Dow AgroSciences (Australia) Ltd. 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™ 600 HERBICIDE

COMPANY IDENTIFICATION
Dow AgroSciences Australia Ltd.
Level 5, 20 Rodborough Rd
Frenchs Forest, NSW, 2086
Australia

Customer Information Number: 1800-700-096
auscustomerservice@dow.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: +61 3-9663-2130
Local Emergency Contact: 1800 033 882

For advice, contact a doctor (at once) or the Australian Poisons Information Centre: 131 126

Transport Emergency Only Dial 000

2. Hazards Identification

HAZARDOUS SUBSTANCES CLASSIFICATION: Classified as hazardous to health according to the criteria of the National Occupational Health and Safety Commission, Australia

RISK PHRASES:

R22	Harmful if swallowed
R36	Irritating to eyes
R43	May cause sensitization by skin contact
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES:

S2	Keep out of reach of children
S23	Do not breathe vapor/spray
S24/25	Avoid contact with skin and eyes
S28	After contact with skin, wash immediately with plenty of soap and water.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection
S62	If swallowed, do not induce vomiting: seek medical advice immediately.

3. Composition Information

Component	CASRN	Concentration
Triclopyr-2-butoxyethyl ester	64700-56-7	71.1 %
Diethylene glycol monoethyl ether	111-90-0	18.7 %
Balance	Not applicable	10.2 %.

4. First Aid Procedures

Consult the Poisons Information Centre (Ph Australia 131 126) 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.

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. If breathing is difficult, oxygen should be administered by qualified personnel.

Skin Contact: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.

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. Suitable emergency eye wash facility should be available in work area.

Ingestion: Seek medical attention immediately. 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 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

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.

5. Fire Fighting Measures

HAZCHEM: 2X

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.

Extinguishing Media to Avoid: Do not use direct water stream. May spread fire.

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: Sulfur oxides. Nitrogen oxides. Hydrogen fluoride. Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: Container may vent and/or rupture due to fire. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

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. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. 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). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

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. 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. See Section 13: Disposal Considerations, for additional information.

7. Handling and Storage

Precautions for safe handling: 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. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies.

8. Exposure Controls / Personal Protection

Control parameters
Exposure limits are listed below, if they exist

Component	List	Type	Value
Diethylene glycol monoethyl ether	AIHA WEEL	TWA	140 mg/m3 25 ppm
Triclopyr-2-butoxyethyl ester	Dow IHG	TWA	2 mg/m3 D-SEN

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 “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.

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.

Exposure controls
Engineering controls: Use engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.

Individual protection measures
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. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly. Items which cannot be decontaminated, such as shoes, belts and watchbands, should be removed and disposed of properly.
Hand protection: Use chemical resistant gloves classified under standard AS/NZS 2161.10: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Butyl rubber. Polyethylene. Ethyl vinyl alcohol laminate (“EVAL”). Examples of acceptable glove barrier materials include: Neoprene. Nitrile/butadiene rubber (“nitrile” or “NBR”). When prolonged or frequently repeated contact may occur, a glove with a protection class of 6 or higher (breakthrough time greater than 480 minutes according to AS/NZS 2161.10) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to AS/NZS 2161.10) is recommended. 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, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Other Information

Selection and use of personal protective equipment should be in accordance with the recommendations in one or more of the relevant Australian/New Zealand Standards, including:
AS/NZS 1336: Recommended practices for eye protection in the industrial environment.
AS/NZS 1337: Eye protectors for industrial applications.
AS/NZS 1715: Selection, use and maintenance of respiratory protective devices.
AS/NZS 2161: Occupational protective gloves.
AS/NZS 2210: Occupational protective footwear.
AS/NZS 4501: Occupational protective clothing set.

9. Physical and Chemical Properties

Appearance	
Physical State	Liquid.
Color	Brown
Odor	Odorless
Odor Threshold	Odorless
pH	6.7 *pH Electrode*
Melting Point	Not applicable
Freezing Point	No test data available
Boiling Point (760 mmHg)	No test data available.
Flash Point - Closed Cup	95 °C *Closed Cup*
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	No 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)	1.2
Specific Gravity (water = 1)	No test data available
Solubility in water (by weight)	Emulsifiable
Auto-ignition Temperature	No test data available
Decomposition Temperature	No test data available
Kinematic Viscosity	No test data available
Explosive properties	No data available
Oxidizing properties	No data available
Liquid Density	1.2 g/ml @ 20 °C *ANZ-01*

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. Stability and Reactivity

Reactivity: No dangerous reaction known under conditions of normal use.

Chemical stability: Unstable at elevated temperatures.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose.

Incompatible Materials: Avoid contact with: Strong 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 fluoride. Nitrogen oxides. Sulfur oxides.

11. Toxicological Information

Acute Toxicity

Acute oral toxicity
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.
As product: LD50, rat, male > 2,000 mg/kg

Dermal
Prolonged skin contact is unlikely to result in absorption of harmful amounts.
As product: LD50, rabbit > 2,000 mg/kg

Inhalation
No adverse effects are anticipated from single exposure to vapor.

Eye damage/eye irritation
May cause slight eye irritation. Corneal injury is unlikely. Vapor or mist may cause eye irritation.

Skin corrosion/irritation
Prolonged contact may cause slight skin irritation with local redness.

Sensitization
Skin: Has caused allergic skin reactions when tested in guinea pigs.

Specific Target Organ Systemic Toxicity (Repeated Exposure)
In animals, effects have been reported on the following organs:
For the active ingredient(s): Kidney. Liver.
For the solvent(s): Blood. Kidney. Liver. Testes.

Carcinogenicity
For active ingredient(s). Did not cause cancer in laboratory animals.
For the solvent(s): Did not cause cancer in laboratory animals.

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.
For the solvent(s): Did not cause birth defects or any other fetal effects in laboratory animals.

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

For the solvent(s): Studies in laboratory animals indicate that diethylene glycol monoethyl ether (DEGEE) is not a reproductive toxicant even when given in large amounts (a few percent in the drinking water). However, at the highest doses, it caused some toxic effects in offspring of treated animals: increased liver weight, decreased brain weight, reduced sperm motility.

Genetic Toxicology
For the active ingredient(s): *In vitro* genetic toxicity studies were negative. Animal genetic toxicity studies were negative.
For the solvent(s): *In vitro* genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

12. Ecological Information

Ecotoxicity

Triclopyr-2-butoxyethyl ester

Material is very toxic to aquatic organisms (LC50/EC50/IC50 below 1 mg/L in the most sensitive species). Material is slightly toxic to birds on an acute basis (LD50 between 501 and 2000 mg/kg). Material is slightly toxic to birds on a dietary basis (LC50 between 1001 and 5000 ppm).

Fish Acute & Prolonged Toxicity
LC50, *Lepomis macrochirus* (Bluegill sunfish), flow-through test, 96 h: 0.36 mg/l
LC50, fish, 96 h: 0.310 mg/l

Aquatic Invertebrate Acute Toxicity
EC50, *Daphnia magna* (Water flea), 48 h, immobilization: 2.9 mg/l

Aquatic Plant Toxicity
ErC50, *Pseudokirchneriella subcapitata* (green algae), Growth rate inhibition, 96 h: > 3.00 mg/l
EbC50, D*iatom navicula* sp., biomass growth inhibition, 120 h: 0.193 mg/l
EbC50, *Lemna gibba*, biomass growth inhibition: 2.2 mg/l

Fish Chronic Toxicity Value (ChV)
Rainbow trout (*Oncorhynchus mykiss*), NOEC: 0.0263 mg/l

Aquatic Invertebrates Chronic Toxicity Value
Daphnia magna (Water flea), 21 d, number of offspring, NOEC: 1.6 mg/l

Toxicity to Above Ground Organisms
oral LD50, *Colinus virginianus* (Bobwhite quail): 735 mg/kg bodyweight.
dietary LC50, *Colinus virginianus* (Bobwhite quail): 1890 mg/kg diet.
oral LD50, *Apis mellifera* (bees): > 110 ug/bee
contact LD50, *Apis mellifera* (bees): > 100 ug/bee

Toxicity to Soil Dwelling Organisms
LC50, *Eisenia fetida* (earthworms), 14 d: > 521 mg/kg

Diethylene glycol monoethyl ether

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

Fish Acute & Prolonged Toxicity
LC50, *Ictalurus catus* (catfish), flow-through test, 96 h: 6,010 mg/l

Aquatic Invertebrate Acute Toxicity
LC50, *Daphnia magna* (Water flea), static test, 48 h, mortality: 1,982 mg/l

Aquatic Plant Toxicity
Based on information for a similar material: ErC50, *Desmodesmus subspicatus* (green algae), static test, Growth rate inhibition, 96 h: > 100 mg/l

Toxicity to Micro-organisms
EC10; Bacteria, 16 h: 4,000 mg/l

Persistence and Degradability

Triclopyr-2-butoxyethyl ester

Chemical degradation (hydrolysis) is expected in the environment. Material is expected to biodegrade only very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
Stability in Water (1/2-life): 8.7 d; 25 °C; pH 7
OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
18 %	28 d	OECD 301B Test	fail

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
2.3E-11 cm3/s	5.6 h	Estimated.

Theoretical Oxygen Demand: 1.21 mg/mg

Triclopyr butoxyethyl ester is rapidly metabolised to triclopyr in the environment and eventually to carbon dioxide. Triclopyr half-life in soil ranges from 1 – 90 days. Triclopyr is mainly broken down by sunlight in water with a half-life of 1 – 10 days. The half-life in plants is 3 – 10 days.

Diethylene glycol monoethyl ether

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% biodegradation in OECD test(s) for inherent biodegradability).
OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
90 %	28 d	OECD 301E Test	pass
> 90 %	5.5 d	OECD 302B Test	Not applicable

Bioaccumulative potential

Triclopyr-2-butoxyethyl ester

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient, n-octanol/water (log Pow): 4.62
Bioconcentration Factor (BCF): 110; fish

Diethylene glycol monoethyl ether

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).
Partition coefficient, n-octanol/water (log Pow): -0.54 Measured

Mobility in soil

Triclopyr-2-butoxyethyl ester

Mobility in soil: Calculation of meaningful sorption data was not possible due to very rapid degradation in the soil.,
For the degradation product: Triclopyr: Potential for mobility in soil is very high (Koc between 0 and 50). However it is not considered sufficiently mobile to contaminate groundwater.
Henry's Law Constant (H): 2.9E-03 Pa*m3/mole.

Diethylene glycol monoethyl ether

Mobility in soil: Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient, soil organic carbon/water (Koc): 20 Estimated.
Henry's Law Constant (H): 2.22E-08 atm*m3/mole; 25 °C Estimated.

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

ADG
ROAD AND RAIL TRANSPORT:

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 are not subject to the ADG Code when transported by road or rail in; packaging that does not exceed 500 L (kg); or IBCs not exceeding 3000 L (kg), (Special Provision AU01).
Note: Goods may be shipped under AU01 even if marked as a dangerous good for sea or air transport (Dangerous Goods regulation (2014) clause 75, subclause 4)

Classification for SEA transport (IMO-IMDG):

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (TRICLOPYR) Marine pollutant.
UN number	3082
Class	9
Packing group	III
Marine pollutant	Triclopyr
Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S (TRICLOPYR)
UN number	3082
Class	9
Packing group	III

Note: Environmentally Hazardous Substances may be shipped as "not restricted" when meeting the descriptions of UN 3077 or UN 3082 as they are not subject to the IMO-IMDG or IATA/ICAO Codes when transported in packaging that does not exceed 5 L or 5kg nett and the packaging used meets defined standards, (Special Provision A197)

Hazchem Code
2X

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

Label
Classification and labeling have been performed according to regulations.

RISK PHRASES:

R22	Harmful if swallowed
R36	Irritating to eyes
R43	May cause sensitization by skin contact
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES:

S2	Keep out of reach of children
S23	Do not breathe vapor/spray
S24/25	Avoid contact with skin and eyes
S28	After contact with skin, wash immediately with plenty of soap and water.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection
S62	If swallowed, do not induce vomiting: seek medical advice immediately.

Poison Schedule: 6
APVMA Approval Number: 31898

Australia Inventory of Chemical Substances (AICS)
The product is used in a biocide/pesticide application and is subject to the applicable regulation. It contains a component exempt from inventory listing requirements. Because an intentional component of the product is not on the inventory, the product may only be used in the exempt application.

16. Other Information

Revision
Identification Number: 52481 / 4069 / Issue Date 11.03.2015 / Version: Replaces 16.08.2013
DAS Code: IWD-3483
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

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

DOW AGROSCIENCES AUSTRALIA LIMITED 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.

