1. PRODUCT AND COMPANY IDENTIFICATION

SUPPLIER: **DOW AGROSCIENCES (PTY) LTD**
Private Bag X160,
Bryanston.
2021

SPILLAGES:
Emergency telephone (+27) 032 5330716 or
082 887 8079
Fax (+27) 032 5336134

POISONINGS:
National Poison Centre 021-9386084 (office hours).
021-9316129 (after hours).
0800 333 444 (24 H)

UOFS Pharmacology/Toxicology information centre:
0824910160
Trade name 2, 4-D ESTER 500 EC
HERBICIDE.
Use Selective hormone type herbicide for post emergence weed control as is indicated on the label.

2. COMPOSITION / INFORMATION ON INGREDIENTS

Active ingredient 2, 4-D ester
Chemical Name 2, 4-D-iso-octyl ester (IUPAC) or
2, 4-D--2-ethylhexyl ester
CAS No. 25168-26-7 or CAS no. 1928-43-4
Chemical Family Aryloxyalkanoic acid
Chemical Formula $C_{16}H_{22}C\ell_2O_3$ (Mol. wt.: 333.3)
NIOSH/RTECS no AG 6825000 (2, 4-D acid)
UN no. 1993
Class 3

Hazardous components 2, 4-D ester 500 g/l a.e. plus Kerosene
EEC classification Xn
R phrases R10**,** R22, R41, R43, and R 51

3. HAZARD IDENTIFICATION

Toxicity class:
WHO (a.i.) II; EPA (formulation) II.
ADI (JMPR): 0.01 mg/kg b.w.
NOEL: 5 mg/kg b.w. for rats and mice (2 y)
Main hazard **I**rritant

Biological hazard:
Toxic to fish and Daphnia.
Eye contact:
Irritating to eyes.
Skin contact:
Slightly irritating to skin.
Ingestion:
Harmful if large amounts are swallowed.
Inhalation:
Harmful by inhalation. Moderately irritating to respiratory tract.

4. FIRST AID MEASURES

Inhalation:
Vapour inhalation is unlikely; inhalation of droplets may cause irritation of the respiratory tract. In case of inhalation, remove source of contamination, or leave contaminated area to fresh air as rapidly as possible. Keep victim from contact for at least 2-3 days.
Skin contact:
If irritation occurs, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Gently wipe off excess chemical. Wash skin gently and thoroughly with water and non-abrasive soap. Dermal absorption may lead to systemic poisoning. **Seek medical advice immediately if irritation persists.**
Eye contact:
Immediately flush eyes with gently flowing lukewarm water or saline solution for 15 minutes, holding the eyelids open. Seek medical attention.
Ingestion:
Unlikely to occur under occupational conditions. In case of deliberate ingestion, have victim rinse mouth thoroughly with water. Do not induce vomiting. Give plenty of water to drink. Seek medical advice immediately. If breathing has stopped, apply artificial respiration.
Advice to the physician
No specific antidote.
Supportive care. Treatment based on judgement of physician in response to symptoms of patient. If lavage is performed,suggest endotracheal and/or oesophageal control. Danger from lungaspiration must be weighed against toxicity when considering emptying the stomach.

5. FIRE FIGHTING MEASURES

Extinguishing media:
Small fires: Carbon dioxide, dry chemical powders, regular foam and water spray.
Large fires: Large fires: Water spray, fog or regular foam. Move containers from fire area if you can do it without risk. Dike fire control water for later disposal; do not scatter the material.Do not use straight streams.
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from the ends of tanks.
For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
Special hazards:
The material will burn. It is not explosive. Should the chemical be involved in a general fire, ensure chemical protective clothing are used. It can produce toxic fumes of hydrogen chloride which forms mists of hydrochloric acid with moisture and phosgene; and carbon monoxide. See point
Protective clothing:
Wear suitable personal protective equipment including approved respiratory protection.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Chemical protective clothing usage is advised, i.e. wear neoprene gloves, cotton overalls and safety goggles.
Environmental precautions:
Do not allow spill to contaminate water supplies. Dike far ahead of liquid spills for later disposal.
Large spills:
Keep spectators away. Isolate hazard area and deny entry. Stay upwind, out of low-lying areas, and ventilate closed spaces before entering. Cover spill with absorbent material. Sweep into disposal container. Wash area with detergent and water and follow with clean water rinse. Do not allow spill to contaminate water supplies. Prevent entry into waterways, sewers, basements or confined areas.
Small spills:
Take up with sand or other noncombustible absorbent material and place into containers for later disposal.
Spill/Leak Procedures:
Notify safety personnel, isolate and ventilate area, deny entry, and stay upwind. Shut off all ignition sources.

7. HANDLING AND STORAGE

Handling:
Handle all crop protection chemicals with care and caution. Do not eat, drink, smoke or go to the toilet with pesticide-contaminated hands. Always wash hands thoroughly after handling pesticides or waste.
Storage:
Do not store near sources of sparks, flame or heat. Store in a dry, cool, well-ventilated warehouse in well-labeled containers. Not to be stored next to foodstuffs and water supplies. Keep away from children and animals. Local regulations should be complied with.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Occupational exposure limits:
ACGIH TLV and OSHA PEL are 10 mg/M^3 for the acid. PELs are in accord with those recommended by OSHA, as in the 1989 revisions of the PELs.

Engineering control measures:
It is essential to provide adequate ventilation. The measures appropriate for a particular worksite depend on how this material is used and on the extent of exposure. Ensure that control systems are properly designed and maintained. Comply with occupational safety, environmental, fire, and other applicable regulations.
If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal protective equipment including approved respiratory protection.
Respirator:
An approved respirator suitable for protection from dusts and mists of pesticides is adequate. Limitations of respirator use specified by the approving agency and the manufacturer must be observed.
Clothing:
Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.
Gloves:
Employee must wear appropriate synthetic protective gloves to prevent contact with this substance.
Eye protection:
The use of safety goggles is recommended.
Emergency eye wash: Where there is any possibility that an employee's eyes may be exposed to this substance, the

employer should provide an eye wash fountain or appropriate alternative within the immediate work area for emergency use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
Clear dark-brown liquid.
Odour:
Phenolic odour.
Flammability:
Flammable.
Explosive properties:
Not explosive under use conditions.
Flash point:
55 ^{o}C
Oxidising properties:
No oxidising properties under use conditions.
pH:
3.5 - 5.0
Density:
1.045 at 20^{o}C
Stability:
Slightly unstable to sunlight.
Solubility:
Will emulsify in water.

10. STABILITY AND REACTIVITY

Storage stability:
2, 4-D is stable at elevated temperatures and at low temperatures. Do not store near crop protection chemicals, feed, fertilizers or seed.
Dilution stability:
2, 4-D is stable in aqueous solutions.

11. TOXICOLOGICAL INFORMATION

Data for 2,4-D acid technical is used.
Acute oral LD_{50} :
1 089.6 mg/kg in male rats.
Acute dermal LD_{50} :
2 531.3 mg/kg in rats.
Acute inhalation LC_{50} Rats 24h:
>1,79 mg/l for the acid..
Acute skin irritation:
Does not provoke irritation or corrosion.
Acute eye irritation:
Causes severe eye irritation and erosions.
Dermal sensitisation:
May have strong to extreme possibilities for causing contact hypersensitivity.
Carcinogenicity:
The carcinogenic status of 2, 4-D is not clear.
Teratogenicity:
2, 4-D exposure is unlikely to be teratogenic in humans at expected exposure levels.
Mutagenicity:
Non-mutagenic.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGY :
Birds:
2, 4-D is slightly toxic to wildfowl and slightly to moderately toxic to birds. The LD50 is 1000 mg/kg in mallards, 272 mg/kg in pheasants, and 668 mg/kg in quail and pigeons.
Fish:
Highly toxic to fish.
LC50 in cutthroat trout is 0, 50 to1,20 mg/ℓ .
Daphnia pulex:
48-hour EC_{50} : 9,25 mg/ℓ.
Bees:
The honeybee LD_{50} is 0.0115 mg/bee.
Rate of degradation in soil:
2, 4-D has low soil persistence. The half-life in soil is less than 7 days. Soil microbes are primarily responsible for its disappearance.
Adsorption/desorption in soil:
As the amount of 2, 4-D added to the soil increases, so the percentage of the total 2,4-D adsorbed to the soil decreases. Higher amounts of substance have lower probabilities of being sorbed.
Rate and route of degradation in water:
In aquatic environments, microorganisms readily degrade 2, 4-D. Rates of breakdown increase with increased nutrients, sediment load, and dissolved organic carbon. Under oxygenated conditions the half-life is 1 week to several weeks
Rate and route of degradation air:
2, 4-D is subject to photo-oxidation by reaction with hydroxyl radicals, and has an estimated half-life of 1 day. Volatilisation is negligible.
German wgk: Not available.

13. DISPOSAL CONSIDERATIONS

Controlled incineration:
2, 4-D is stable under normal temperatures and pressures. Contact with strong oxidisers may cause fire or explosion. The free acid is stable at its melting point. Incineration at high temperatures (1000°C) with sufficient residence time leads to complete detoxification and destruction and is the most environmentally acceptable method for disposal. Incineration at low temperatures could lead to the formation of chlorinated dibenzo-*p*-dioxins. The non-persistence and detoxification of 2, 4-D in soil indicates that burial in non-crop areas, away from water supplies, would be an acceptable method for the disposal of small quantities of 2,4-D discharge in surface water and sewers should be avoided.

Package product wastes:
Combustible containers should be disposed of in pesticide incinerators or in specified landfill sites. Non-combustible containers must be triple rinsed using the normal diluent at a volume equal to approximately 10% of the drum's capacity. Add the rinsing mixture to the spray mixture or use the recommended disposal methods. Containers must be punctured and disposed of in specified landfill areas.

14. TRANSPORT INFORMATION

UN NUMBER 1993

ADR/RID
Substance name: Flammable liquid, n.o.s
(Contains Kerosene and 2, 4-D ester.)
Substance ID no. 1993
Hazard ID no. 90
Label: 3
Item no.: 5^0 (C)

IMDG/IMO
Packaging group: III
Label of class: 3 **Marine pollutant**
Shipping name: Flammable liquid, n.o.s.
(Contains Kerosene and 2, 4-D ester.)

AIR/IATA
Shipping name: Flammable liquid, n.o.s.
(Contains Kerosene and 2, 4-D ester).

Class 3
Hazard Label Miscellaneous
Packaging Group III
Passenger Aircraft Y309 (10 L)
309 (60L)
Cargo Aircraft 310 (60L)

UK classification Not available.

Tremcard number 30GF1-III

15. REGULATORY INFORMATION

Symbol : Xn
Risk phrases :
R10 Flammable
R22 Harmful if swallowed.
R 41: Risk of serious damage to eyes.
R43 May cause sensitisation by skin contact.
R51: Toxic to aquatic organisms.
Safety phrases:
S2 Keep out of reach of children.
S36/37 Wear suitable protective clothing and gloves.
S45 In case of accident or if you feel unwell, seek medical advice immediately.
Indication of danger : Harmful

National legislation: In accordance with the South African National Road Traffic Act, 1996 (Act (93 of 1996), the Fire Brigade Act, 1987 (Act 99 of 1987) and the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

16. OTHER INFORMATION

Prepared by: Danie Fourie

All information and instructions provided in this Material Safety Data Sheet (MSDS) are based on the current state of scientific and technical knowledge at the date indicated on the present MSDS and are presented in good faith and believed to be correct. This information applies to the PRODUCT AS SUCH. In case of new formulations or mixes, it is necessary to ascertain that a new danger will not appear.
It is the responsibility of persons in receipt of this MSDS to ensure that the information contained herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product. If the recipient subsequently produces formulations(s) containing this product, it is the recipient's sole responsibility to ensure the transfers

of all relevant information from this MSDS to their own MSDS.

REFERENCES

- Applicable to own physical and chemical, toxicity and ecotoxicity research studies.
- The Pesticide Manual; Thirteenth Edition; Editor Clive Tomlin; Crop Protection Publications, 2003.
- EXTOXNETPIP, Revised June 1996
- Dangerous Goods Regulations, 42nd Edition. Effective 1 January 2004.
- IMDG Code, Vol.2, 2000 Edition.
- SABS 0265:1999

END OF MSDS.