

Product Name: Garlon* 4 Herbicide

Issue Date: 2011.09.14

Dow AgroSciences Canada Inc. encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification**Product Name**

Garlon* 4 Herbicide

COMPANY IDENTIFICATION

Dow AgroSciences Canada Inc.
A Subsidiary of The Dow Chemical Company
Suite 2100, 450 1st Street SW,
Calgary, AB T2P 5H1
Canada

For MSDS updates and Product Information: 800-667-3852**Prepared By:** Prepared for use in Canada by EH&S, Hazard Communications.
Revision 2011.09.14**Customer Information Number:** 800-667-3852
solutions@dow.com**EMERGENCY TELEPHONE NUMBER****24-Hour Emergency Contact:** 613-996-6666
Local Emergency Contact: 613-996-6666**2. Hazards Identification****Emergency Overview****Color:** Yellow**Physical State:** Liquid**Odor:** Gasoline-like**Hazards of product:**

DANGER! Combustible liquid and vapor. May cause allergic skin reaction. May cause eye irritation. May cause skin irritation. Harmful or fatal if swallowed; can enter lungs and cause damage. Isolate area. Toxic fumes may be released in fire situations. Highly toxic to fish and/or other aquatic organisms.

Potential Health Effects

Eye Contact: May cause pain disproportionate to the level of irritation to eye tissues. May cause slight eye irritation. Corneal injury is unlikely.

Skin Contact: Brief contact may cause moderate skin irritation with local redness. Repeated contact may cause severe skin irritation with local redness and discomfort. May cause drying and flaking of the skin.

Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Skin Sensitization: Has caused allergic skin reactions when tested in guinea pigs. With the dilute mix, no allergic skin reaction is expected.

Inhalation: Mist may cause irritation of upper respiratory tract (nose and throat).

Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Aspiration hazard: Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

Cancer Information: In a lifetime 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. In long-term animal studies with ethylene glycol butyl ether, small but statistically significant increases in tumors were observed in mice but not rats. The effects are not believed to be relevant to humans. If the material is handled in accordance with proper industrial handling procedures, exposures should not pose a carcinogenic risk to man.

Birth Defects/Developmental Effects: For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

Reproductive Effects: For similar active ingredient(s). Triclopyr. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

3. Composition/information on ingredients

| Component | CAS # | Amount W/W |
|---------------------------------|---------------|---------------------|
| Triclopyr-2-butoxyethyl ester | 64700-56-7 | 61.6 % |
| Kerosene (petroleum) | 8008-20-6 | >= 18.6 - <= 31.0 % |
| Ethylene glycol monobutyl ether | 111-76-2 | 0.5 % |
| Balance | Not available | >= 6.9 - <= 19.3 % |

Amounts are presented as percentages by weight.

4. First-aid measures

Description of first aid measures

General advice: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, then give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask etc). Call a poison control center or doctor for treatment advice.

Skin Contact: Take off contaminated clothing. Wash skin with soap and plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice. Wash clothing before reuse. Shoes and other leather items which cannot be decontaminated should be disposed of properly. Suitable emergency safety shower facility should be available in work area.

Eye Contact: Hold eyes 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 eyes. Call a poison control center or doctor for treatment advice.

Ingestion: Immediately call a poison control center or doctor. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give any liquid to the person. Do not give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), no additional symptoms and effects are anticipated.

Indication of immediate medical attention and special treatment needed

The decision of whether to induce vomiting or not should be made by a 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. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data Sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

Skin contact may aggravate preexisting dermatitis.

5. Fire Fighting Measures

Suitable extinguishing media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Phosgene. Nitrogen oxides. Hydrogen chloride. Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is produced when product burns.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Consider feasibility of a controlled burn to minimize environment damage. Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

See Section 9 for related Physical Properties

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to Section 7, Handling, for additional precautionary measures. No smoking in area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance.

7. Handling and Storage

Handling

General Handling: Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. Keep out of reach of children. Do not swallow. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. Use with adequate ventilation. Wash thoroughly after handling.

Storage

Store in a dry place. Store in original container. Keep container tightly closed. Do not store near food, foodstuffs, drugs or potable water supplies.

8. Exposure Controls / Personal Protection

Exposure Limits

| Component | List | Type | Value |
|---------------------------------|------------|---|---|
| Kerosene (petroleum) | Dow IHG | TWA as total hydrocarbon vapor | 10 mg/m ³ SKIN |
| | CAD BC OEL | TWA Non-aerosol. as total hydrocarbon vapor | 200 mg/m ³ SKIN |
| | ACGIH | TWA Non-aerosol. as total hydrocarbon vapor | 200 mg/m ³ P: Application restricted to conditions in which there are negligible aerosol exposures. |
| | CAD ON OEL | TWAEV as total hydrocarbon vapor | 200 mg/m ³ SKIN |
| | CAD AB OEL | TWA Vapor. as total hydrocarbon vapor | 200 mg/m ³ |
| | CAD AB OEL | SKIN Vapor. as total hydrocarbon vapor | Can be absorbed through the skin. |
| Triclopyr-2-butoxyethyl ester | Dow IHG | TWA | 2 mg/m ³ D-SEN |
| Ethylene glycol monobutyl ether | CAD ON OEL | TWAEV | 20 ppm SKIN |
| | ACGIH | TWA | 20 ppm |
| | CAD AB OEL | TWA | 97 mg/m ³ 20 ppm SKIN |
| | CAD BC OEL | TWA | 20 ppm |

| | | |
|-----------|-----|-----------------------------|
| OEL (QUE) | TWA | 97 mg/m ³ 20 ppm |
| OEL (QUE) | TWA | 97 mg/m ³ 20 ppm |

Consult local authorities for recommended exposure limits.

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

A "skin" notation following the inhalation exposure guideline refers to the potential for dermal absorption of the material including mucous membranes and the eyes either by contact with vapors or by direct skin contact.

It is intended to alert the reader that inhalation may not be the only route of exposure and that measures to minimize dermal exposures should be considered.

A D-SEN notation following the exposure guideline refers to the potential to produce dermal sensitization, as confirmed by human or animal data.

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields).

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Appearance

| | |
|---|--|
| Physical State | Liquid |
| Color | Yellow |
| Odor | Gasoline-like |
| Odor Threshold | No test data available |
| pH | 6.4 <i>pH Electrode</i> |
| Melting Point | Not applicable |
| Freezing Point | No test data available |
| Boiling Point (760 mmHg) | No test data available |
| Flash Point - Closed Cup | 65.5 °C <i>Closed Cup</i> |
| Evaporation Rate (Butyl Acetate = 1) | No test data available |
| Flammable Limits In Air | Lower: No test data available Upper: No test data available |
| Vapor Pressure | No test data available |
| Vapor Density (air = 1) | No test data available |

| | |
|---|-------------------------------------|
| Specific Gravity (H2O = 1) | 1.08 23 °C/4 °C <i>EC Method A3</i> |
| Solubility in water (by weight) | emulsifiable |
| Partition coefficient, n-octanol/water (log Pow) | 4.09 <i>Measured</i> |
| Autoignition Temperature | No test data available |
| Decomposition Temperature | No test data available |
| Kinematic Viscosity | 11.2 cSt @ 20 °C |

10. Stability and Reactivity

Reactivity

No dangerous reaction known under conditions of normal use.

Chemical stability

Thermally stable at typical use temperatures.

Possibility of hazardous reactions

Polymerization will not occur.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Acids. Bases. Oxidizers.

Hazardous decomposition products

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Carbon monoxide. Carbon dioxide. Hydrogen chloride. Nitrogen oxides. Phosgene. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity

Ingestion

LD50, Rat 1,338 mg/kg

Dermal

LD50, Rabbit > 2,000 mg/kg

Inhalation

LC50, 4 h, Aerosol, Rat > 5.2 mg/l

No deaths occurred at this concentration.

Eye damage/eye irritation

May cause pain disproportionate to the level of irritation to eye tissues. May cause slight eye irritation. Corneal injury is unlikely.

Skin corrosion/irritation

Brief contact may cause moderate skin irritation with local redness. Repeated contact may cause severe skin irritation with local redness and discomfort. May cause drying and flaking of the skin.

Sensitization

Skin

Has caused allergic skin reactions when tested in guinea pigs. With the dilute mix, no allergic skin reaction is expected.

Respiratory

No relevant information found.

Repeated Dose Toxicity

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Chronic Toxicity and Carcinogenicity

Active ingredient did not cause cancer in laboratory animals. In a lifetime 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. In long-term animal studies with ethylene glycol butyl ether, small but statistically significant increases in tumors were observed in mice but not rats. The effects are not believed to be relevant to humans. If the material is handled in accordance with proper industrial handling procedures, exposures should not pose a carcinogenic risk to man.

Carcinogenicity Classifications:

| Component | List | Classification |
|---------------------------------|-------|---|
| Kerosene (petroleum) | ACGIH | Confirmed animal carcinogen with unknown relevance to humans.; Group A3 |
| Ethylene glycol monobutyl ether | ACGIH | Confirmed animal carcinogen with unknown relevance to humans.; Group A3 |

Developmental Toxicity

For the active ingredient(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

Reproductive Toxicity

For similar active ingredient(s). Triclopyr. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. For kerosene: Limited data in laboratory animals suggest that the material does not affect reproduction.

Genetic Toxicology

Contains a component(s) which were negative in in vitro genetic toxicity studies. Contains component(s) which were negative in animal genetic toxicity studies.

12. Ecological Information

Toxicity

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested). Material is slightly toxic to birds on an acute basis (LD50 between 501 and 2000 mg/kg).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (*Oncorhynchus mykiss*), flow-through, 96 h: 0.984 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea *Daphnia magna*, flow-through, 48 h, immobilization: 0.35 mg/l

Aquatic Plant Toxicity

EbC50, green alga *Pseudokirchneriella subcapitata* (formerly known as *Selenastrum capricornutum*), biomass growth inhibition, 72 h: 10.6 mg/l

Toxicity to Above Ground Organisms

oral LD50, bobwhite (*Colinus virginianus*)

oral LD50, Honey bee (*Apis mellifera*)

contact LD50, Honey bee (*Apis mellifera*)

Toxicity to Soil Dwelling Organisms

LC50, Earthworm *Eisenia foetida*, adult, 14 d: 2,552 mg/kg

Persistence and Degradability

Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

Bioaccumulative potential

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient, n-octanol/water (log Pow): 4.09 Measured

Bioconcentration Factor (BCF): Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5). 505

Mobility in soil

Mobility in soil: No relevant data found.

13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

TDG Small container
NOT REGULATED

TDG Large container
NOT REGULATED

IMDG

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S

Technical Name: Contains Triclopyr-2-butoxyethyl Ester, KEROSENE

Hazard Class: 9 **ID Number:** UN3082 **Packing Group:** PG III

EMS Number: f-a,s-f

Marine pollutant.: Yes

ICAO/IATA

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S

Technical Name: Contains Triclopyr-2-butoxyethyl Ester, KEROSENE

Hazard Class: 9 **ID Number:** UN3082 **Packing Group:** PG III

Cargo Packing Instruction: 964

Passenger Packing Instruction: 964

15. Regulatory Information

CEPA - Domestic Substances List (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

Hazardous Products Act Information: CPR Compliance

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

Hazardous Products Act Information: WHMIS Classification

This product is exempt under WHMIS.

Pest Control Products Act Registration number: 21053

National Fire Code of Canada

Class IIIA

16. Other Information

Hazard Rating System

| | | | |
|-------------|---------------|-------------|-------------------|
| NFPA | Health | Fire | Reactivity |
| | 2 | 2 | 1 |

Recommended Uses and Restrictions

Identified uses

Product use: End use herbicide product

Revision

Identification Number: 50683 / 1023 / Issue Date 2011.09.14 / Version: 5.0

DAS Code: XRM-4714

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

| | |
|---------|---|
| N/A | Not available |
| W/W | Weight/Weight |
| OEL | Occupational Exposure Limit |
| STEL | Short Term Exposure Limit |
| TWA | Time Weighted Average |
| ACGIH | American Conference of Governmental Industrial Hygienists, Inc. |
| DOW IHG | Dow Industrial Hygiene Guideline |
| WEEL | Workplace Environmental Exposure Level |
| HAZ_DES | Hazard Designation |
| VOL/VOL | Volume/Volume |

Dow AgroSciences Canada Inc. urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided 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 between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.