

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

CROSSBOW* HERBICIDE

Effective Date: 9/9/99
Product Code: 01662
MSDS: 001715

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Crossbow* Herbicide

COMPANY IDENTIFICATION:

Dow AgroSciences
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. COMPOSITION/INFORMATION ON INGREDIENTS:

2,4-Dichlorophenoxyacetic acid, butoxyethyl ester	CAS# 001929-73-3	34.4%
Triclopyr, butoxyethyl ester	CAS# 064700-56-7	16.5%
Inert Ingredients, Total, Including : Kerosene	CAS# 008008-20-6	49.1%

This document is prepared pursuant to the OSHA Hazard Communication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

3. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Hazardous chemical. Reddish brown liquid with sweet odor. May cause moderate eye irritation. Prolonged exposure may cause skin irritation; prolonged skin contact may cause allergic reaction in susceptible individuals. LD₅₀ for skin absorption in rabbits is >5000 mg/kg. Oral LD₅₀ for rats is 1000-2589 mg/kg (males) and 1000-2398 mg/kg (females). LC₅₀ for rats is 5 mg/L (males) and >5 mg/L (females). Flash point: 148F (64C); avoid temperatures above the flash point. Toxic to fish and aquatic organisms.

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POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects which could occur if this material is not handled in the recommended manner.

EYE: May cause moderate eye irritation. Corneal injury is unlikely.

SKIN: Short single exposure may cause slight skin irritation. Prolonged or repeated exposure may cause moderate skin irritation. May cause drying or flaking of skin. A single prolonged exposure is not likely to result in the material being absorbed through the skin in harmful amounts. The LD₅₀ for skin absorption in rabbits is >5000 mg/kg.

INGESTION: Single dose oral toxicity is low. The oral LD₅₀ for rats is 1000-2589 mg/kg (males) and 1000-2398 mg/kg (females). Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. If aspirated (liquid enters the lung), may cause lung damage or even death due to chemical pneumonia.

INHALATION: Excessive exposure may cause irritation to upper respiratory tract (nose and throat). Signs and symptoms of excessive exposure may be central nervous system effects. The LC₅₀ for rats is approximately 5 mg/L (males) and >5 mg/L (females).

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:

Effects have been reported on the following organs: blood, gastrointestinal tract, kidney, liver, muscle, and respiratory tract.

CANCER INFORMATION: Triclopyr did not cause cancer in laboratory animals. Various animal cancer tests have shown no reliable positive association between 2,4-D exposure and cancer. Epidemiology studies on herbicide use have been both positive and negative with the majority being negative. In a life-time animal dermal carcinogenicity study, an increased incidence of skin tumors was observed when kerosene was applied at doses that also produced skin irritation. This response was similar to that produced in skin by other types of chronic chemical/physical irritation. No increase in tumors was observed when non-irritating dilutions of kerosene were applied at equivalent doses, indicating that kerosene is unlikely to cause skin cancer in the absence of long-term continued skin irritation.

TERATOLOGY (BIRTH DEFECTS): Did not cause birth defects; other fetal effects occurred only at doses toxic to the mother.

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REPRODUCTIVE EFFECTS. Triclopyr, laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. Excessive dietary levels of 2,4-D acid have caused decreased weight and survival in off-spring in a rat reproduction study.

4. FIRST AID:

EYES: Flush eyes with plenty of water.

SKIN: Wash off in flowing water or shower.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Remove to fresh air if effects occur. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: The decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: 148°F (64.4°C)

METHOD USED: Setaflash

FLAMMABLE LIMITS

LFL: Not determined

UFL: Not determined

EXTINGUISHING MEDIA: Water fog, foam, CO₂, dry chemical.

FIRE & EXPLOSION HAZARDS: Combustible. Noxious fumes under fire conditions. Contain water from fire fighting to prevent entry to surface and ground water.

FIRE-FIGHTING EQUIPMENT: Use positive pressure self-contained breathing apparatus and full protective clothing.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Use appropriate safety equipment. Use non-combustible absorbent material, such as sand or Zorball, and shovel into suitable container for disposal. Dike area in case of large spills and report to Dow AgroSciences at 800-992-5994. Do not use water for clean up.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

HANDLING: Keep out of reach of children. Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with eyes, skin and clothing. Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet.

STORAGE: Keep product away from open flame. Do not exceed 140°F. Do not store with acids, bases or oxidizing materials. See product label for handling/storage precautions relative to the end use of this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where a potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE(S):

3,5,6-Trichloro-2-pyridinyloxyacetic acid, butoxyethyl ester: Dow AgroSciences Industrial Hygiene Guide is 2 mg/M³ as acid equivalent, Skin.

Kerosene: Dow AgroSciences Industrial Hygiene Guide is 10 mg/M³.

2,4-Dichlorophenoxyacetic acid, butoxyethyl ester: none established for the ester; ACGIH TLV and OSHA PEL are 10 mg/M³ for the acid.

A "skin" notation following the exposure guideline refers to the potential for dermal absorption of the material. It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposure should be considered.

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ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guidelines. When respiratory protection is required for certain operations, use a NIOSH approved air-purifying respirator for organic vapors.

SKIN PROTECTION: Use gloves impervious to this material.

EYE PROTECTION: Use chemical goggles.

APPLICATORS AND ALL OTHER HANDLERS: Please refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: >175°C (kerosene)
VAP PRESS: 0.1mm @ 37.8°C (kerosene)
VAP DENSITY: 4.7 (kerosene)
SOL. IN WATER: Forms an emulsion
SP. GRAVITY: 1.013 @ 20°C/20°C
APPEARANCE: Reddish brown liquid.
ODOR: Sweet odor.

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Avoid temperatures above or near flash point.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Acid, base and oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Noxious fumes, nitrogen oxide, hydrogen chloride and phosgene may result under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

MUTAGENICITY: For the components tested, in-vitro and animal mutagenicity studies were predominantly negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: Based largely or completely on information for triclopyr and 2,4-D. Bioconcentration potential is moderate (BCF between 3 and 5).

DEGRADATION & PERSISTENCE: Based largely or completely on information triclopyr and 2,4-D. Chemical degradation (hydrolysis) is expected in the environment within minutes to hours. Based on information for kerosene. Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD is >40%).

ECOTOXICOLOGY: Based largely or completely on information for triclopyr and 2,4-D. Material is highly toxic to aquatic organisms on an acute basis (LC₅₀/EC₅₀ is between 0.1 and 1 mg/L in most sensitive species). Based on information for kerosene. EC₅₀ is above the water solubility.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Improper disposal of excess wastes are a violation of federal law. 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.

14. TRANSPORT INFORMATION:

For DOT regulatory information, if required, consult transportation regulations, product shipping papers, or contact your Dow AgroSciences representative.

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15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

Chemical Name	CAS Number	Concentration
2,4-D ESTERS	001929-73-3	34.4%

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- An immediate health hazard
- A delayed health hazard
- A fire hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
2,4-D ESTERS	001929-73-3	PA3 NJ3 PA1
KEROSENE	008008-20-6	NJ3 PA1

NJ3=New Jersey Workplace Hazardous Substance (present at greater than or equal to 1.0%).
PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).
PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	1
Flammability	2
Reactivity	0

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:
Category:

Chemical Name	CAS Number	RQ	% in Product
2,4-Dichloro-phenoxyacetic acid, butoxyethyl ester	001929-73-3	100	34.4%

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16. OTHER INFORMATION:

MSDS STATUS: Revised Sections 3,4,6,7,8, & 12
Reference: DR-0224-8411
Replaces MSDS dated: 2/24/99

The Information Herein Is Given In Good Faith, But No
Warranty, Express Or Implied, Is Made. Consult Dow
AgroSciences For Further Information.