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
Verdict™ 520 Herbicide

COMPANY IDENTIFICATION
Dow AgroSciences (Australia) Ltd.
A Subsidiary of The Dow Chemical Company
ABN 24 003 771 659
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
R22 Harmful if swallowed.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

3. Composition Information

Component	Amount	Classification:	CAS #
methyl (R)-2-(4-(3-chloro-5-trifluoro methyl-2-pyridyloxy)phen oxy) propionate	46.9 %	Xn: R22; N: R50/53	72619-32-0

Diethylene glycol monoethyl ether	> 40.0 - < 50.0 %	Not classified.	111-90-0
Haloxyfop	< 1.0 %	Xn: R22; N: R50, R53	69806-34-4

See Section 16 for full text of R-phrases.

4. First Aid Procedures

Consult the Poisons Information Centre (Australia 131126) 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: 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. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
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: Call a poison control 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 poison control center or doctor. Never 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

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: Hydrogen fluoride. 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.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. 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.

Hazchem: 2X•
See Section 9 for related Physical Properties

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep personnel out of low areas. 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. Spills or discharge to natural waterways is likely to kill aquatic organisms.
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

Handling
General Handling: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor or mist. Wash thoroughly after handling. Use with adequate ventilation. 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. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

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

Exposure Limits

Component	List	Type	Value
Diethylene glycol monoethyl ether	AIHA WEEL	TWA	140 mg/m3 25 ppm
Haloxyfop	Dow IHG	TWA	2 mg/m3

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.

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields).
Skin Protection: No precautions other than clean body-covering clothing should be needed.
Hand protection: Chemical protective gloves should not be needed when handling this material. Consistent with general hygienic practice for any material, skin contact should be minimized.
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. For most conditions no respiratory protection should be needed; however, if discomfort is experienced, 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.

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.

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 2919: Industrial clothing.

9. Physical and Chemical Properties

Appearance	
Physical State	Liquid.
Color	Brown
Odor	Solvent
Odor Threshold	No test data available
pH	5.4 *CIPAC MT 75.2*
Melting Point	Not applicable
Freezing Point	No test data available
Boiling Point (760 mmHg)	202 °C *Literature* (solvent).
Flash Point - Closed Cup	97.5 °C *Pensky-Martens Closed Cup ASTM D 93*
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	No data available
Flammable Limits In Air	**Lower**: 1.2 %(V) *Literature* (solvent) **Upper**: 8.5 %(V) *Literature* (solvent)
Vapor Pressure	14 mmHg @ 20 °C *Literature*
Vapor Density (air = 1)	1.148
Specific Gravity (H2O = 1)	116 *Literature*
Solubility in water (by weight)	emulsifiable
Autoignition Temperature	No test data available
Decomposition Temperature	No test data available
Dynamic Viscosity	34.4 mPa.s @ 20 °C 14.1 mPa.s @ 40 °C
Explosive properties	no data available
Oxidizing properties	No significant increase (>5C) in temperature.
Liquid Density	1.150 g/cm3 *CIPAC MT 3.1*

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. Generation of gas during decomposition can cause pressure in closed systems.

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 chloride. Hydrogen fluoride. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity
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.
As product: Single dose oral LD50 has not been determined. Based on information for component(s):
Estimated. LD50, rat 600 mg/kg
Aspiration hazard
Based on physical properties, not likely to be an aspiration hazard.
Dermal
Prolonged skin contact is unlikely to result in absorption of harmful amounts.
As product: The dermal LD50 has not been determined. For the active ingredient(s): LD50, rat > 2,000 mg/kg
No deaths occurred at this concentration.
Inhalation
No adverse effects are anticipated from single exposure to mist. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).
As product: LC50, 4 h, Mist, rat, male and female > 5.41 mg/l
Eye damage/eye irritation
May cause slight temporary eye irritation. Corneal injury is unlikely. May cause pain disproportionate to the level of irritation to eye tissues.
Skin corrosion/irritation
Prolonged exposure not likely to cause significant skin irritation.
Sensitization
Skin
For the active ingredient(s): Did not cause allergic skin reactions when tested in guinea pigs. For the major component(s): Did not cause allergic skin reactions when tested in humans.
Respiratory
No relevant data found.
Repeated Dose Toxicity
For similar active ingredient(s): Haloxyfop In animals, effects have been reported on the following organs: Kidney. Blood. Testes. Thyroid. Liver. Dose levels producing these effects were many times higher than any dose levels expected from exposure due to use. For the solvent(s): Based on available data, repeated exposures are not anticipated to cause significant adverse effects.
Chronic Toxicity and Carcinogenicity
For similar active ingredient(s): Haloxyfop did not cause cancer in laboratory rats; however, there was a slightly increased incidence of malignant liver tumors in female mice in a lifetime dietary feeding study.
For the solvent(s): Did not cause cancer in laboratory animals.

Developmental Toxicity
For similar active ingredient(s): Haloxyfop acid. 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 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. For similar active ingredient(s): Haloxyfop In animal studies, did not interfere with reproduction.

Genetic Toxicology
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information

Toxicity
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).

Fish Acute & Prolonged Toxicity
LC50, Oncorhynchus mykiss (rainbow trout), flow-through test, 96 h: 0.92 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, Daphnia magna (Water flea), static test, 48 h, mortality: 38 mg/l
Aquatic Plant Toxicity
ErC50, Pseudokirchneriella subcapitata (green algae), static test, Growth rate inhibition: > 31 mg/l
Toxicity to Above Ground Organisms
oral LD50, Colinus virginianus (Bobwhite quail): 1517 mg/kg bodyweight.
oral LD50, Apis mellifera (bees): > 210.0 micrograms/bee
contact LD50, Apis mellifera (bees): > 200.0 micrograms/bee
Toxicity to Soil Dwelling Organisms
LC50, Eisenia fetida (earthworms), 14 d: 671.05 mg/kg

Persistence and Degradability

Data for Component: **methyl (R)-2-(4-(3-chloro-5-trifluoromethyl-2-pyridyloxy)phenoxy) propionate**

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.

Stability in Water (1/2-life):
< 24 h; pH 9

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method	10 Day Window
8 - 11 %	28 d	OECD 301D Test	fail

Data for Component: **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

Data for Component: **Haloxyfop**

Stability in Water (1/2-life):
> 45 d

Bioaccumulative potential

Data for Component: **methyl (R)-2-(4-(3-chloro-5-trifluoromethyl-2-pyridyloxy)phenoxy) propionate**

Bioaccumulation: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).
Partition coefficient, n-octanol/water (log Pow): 0.63 - 4.6 Measured
Bioconcentration Factor (BCF): 262; Estimated.

Data for Component: **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

Data for Component: **Haloxyfop**

Partition coefficient, n-octanol/water (log Pow):
Bioconcentration Factor (BCF): 9; Fish; Measured

Mobility in soil

Data for Component: **methyl (R)-2-(4-(3-chloro-5-trifluoromethyl-2-pyridyloxy)phenoxy) propionate**

Mobility in soil: Potential for mobility in soil is medium (Koc between 150 and 500).
Partition coefficient, soil organic carbon/water (Koc): 17,800 Estimated.
Henry's Law Constant (H): 1.18E-08 - 3.19E-07 atm*m3/mole Measured

Data for Component: **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.

Data for Component: **Haloxyfop**

Partition coefficient, soil organic carbon/water (Koc): 76 Measured

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

ROAD AND RAIL TRANSPORT:

Not dangerous goods under the ADG code when being transported in IBCs or other receptacles < 500 L (kg), (Special Provision AU01).

IMDG

Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCES, LIQUID, N.O.S
Technical Name: Haloxyfop methyl ester
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: Haloxyfop methyl ester

Hazard Class: 9 **ID Number:** UN3082 **Packing Group:** PG III
Cargo Packing Instruction: 964
Passenger Packing Instruction: 964
Environmental Hazard: Yes

HAZCHEM CODE: 2X•
This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. 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

Poison Schedule: S6
APVMA Approval Number
50643

Classification and User Label Information
Hazard Symbol:
Xn **-** Harmful.
N **-** Dangerous for the environment
Risk Phrases :
R22 **-** Harmful if swallowed.
R50/53 **-** Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Phrases :
S61 **-** Avoid release to the environment. Refer to special instructions/Safety data sheets.

16. Other Information

Revision
Identification Number: 59815 / 4069 / Issue Date 21.10.2013 / Version: Replaces 16.01.12
DAS Code: GF-142

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

Dow AgroSciences (Australia) Ltd. 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.