SAFETY DATA SHEET

Dow AgroSciences

Emergency Phone: 0800 844 455
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Dow AgroSciences (N Z) Ltd.
89 Paritutu Road, New Plymouth

PRODUCT: TORDON™ BRUSHKILLER XT

Effective Date: 8 April 2013
Product Code: 101205028

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Tordon™ Brushkiller XT
RECOMMENDED USES: Broadleaf herbicide

COMPANY IDENTIFICATION:
Dow AgroSciences (NZ) Ltd.
Registration No. 169964
89 Paritutu Road, New Plymouth

Customer Service Toll Free Number:
0800 803 939
(Mon-Fri, 8am–4.30 pm)
www.dowagrosciences.co.nz

Emergency Telephone Numbers:
24-Hour Emergency Contact: +64 6 751 2407
Local Emergency Contact: 0800 844 455

For medical advice, contact the New Zealand Poisons Information Centre:
0800 POISON (0800 764 766)

Transport Emergency Only Dial 111

This SDS may not provide exhaustive guidance for all the HSNO controls assigned to this substance. The NZ EPA website www.epa.govt.nz should be consulted for a full list of triggered controls and cited regulations

2. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW
Classified as Hazardous.
Classified as Dangerous Goods for transport.

HSNO Hazard Classification: 3.1D, 6.1D, 6.3B, 6.4A, 6.5B, 6.9B, 9.1A, 9.2A, 9.3C

Hazard Statements:
Combustible liquid.
Harmful if swallowed.
Causes mild skin irritation and eye irritation.
May cause an allergic skin reaction.
May cause damage to organs through prolonged or repeated exposure.
Very toxic to aquatic life with long-lasting effects.
Very toxic to the soil environment.
Harmful to terrestrial vertebrates.

Precautionary Statements:
Keep out of reach of children.
Read label before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat and open flames. No smoking.
Do not breathe mist.
Wash hands and face thoroughly after handling.
Use of personal protective equipment is required. Wear protective gloves, clothing and eye protection
Contaminated work clothing should not be allowed out of the work place.
Avoid release to the environment.

3. COMPOSITION/ INFORMATION ON INGREDIENTS:

Ingredient	CAS #	Content
Triclopyr Butoxyethyl ester	64700-56-7	36.4%
Picloram as the hexyloxypropylalmine salt	1918-02-1	8.7%[1]
Aminopyralid as the hexyloxypropylalmine salt	150114-71-9	0.7%[1]
Balance not individually contributing to hazard classification		54.2%

[1] Salt

4. FIRST AID:

Consult the National Poisons Information Centre (0800 POISON (0800 764 766) or a doctor in every case of suspected chemical poisoning. Never give fluids or induce vomiting if a patient is unconscious or convulsing regardless of cause of injury. If breathing difficulties occur seek medical attention immediately.

EYES: Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, and then continue rinsing eyes. Call the National Poisons Information Centre or doctor for treatment advice.

SKIN: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call the National Poisons Information Center or doctor for treatment advice.

INGESTION: Call the National Poisons Information Center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the National Poisons Information

Centre or doctor. Never give anything by mouth to an unconscious person.

INHALATION: Move person to fresh air. If person is not breathing, call an emergency responder or ambulance, and then give artificial respiration; if by mouth-to-mouth use rescuer protection (pocket mask etc.). Call the National Poisons Information Center or doctor for treatment advice.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

HAZCHEM: 1X

FLASH POINT: 82 °C (PMCC)

FLAMMABLE LIMITS
LFL: Not determined
UFL: Not determined

EXTINGUISHING MEDIA: Alcohol-resistant foam, water fog, CO_2, and/or dry chemical.

FIRE & EXPLOSION HAZARDS: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

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

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: DO NOT touch or walk through spilled material. Wear a face shield or goggles, overalls buttoned to neck and wrist, chemical resistant gloves and boots. Stop leak when safe to do so. Dike area and prevent entry into waterways, and drains, or coming into contact with HSNO Class 1, 2, 3.2, 4 or 5 substances. **Small spills/leaks:** Absorb with material such as sand, soil or sawdust. Collect spilled product and place in sealable container for disposal. Spill residues may be cleaned using water and detergent. Contain and absorb wash water for disposal. Absorb and collect washings and place in the same sealable container for disposal. Dike the area of large spills and report them to Dow AgroSciences Emergency Services at 0800 844 455

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

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

STORAGE: Store in tightly closed original container in a cool, dry well-ventilated area out of direct sunlight when not in use. Do not store with food, feedstuffs, fertilizers and seeds. See product label for further handling/storage precautions relative to the end use of this product.

This substance is subject to a requirement for an emergency management plan, secondary containment and signage, whenever it is held in quantities of 100 litres or more, either alone on in aggregate with other hazardous substances. See Hazardous substances Emergency Management and Identification Regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

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

EXPOSURE GUIDELINE(S):
Triclopyr BEE: Dow AgroSciences Industrial Hygiene Guide is 2 mg/m^3 as acid equivalent, Skin.
Picloram: NOHSC TWA is 10 mg/m^3. OSHA PEL is 15 mg/m^3 total dust, 5 mg/m^3 respirable.

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 exposures should be considered.

No WES TEL has been set for this product by NZ EPA

Aminopyralid, EEL_{water} = 0.06 mg/L
Aminopyralid, EEL_{soil} = 0.00002 mg/kg

Aminopyralid, $EEL_{surface\ deposition}$ = 0.005 g/ha

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 an approved air-purifying respirator. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

SKIN PROTECTION: When prolonged or frequently repeated contact could occur, use chemically protective clothing resistant to this material. Selection of specific items such as face shield, gloves, boots, apron, or full-body suit will depend on operation.

EYE PROTECTION: Use chemical goggles. Eye wash fountain should be located in the immediate work area.

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

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE:	Liquid
ODOUR:	Ester
SPECIFICGRAVITY:	1.148 g/mL
VAPOUR PRESSURE:	Not available for substance (triclopyr BE = 3.60×10^{-6} mmHg @ 25 °C ; Picloram acid = 6.16×10^{-7} mm Hg at 35 °C), aminopyralid acid = 19×10^{-5} mm Hg
SOLUBILITY IN WATER:	Emulsifiable
pH:	6.9 (1% solution)

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID): Avoid strong acids, bases, and oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Nitrogen oxides, hydrogen chloride, and phosgene may result under fire conditions.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

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. May cause slight temporary corneal injury. Classified 6.4A.

SKIN: Prolonged or repeated skin contact may cause skin irritation. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Classified 6.3B and 6.5B.

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. Classified 6.1D.

INHALATION: Prolonged exposure is not expected to cause adverse effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Repeated excessive exposures to high amounts of picloram may cause liver effects. For triclopyr BEE, in animals, effects have been reported on the following organs: blood, kidney and liver. For aminopyralid, in animals, effects have been reported on the following organs: gastrointestinal tract. Classified 6.9B.

CANCER INFORMATION: The active ingredients did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): The active ingredients did not cause birth defects.

REPRODUCTIVE EFFECTS: Picloram and aminopyralid, in laboratory animal studies, did not interfere with

reproduction. For triclopyr acid, in laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

MUTAGENICITY (EFFECTS ON GENETIC MATERIAL):
For triclopyr, in-vitro and animal genetic toxicity studies were negative. The preponderance of data shows picloram to be non-mutagenic in in-vitro and animal test systems. For aminopyralid, in-vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:
MOVEMENT AND PARTITIONING: Based largely or completely on information for triclopyr BEE.
Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Measured log octanol/water partition coefficient (Log Pow) is 4.09-4.49.
Based largely or completely on information for picloram.
Bioconcentration potential is moderate (BCF is between 100 and 3000 or Log Pow between 3 and 5).
Potential for mobility in soil is very high (Koc is between 0 and 50).
Log octanol/water partition coefficient (Log Pow) is estimated using a structural fragment method to be 2.27.
Log soil organic carbon/water partition coefficient (Log Koc) is 1.23.
Bioconcentration factor (BCF) in fish is between 31 - 135.
Based largely or completely on information for aminopyralid.
Bioconcentration potential is low (BCF is <100 or Log Pow <3).
Log octanol/water partition coefficient (Log Pow) is estimated using a structural fragment method to be 0.72.

DEGRADATION AND PERSISTENCE: Based largely or completely on information for triclopyr BEE.
Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.
Biodegradation reached in CO_2 Evolution Test (Modified Sturm Test, OECD Test No. 301B) after 28 days: 18%.
The photolysis half-life in water is 6.6 days.
Under aerobic soil conditions the half-life is 6-52 days.
The hydrolysis half-life is 12 hours.
Theoretical Oxygen Demand (ThOD) is calculated to be 1.39 p/p.
Based largely or completely on information for picloram.
In the atmospheric environment, material is estimated to have a tropospheric half-life of 12.21 days.
The photolysis half-life in water is 2.3-9.58 days.
Under aerobic soil conditions the half-life is 167-513 days.
Under anaerobic soil conditions the half-life is >300 days.
The hydrolysis half-life is >1.8 years.
Theoretical Oxygen Demand (ThOD) is calculated to be 0.99 p/p.
Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.
Biodegradation reached in Manometric Respirometry Test (OECD Test No. 301 F) after 28 days: 0%.
Based largely or completely on information for aminopyralid.
Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.
Biodegradation reached in Manometric Respirometry Test (OECD Test No. 301 F) after 28 days is 0%.
The rate constant for the vapour phase reaction with photochemically produced hydroxyl radicals at 25°C is estimated to be 1.6646 E^{-12} cm^3/molecule-sec at 25°C.
In the atmospheric environment, material is estimated to have a tropospheric half-life of 6.426 days.

ECOTOXICOLOGY: Based largely or completely on information for triclopyr BEE.
Material is highly toxic to aquatic organisms on an acute basis (LC_{50} between 0.1 and 1 mg/L in most sensitive species).
Material is slightly toxic to birds on an acute basis (LD_{50} between 501 and 2000 mg/kg).
Material is practically non-toxic to birds on a dietary basis (LC_{50} >5000 ppm).
Growth inhibition EC_{50} in duckweed *(Lemna* sp.*)* is 2.2 mg/L.
Growth inhibition EC_{50} for diatom *(Navicula* sp.*)* is 0.193 mg/L.
Growth inhibition EC_{50} for marine diatom *(Skeletonema costatum)* is 1.17 mg/L.
Growth inhibition EC_{50} for blue-green alga *(Anabaena flos-aquae)* is 2.27 mg/L.
Acute oral LD_{50} in honeybee *(Apis mellifera)* is >110 µg/bee.

Acute contact LD_{50} in honeybee *(Apis mellifera)* is >100 µg/bee.

Based largely or completely on information for picloram.

Material is moderately toxic to aquatic organisms on an acute basis (LC_{50} or EC_{50} between 1 and 10 mg/L in most sensitive species).

Material is practically non-toxic to birds on an acute basis (LD_{50} is >2000 mg/kg).

Acute contact LD_{50} in honeybee *(Apis mellifera)* is >0.100 mg/bee.

Acute oral LD_{50} in honeybee *(Apis mellifera)* is >0.100 mg/bee.

The LC_{50} for earthworm *(Eisenia foetida)* is >5000 mg/kg.

Based largely or completely on information for aminopyralid.

Material is slightly toxic to aquatic organisms on an acute basis (LC_{50} or EC_{50} is between 10 and 100 mg/L in the most sensitive species tested).

Material is practically non-toxic to birds on an acute basis (LD_{50} is >2000 mg/kg).

Material is practically non-toxic to birds on a dietary basis (LC_{50} is >5000 mg/kg).

Acute oral LD_{50} in honeybee *(Apis mellifera)* is >120 µg.

Acute contact LD_{50} in honeybee *(Apis mellifera)* is >100 µg.

The LC_{50} in earthworm *(Eisenia foetida)* is >1000 mg/kg.

Growth inhibition EC_{50} in marine diatom *(Skeletonema costatum)* is 77 mg/L.

Growth inhibition EC_{50} in diatom *(Navicula sp.)* is 18 mg/L.

Growth inhibition EC_{50} in green alga *(Selenastrum capricornutum)* is 32 mg/L.

Growth inhibition EC_{50} in duckweed *(Lemna sp.)* is >88 mg/L

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: 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 and regulations.

14. TRANSPORT INFORMATION:

PUBLIC PASSENGER VEHICLE TRANSPORT: To be transported ONLY in the sealed original container. Maximum volume permitted to be transported in a passenger service vehicle: 100mL

DANGEROUS GOODS CLASSIFICATION

UN No:	3082
Class:	9
Packing group:	III
SHIPPING NAME:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (triclopyr BEE, picloram) Marine pollutant

Compliance with the above land, rail, marine and air requirements is deemed to comply with the applicable requirements of the Hazardous substances Identification and Emergency Management Regulations.

15. REGULATORY INFORMATION:

ACVMG APPROVAL NUMBER: P7545
NZ EPA New Zealand Approval Code: HSR007630

16. OTHER INFORMATION:

Glossary

ACGIH: American Conference of Governmental Industrial Hygienists.

BCF: Bioconcentration Factor - a measure for the characterization of the accumulation of a chemical in an organism. It is defined as the concentration of a chemical in an organism (plants, microorganisms, animals) divided by the concentration in a reference compartment (e.g. food, surrounding water).

EC_{50}: median effective concentration. Statistically derived concentration of a substance in an environmental medium expected to produce a certain effect in 50% of test organisms in a given population under a defined set of conditions.

EEL: Environmental exposure standard set by NZ EPA

Explosive Limits: The range of concentrations (% by volume in air) of a flammable gas or vapour that can result in an explosion for ignition in a confined space.

NZ EPA: The Environmental Protection Authority of New Zealand.

K_{oc}: the organic carbon partition coefficient (mL soil water /g organic carbon)**.**

K_{ow}: See P_{ow}
LC_{50}: Lethal Concentration 50%. A concentration of chemical in air or water that will kill 50% of the test organisms.
LD_{50}: Lethal Dose-50%. The doses of a chemical that will kill 50% of the test animals receiving it.
NIOSH: American national Institute of Occupational Safety and Health, a federal agency which conducts research on occupational safety and health questions and recommends new standards.
OSH: Occupational Safety and Health Service of New Zealand.
OSHA: American Occupational Safety and Health Administration.
PEL: Permissible Exposure Level, a maximum allowable exposure level by law.
pH: Measure of how acidic or alkaline a material is using a 1 - 14 scale. pH 1 is strongly acidic and pH 14 strongly alkaline.
Polymerisation: a chemical reaction in which small molecules (monomers) combine to form much larger molecules (polymers). A hazardous polymerisation reaction is one that occurs at a fast rate and releases large amounts of energy.
P_{ow}: The octanol-water partition coefficient is the ratio of the concentration of a chemical in octanol and in water at equilibrium and at a specified temperature. Octanol is an organic solvent that is used as a surrogate for natural organic matter. This parameter is used in many environmental studies to help determine the fate of chemicals in the environment.
STEL: Short-Term Exposure Limit. A term used to indicate the maximum average concentration allowed for a continuous 15 minute exposure period.
TEL: Tolerable Exposure Limit set by NZ EPA
TVL: Threshold Limit Value, an exposure limit set by a competent authority
TWA: Time Weighted Average. The average concentration of a chemical in air over the total exposure time - usually an 8-hour workday.
WES: Work place exposure standard set by NZ EPA or OSH.

References

AS/NZS 1715-1994 Selection Use and Maintenance of Respiratory Protective Devices.
ASNZS 1716 - 1994 Respiratory protective devices.
A guide to Respiratory Protection (published by the Occupational Safety and Health Service with support of NZ Safety Ltd 1999
Guidelines for Personal Protection for Agrichemical Users NZ Safety Limited.
Environmental Protection Authority Decision for NZ EPA Approval Code (Refer to Section 15).
Land Transport Rule 45001: Dangerous Goods 1999.
International Maritime Dangerous Goods Code (IMDG)
Maritime Rule 24A Carriage of Cargoes-Dangerous Goods
International Air Transport Association (IATA) Dangerous Goods Regulation

VERSION TRACKING
Replaces version dated: 7 August 2007
Sections amended: 5
Product code: GF-1544

FOR FURTHER PRODUCT INFORMATION CALL DOW AGROSCIENCES CUSTOMER SERVICE REPRESENTATIVES TOLL FREE 0800 803 939 DURING BUSINESS HOURS.

Dow AgroSciences (NZ) Ltd. urges each customer or recipient of this SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this 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 SDSs, we are not and cannot be responsible for SDSs obtained from any source other than ourselves. If you have obtained an SDS from another source or if you are not sure that the SDS you have is current, please contact us for the most current version.