIR - Upper (%):.....NAp
FLAMMABLE LIMITS IN AIR - Lower (%):.....NAp
AUTOIGNITION TEMPERATURE:NAp
SENSITIVITY TO MECHANICAL IMPACT (Y/N):.....NA. No sensitivity expected based on long handling history.
SENSITIVITY TO STATIC DISCHARGE:NA. No sensitivity expected based on long handling history.
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 unnecessary people away. Avoid runoff to natural waters, irrigation ditches, water supplies and sewers. Sweep or scoop up spill and contain all affected material in a closed, labeled container for proper disposal. Isolate from other waste materials. If spill area is on ground near trees or other valuable plants, it may be necessary to remove topsoil (e.g., 5 cm/2 inches) after initial cleanup. Spill residue may damage or kill many types of plants for an extended period. Hard surfaces can be washed with detergent and water only when collecting all cleaning solution for proper disposal. DO NOT flush spill areas in a manner that causes runoff to other areas.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: 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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

Hazardous Ingredients	TWA*	ACGIH TLV®	STEL	Units
2,4-D	10**	10**	N/E	mg/M ³
Bromacil	N/E	10	N/E	mg/M ³
Silica, crystalline as quartz	0.1	0.1	N/E	mg/M ³

*8-hour TWA unless otherwise noted

**based on adopted limit for 2,4-D



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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.

RESPIRATORY PROTECTION EQUIPMENT: Use an approved dust or pesticide respirator if ventilation is not adequate or exposure to dusts is likely.

PROTECTIVE GLOVES: Chemical-resistant/rubber gloves, e.g., nitrile or neoprene. Rinse gloves before removal. Gloves are not required for applicator in enclosed tractor.

EYE AND FACE PROTECTION: Protective eyewear such as face shield or safety glasses when handling the product during mixing and loading.

OTHER PROTECTIVE EQUIPMENT: Long sleeved shirt, long pants, socks and shoes are minimum work clothing. Coveralls or a chemical-resistant apron should also be worn when open pouring. 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:	NAp.
VAPOR PRESSURE:	1.4 x 10 ⁻⁷ mm Hg @ 25°C (2,4-D).
.....	3.1 x 10 ⁻⁷ mm Hg @ 25°C (Bromacil).
VAPOR DENSITY (air = 1):	NA.
FREEZING POINT:	NAp.
MELTING POINT:	NAp.
PHYSICAL STATE:	Pellets.
ODOUR:	Characteristic phenolic.
COLOUR:	Grey.
ODOR THRESHOLD (ppm):	NA.
EVAPORATION RATE (butyl acetate = 1):	NAp.
SPECIFIC GRAVITY (water = 1):	NA.
DENSITY @ 25°C:	NA.
pH:	NAp.
SOLUBILITY IN WATER (20°C):	Pellets insoluble. 2,4-D and bromacil are moderately soluble.
COEFFICIENT OF WATER/OIL DISTRIBUTION:	NA.

10. STABILITY AND REACTIVITY

STABILITY: Stable.

HAZARDOUS POLYMERIZATION: Will not occur.

HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS: Hydrogen chloride, other chlorine compounds, hydrogen bromide, 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. Bromacil is incompatible with amines.

CONDITIONS TO AVOID: None known.



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11. TOXICOLOGICAL INFORMATION

Data are from laboratory studies conducted on 2,4-D acid:

- ACUTE ORAL LD₅₀ (mg/kg):** 699 (Rat)
- ACUTE DERMAL LD₅₀ (mg/kg):** > 2000 (Rabbit)
- ACUTE INHALATION LC₅₀ (mg/l):** > 1.8 mg/l (Rat) (highest attainable concentration)
- OTHER:** Tested as severely irritating to the eye and slightly irritating to the skin (Rabbit).

Data are from laboratory studies conducted on bromacil 80% wettable powder:

- ACUTE ORAL LD₅₀ (mg/kg):** 1650 (Rat)
- ACUTE DERMAL LD₅₀ (mg/kg):** > 5000 (Rat)
- ACUTE INHALATION LC₅₀ (mg/l):** > 4.8 mg/l (Rat)
- OTHER:** Tested as initially irritating to the eye and skin (Rabbit).

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:

Data on 2,4-D acid:

- 96-HOUR LC₅₀ (mg/L):** 358 (Rainbow Trout)
- 96-HOUR LC₅₀ (mg/L):** 263 (Bluegill)
- 48-HOUR EC₅₀ (mg/L):** 36.4 (Daphnia)
- DIETARY LC₅₀ (ppm):** > 5620 (Bobwhite Quail)
- DIETARY LC₅₀ (ppm):** > 5620 (Mallard Duck)

Data on bromacil acid unless otherwise indicated:

- 96-HOUR LC₅₀ (mg/L):** 36 (Rainbow Trout)
- 96-HOUR LC₅₀ (mg/L):** 127 (Bluegill)
- 48-HOUR EC₅₀ (mg/L):** 121 (Daphnia)
- DIETARY LC₅₀ (ppm):** > 10000 (Bobwhite Quail) (Data on bromacil 80% wettable powder)
- DIETARY LC₅₀ (ppm):** > 10000 (Mallard Duck) (Data on bromacil 80% wettable powder)

CHEMICAL FATE INFORMATION: Field dissipation studies conducted on a granular form of 2,4-D dimethylamine salt suggest an average half-life of 2 weeks for 2,4-D acid from application of this product. Field dissipation studies on bromacil demonstrated half-lives of 124 to 155 days.

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.

Do not reuse container for any purpose. Make the empty container unsuitable for further use. Dispose of the container in accordance with provincial requirements.



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14. TRANSPORT INFORMATION

CANADIAN TDG DESCRIPTION (Road & Rail): Not dangerous for transport by road/rail in Canada. Contact manufacturer for updates to transport information.

15. REGULATORY INFORMATION

WHMIS HAZARD CLASS: D2B Toxic Material

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

REVISIONS:

The following has been revised since the last issue of this MSDS: Section 1 revision.

ADDITIONAL INFORMATION:

Abbreviations used throughout the MSDS 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 MSDS contains all of the information required by the CPR.

Company references utilized in preparation of the MSDS.

*****END OF MSDS*****