SAFETY DATA SHEET

Section 1. Identification of the material and the supplier

Product:	**Bow & Arrow NZ Herbicide**
Product Use:	Herbicide for the control of certain broadleaf weeds in turf.
Restriction of Use:	Refer to Section 15
Manufacturer:	**Turf Culture Pty Ltd** 43 Gap Road, Sunbury, Vic 3429 Australia Phone: +61 1300 11 8873 Fax: +61 3 8888 9991 www.turfculture.co.nz
New Zealand Supplier:	**PGG Wrightson Turf Ltd** 3/118 Savill Drive, Mangere East, Auckland 2024, New Zealand Phone: +64 09 570 2570 www.pggwrightsonturf.co.nz
Emergency No:	**0800 764 766 (National Poison Centre)**
Date of SDS Preparation:	19 July 2021

Section 2. Hazards Identification

This substance is hazardous according to the EPA Hazardous Substances (Classification) Notice 2020

EPA Approval No: HSR100816

Pictograms

Harmful if swallowed

Chronic Toxic

Eye Corrosive

Ecotoxic

Signal Word: **DANGER**

GHS Classification and Category	Hazard Code	Hazard Statement
Acute oral toxicity Cat. 4	H302	Harmful if swallowed.
Skin irritation Cat. 2	H315	Causes skin irritation.
Specific target organ toxicity – repeated exposure Cat. 1	H372	Causes damage to organs through prolonged or repeated exposure.
Serious eye damage Cat. 1	H318	Causes serious eye damage.
Hazardous to the aquatic environment chronic Cat. 1	H410	Very toxic to aquatic life with long lasting effects.
Hazardous to soil organisms	H421	Hazardous to soil organisms

Hazardous to terrestrial vertebrates	H432	Hazardous to terrestrial vertebrates

Prevention Code	Prevention Statement
P102	Keep out of reach of children.
P103	Read label before use.
P260	Do not breathe fumes, vapours, or spray.
P264	Wash hands thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective clothing as detailed in Section 8.

Response Code	Response Statement
P101	If medical advice is needed, have product container or label at hand.
P310	Immediately call a POISON CENTER or doctor/physician.
P330	Rinse mouth.
P362	Take off contaminated clothing and wash before re-use.
P391	Collect spillage.
P301 + P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P305 + P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.

Storage Code	Storage Statement
None allocated	

Disposal Code	Disposal Statement
P501	Refer to Section 13.

Section 3. Composition / Information on Hazardous Ingredients

Ingredients	Conc%	CAS NUMBER.
Diflufenican	15g/L	83164-33-4
MCPA (as the potassium salt)	300g/L	84-74-6
Clopyralid (as the potassium salt)	20g/L	1702-17-6
Non hazardous and water	To 100	

Section 4. First Aid Measures

General Information:

You should call The Poisons Information Centre if you feel that you may have been poisoned, burned or irritated by this product. The number is 0800 764 766 in New Zealand and is available at all times. Have this SDS with you when you call.

Inhalation: No first aid measures normally required. However, if inhalation has occurred, and irritation has developed, remove to fresh air and observe until recovered. If irritation becomes painful or persists more than about 30 minutes, seek medical advice.

Skin Contact: Wash gently and thoroughly with warm water (use non-abrasive soap if necessary) for 10-20 minutes or until product is removed. Under running water, remove contaminated clothing, shoes and leather goods (e.g. watchbands and belts) and completely decontaminate them before reuse or discard. If irritation persists, repeat flushing and seek medical attention.

Eye Contact: Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 20 minutes or until the product is removed, while holding the eyelid(s) open. Take care not to rinse contaminated water into the unaffected eye or onto the face. Obtain medical attention immediately. Take special care if exposed person is wearing contact lenses. Immediately call a POISON CENTER or doctor/physician.

Ingestion: If swallowed, do NOT induce vomiting. Wash mouth with water and contact a Poisons Information Centre, or call a doctor.

Most important symptoms and effects, both acute and delayed

Symptoms: Refer to Section 11 for full details.

Ingestion: Harmful if swallowed.
Inhalation: Not applicable.
Skin: Causes skin irritation.
Eye: Causes serious eye damage.
Chronic: Causes damage to organs through repeated or prolonged exposure.

Section 5. Fire Fighting Measures

Hazard Type	Non Flammable
Hazards from decomposition products	The major hazard in fires is usually inhalation of heated and toxic or oxygen deficient (or both), fire gases. There is no risk of an explosion from this product under normal circumstances if it is involved in a fire. Fire decomposition products from this product are likely to be toxic and corrosive if inhaled. Take appropriate protective measures.
Suitable Extinguishing media	Use extinguishing media suited to burning materials.
Precautions for firefighters and special protective clothing	Use breathing apparatus. Contain spillage.
HAZCHEM CODE	3Z

Section 6. Accidental Release Measures

In the event of a major spill, prevent spillage from entering drains or watercourses. Wear full protective clothing including eye/face protection. All skin areas should be covered. Suitable materials for protective clothing include rubber, PVC. Eye/face protective equipment should comprise as a minimum, protective goggles. If there is a significant chance that vapours or mists are likely to build up in the cleanup area, we recommend that you use a respirator. Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian Standard mentioned below (section 8). Otherwise, not normally necessary.

Stop leak if safe to do so, and contain spill. Absorb onto sand, vermiculite or other suitable absorbent material. If spill is too large or if absorbent material is not available, try to create a dike to stop material spreading or going into drains or waterways. Sweep up and shovel or collect recoverable product into labelled containers for recycling or salvage, and dispose of promptly. Recycle containers wherever possible after careful cleaning. Refer to product label for specific instructions. After spills, wash area-preventing runoff from entering drains. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this SDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to disposal. Thoroughly launder protective clothing before storage or re-use. Advise laundry of nature of contamination when sending contaminated clothing to laundry.

Section 7. Handling and Storage

Precautions for Handling:

- Keep out of reach of children.
- Read label before use.
- Do not breathe fumes, vapours, or spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Keep exposure to this product to a minimum, and minimise the quantities kept in work areas.
- Avoid release to the environment.
- Wear protective clothing as detailed in Section 8.

Precautions for Storage:

- Store away from incompatible materials listed in Section 10.
- Protect this product from light.
- Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight.
- Some liquid preparations settle or separate on standing and may require stirring before use.

Section 8 Exposure Controls / Personal Protection

WORKPLACE EXPOSURE STANDARDS (provided for guidance only)

Substance	TWA ppm	TWA mg/m^3	STEL ppm	STEL mg/m^3

No ingredients have exposure limits.

Workplace Exposure Standard – Time Weighted Average (WES-TWA).The time-weighted average exposure standard designed to protect the worker from the effects of long-term exposure. Workplace Exposure Standard – Short-Term Exposure Limit (WESSTEL). The 15-minute average exposure standard. Applies to any 15- Minute period in the working day and is designed to protect the worker against adverse effects of irritation, chronic or irreversible tissue change, or narcosis that may increase the likelihood of accidents. The WES-STEL is not an alternative to the WES-TWA; both the short-term and time-weighted average exposures apply. Workplace Exposure Standards and Biological Exposure Indices NOV 2020 12TH EDITION.

Engineering Controls

This product should only be used in a well-ventilated area. If natural ventilation is inadequate, use of a fan is suggested.

Personal Protection Equipment

Eyes	Protective glasses or goggles should be worn when this product is being used. Failure to protect your eyes may cause them harm. Emergency eye wash facilities are also recommended in an area close to where this product is being used.
Skin & hands	Prevent skin contact by wearing impervious gloves, clothes and, preferably, apron. Make sure that all skin areas are covered. See below for suitable material types. We suggest that protective clothing be made from the following materials: PVC
Respiratory	Usually, no respirator is necessary when using this product. However, if you have any doubts consult the Australian/New Zealand Standard mentioned above. Otherwise, not normally necessary.
General	Eyebaths or eyewash stations and safety deluge showers should be provided near to where this product is being used.

Section 9 Physical and Chemical Properties

Appearance	Viscous light brown suspension concentrate.
Odour	Characteristic odour
Odour Threshold	Not available
pH	7.0-9.0 (1% in water)
Boiling Point	100°C at 100kPa
Melting Point	No specific data. Liquid at normal temperatures.
Freezing Point	No specific data. Liquid at normal temperatures.
Flash Point	Does not bun
Flammability	Non flammable
Upper and Lower Explosive Limits	Not available
Vapour Pressure	2.37 kPa at 20°C (water vapour pressure).
Vapour Density	Not available
Specific Gravity	1.16 – 1.18 at 25°C
Water Solubility	Completely soluble
Partition Coefficient:	Not available
Auto-ignition Temperature	Not applicable
Decomposition Temperature	Not available
Viscosity	200 - 300 cP (After 1 min at 20°C, spindle 2, 20 RPM)
Particle Characteristics	Not available

Section 10. Stability and Reactivity

Stability of Substance	This product is stable under normal conditions.
Possibility of hazardous reactions	This product is unlikely to react or decompose under normal storage conditions. However, if you have any doubts, contact the supplier for advice on shelf life properties.
Conditions to Avoid	Protect this product from light. Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight.
Incompatible Materials	Strong acids, strong bases, strong oxidising agents.
Hazardous Decomposition Products	Combustion forms carbon dioxide, and if incomplete, carbon monoxide and smoke. Water is also formed. May form nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas in reducing atmospheres. Carbon monoxide poisoning produces headache, weakness, nausea, dizziness, confusion, dimness of vision, disturbance of judgment, and unconsciousness followed by coma and death.

Section 11 Toxicological Information

Acute Effects:

Swallowed	**Short Term Exposure:** Significant oral exposure is considered to be unlikely. Available data shows that this product is harmful, but symptoms are not available. However, this product is an oral irritant. Symptoms may include burning sensation and reddening of skin in mouth and throat. Other symptoms may also become evident, but all should disappear once exposure has ceased. **Long Term Exposure:** Target organ toxicant (liver/kidney)
Dermal	Not applicable.

Inhalation	Available data indicates that this product is not harmful. However product may be mildly irritating, although unlikely to cause anything more than mild transient discomfort.
Eye	Causes severe eye damage. Symptoms may include stinging and reddening of eyes and watering which may become copious. Other symptoms may also become evident. If exposure is brief, symptoms should disappear once exposure has ceased. However, lengthy exposure or delayed treatment may cause permanent damage.
Skin	**Short Term Exposure:** Available data indicates that this product is a skin irritant. Symptoms may include itchiness and reddening of contacted skin. Other symptoms may also become evident, but all should disappear once exposure has ceased.

Chronic Effects:

Carcinogenicity	Not applicable.
Reproductive Toxicity	Not applicable.
Germ Cell Mutagenicity	Not applicable.
Aspiration	Not applicable.
STOT/SE	Not applicable.
STOT/RE	Causes damage to organs through repeated or prolonged exposure. Target organs: Kidney and liver toxicity.

Toxicity data on ingredient chemicals:

MCPA (as the potassium salt):
LD50 (mouse) = 439 mg/kg
STOT:Primary Organ: Hepatotoxicity (liver)
Oral administration of technical MCPA to male and female beagle dogs (6/sex/dose) at doses of 0, 6, 30, or 150 ppm (0, 0.15, 0.75, or 3.75 mg/kg/day) for 52 weeks resulted in kidney and liver toxicity at the mid-and/or high-dose levels, with alterations in clinical chemistries (kidneys: urea, potassium, creatinine; liver: bilirubin, GPT, GOT, triglycerides, and cholesterol) associated with concommitant organ weight changes (liver) and histopathology changes (kidney: increased kidney pigment deposition in proximal tubular epithelium; liver: change in the nature/coloration of gall fluid). Therefore, based upon kidney and liver toxicity at the 30 and 150 ppm dose levels, the LEL for systemic toxicity is 30 ppm (0.75 mg/kg/day). The NOEL for systemic toxicity is 6 ppm (0.15 mg/kg/day).

Clopyralid (as the potassium salt)
LD50 (Rat) = 2675 mg/kg bw
Eye Corrosivity: SPECIES: Rabbit
RESULT: Exposure to Lontel T (95.4% clopyralid) dust revealed a severe irritating effect in the eyes of rabbits. Slight discomfort was observed in all animals immediately upon instillation of the test material. Observations of the conjunctivae post-treatment were characterised as slight to marked redness and chemosis. All animals had a marked amount of discharge from the treated eye. Reddening of the iris was observed in all animals. Corneal opacity was observed in all animals and ranged from scattered or diffuse areas of opacity to marked opacity. Signs of irritation were present in all animals 21 days post treatment.

Section 12. Ecotoxicological Information

This product is:
Very toxic to aquatic life with long lasting effects.
Hazardous to soil organisms.
Hazardous to terrestrial vertebrates.

Persistence and degradability	No data available
Bioaccumulation	No data available
Mobility in Soil	No data available
Other adverse effects	No data available

Data on ingredient chemicals:

Diflufenican Very toxic to aquatic life with long lasting effects (algae).

MCPA (as the potassium salt) Very toxic to aquatic life with long lasting effects (algal).

ACUTE: SPECIES: Navicula pelliculosa (Algae), TYPE OF EXPOSURE: DURATION: 96 hr ; ENDPOINT: EC50: VALUE: 0.21 mg/l ;REFERENCE SOURCE: AH Marks and Company Ltd Bradford [IUCLID]

CHRONIC : SPECIES: other aquatic plant ; TYPE OF EXPOSURE: DURATION: 14 day; ENDPOINT: NOEC ; VALUE: < 0.014 mg/l ; REFERENCE SOURCE: AH Marks and Company Ltd Bradford [IUCLID]
Bioccumulative: No

Clopyralid (as the potassium salt)
Aquatic Toxicity
Bioccumulative: No
Bluegill sunfish <1.0 in 28 days
Based on this BCF, clopyralid is not bioaccumulative under HSNO criteria. This is also supported by a Log Kow of -2.63 at pH 7.
EFSA Scientific Report (2005).
Rapidly Degradable: No
Soil Toxicity
SPECIES: Soybean; ENDPOINT: EC50 (14 day); VALUE: 0.0076 lb/acre [MEA salt] (Converted to 0.0016 mg/kg ai soil); REFERENCE SOURCE: USEPA Pesticides Database (2004).
Soil DT 50 > 30 days: yes
Terrestrial Vertebrate Toxicity
SPECIES: Mallard duck, Anas platyrhynchos ; ENDPOINT: LD50: VALUE: 1465 mg/kg bw [MEA salt]
REFERENCE SOURCE: USDA Forest Service (2004).

Do not allow to enter waterways.

Section 13. Disposal Considerations

Disposal Method/Container Disposal:
Ensure the container is empty. Triple rinse empty container and add rinsate to spray tank. Recycle punctured container without caps through Agrecovery (0800 247 326, www.agrecovery.co.nz). Otherwise crush and bury in a suitable landfill. DO NOT reuse this container for any other purpose.
Precautions or methods to avoid: Avoid release to the environment.

Section 14 Transport Information

This product is classified as a Dangerous Good for transport in NZ; NZS 5433:2012

Road and Rail Transport

UN No:	3082
Class-primary	9
Packing Group	III
Proper Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Air Transport

UN No:	3082
Class-primary	9
Packing Group	III
Proper Shipping Name:	UN No: 3082
Class-primary	9
Packing Group	III
Proper Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Marine Transport

UN No:	3082
Class-primary	9
Packing Group	III
Marine Pollutant	Yes
Proper Shipping Name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.

Limited Quantities Statement:

If the product's individual container is below 5L/kg, it can be transported as a non-DG as long as the product packaging is still labelled as per DG requirements and the driver is given safety information in accordance with Chapter 3.4 of the UNRTDG.

Section 15 Regulatory Information

This substance is classified hazardous according to the EPA Hazardous Substances (Classification) Notice 2020

EPA Approval Code: HSR100816

HSW (HS) Regulations 2017	**Trigger Quantity**
Signage Trigger Quantities (Schedule 3)	100Kg
Emergency Response Plan (Schedule 5)	100Kg
Secondary Containment (Schedule 5)	100Kg
Tracking (Schedule 26)	Not required
HSNO Additional Controls (Restrictions of use)	
77A	This substance must not be applied onto or into water.
77A - The maximum level of an impurity in the technical grade active material for this substance is set.	The maximum level of 4-chloro-2-methylphenol in the MCPA component of Turf Culture Bow and Arrow Herbicide shall not exceed 10 g/kg
77A – A restriction has been placed on the use of the substance.	Turf Culture Bow and Arrow Herbicide must not be used for the treatment of turf, where that turf will be mown and the clippings used for making compost; or where the clippings will be made available for collection for, or deposited at, a municipal green waste recycling depot.
Hazardous Property Controls Notice 2017	
HPC Notice Part 4 Clause 47	Equipment for class 9 substances must be appropriate
HPC Notice Part 4 Clause 48	Records of application of class 9 pesticides and plant growth regulators
HPC Notice Part 3	Hazardous substances in a place other than a workplace
HPC Notice Part 4 Subpart C	Qualifications required for application of class 9 pesticides

ACVM Act and Regulations	
ACVM Reg No.	Exempt.
Tolerable Exposure Level (TEL)	Non-Set
Environmental Exposure Level (EEL)	Non-Set

Section 16 Other Information

Glossary

Cat	Category
EC_{50}	Median effective concentration.
EEL	Environmental Exposure Limit.
EPA	Environmental Protection Authority
HSNO	Hazardous Substances and New Organisms.
HSW	Health and Safety at Work.
LC_{50}	Lethal concentration that will kill 50% of the test organisms inhaling or ingesting it.
LD_{50}	Lethal dose to kill 50% of test animals/organisms.
LEL	Lower explosive level.
OSHA	American Occupational Safety and Health Administration.
TEL	Tolerable Exposure Limit.
TLV	Threshold Limit Value-an exposure limit set by responsible authority.
UEL	Upper Explosive Level
WES	Workplace Exposure Limit

References:

1. EPA Hazardous Substances (Safety Data Sheets) Notice 2017
2. Workplace Exposure Standards and Biological Exposure Indices Nov 2017 edition.
3. Assigning a hazardous substance to a HSNO Approval (Aug 2013).
4. Transport of Dangerous goods on land NZS 5433:2012
5. HSW (Hazardous Substances) Regulations 2017

Disclaimer

This document has been prepared by TCC (NZ) Ltd and serves as the suppliers Safety Data Sheet ('SDS'). It is based on information concerning the product which has been provided to TCC (NZ) Ltd or obtained from third party sources and is believed to represent the current state of knowledge as to the appropriate safety and handling precautions for the product at the time of issue. Further clarification regarding any aspect of the product should be obtained directly from the manufacturer. While TCC (NZ) have taken all due care to include accurate and up-to-date information in this SDS, it does not provide any warranty as to accuracy or completeness. As far as lawfully possible, TCC (NZ) Ltd accept no liability for any loss, injury or damage (including consequential loss) which may be suffered or incurred by any person as a consequence of their reliance on the information contained in this SDS

The information herein is given in good faith, but no warranty, express or implied is made.

Please contact the New Zealand distributor, if further information is required.

Issue Date: 19 July 2021 Review Date: 19 July 2026