1. IDENTIFICATION OF THE SUBSTANCE

Product Name: DEMETON EC
Insecticide & Acaricide

UN No. 3017

Supplier: Universal Crop Protection (Pty) Ltd.
PO Box 801
Kempton Park, 1620, South Africa

Telephone: (011) 396 2233
Fax: (011) 396 4666
Website: www.villacrop.co.za

Emergency telephone: (011) 396 2233
083 326 9272

24 Hr Emergency Numbers:
Batelieur: 083 1233 911 or
(Client: Villa Crop Protection) 0860 333 911

In case of Poisoning:
Tygerberg Poisoning Information Centre: (021) 931 6127
Red Cross Poisoning Information Centre: (021) 689 5227
Griffon Poison Information Centre: 082 446 8946

2. COMPOSITION / INFORMATION ON INGREDIENTS

Common Name: Demeton-S-methyl
Active ingredient: Demeton-S-methyl (BSI, E-ISO, ANSI, ESA, BPC)
Demeton S-methyl (F-ISO, JMAF)
Chemical Name: S-2-ethylthioethyl O,O-dimethyl phosphorothioate (IUPAC)
Synonyms: 2-ethylthioethyl dimethyl phosphorothiolate

CAS No.: [919-86-8]

Chemical Family: Organophosphate
Chemical Formula: C₆H₁₅O₃PS₂ (Mol. wt.: 230.3)

Use: Systemic insecticide with contact and stomach action.

Formulation: Demeton-S-methyl: 250 g/l
Emulsifiable Concentrate

Hazardous components: Demeton-S-methyl

3. HAZARD IDENTIFICATION

Toxicity class:
WHO Ib; EPA I

ADI: 0.005 mg/kg

NOEL:
1 mg/kg (rats and mice) - 2 year
1 mg/kg diet (dogs) - 1 year

NIOSH: 10 mg/m³

Main Hazard:
This compound inhibits cholinesterase enzyme activity in the nervous tissue. It is highly toxic. Contact with skin, inhalation of spray, or swallowing may be fatal.

Fire and explosion hazard:
Product is highly flammable and explosive due to the solvent.

Chemical Hazard:
None known.

Biological Hazard:
Likely routes of exposure: Skin and eye contact, ingestion and inhalation.

Ingestion:
Highly toxic by ingestion. Refer point 4 symptoms.

Inhalation:
Highly toxic by inhalation depends on volatility of compound. Refer point 4 for symptoms.

Skin contact:
Highly toxic, due to possible absorption. Irritating to skin.

Eye contact:
Irritating to eyes

Carcinogenicity: Refer section 9
Mutagenicity: Refer section 9
Neurotoxicity: Refer section 9
Reproductive / Teragenicity: Refer section 9

4. FIRST AID MEASURES AND PRECAUTIONS

Symptoms of exposure to the product include: nausea, headache, tiredness, giddiness, blurred vision and pupillary constriction. Depending on severity of poisoning these symptoms become worse with the onset of vomiting, abdominal pain, diarrhoea, sweating and salivation. Confusion, ataxia, slurred speech, loss of reflexes are some of the central nervous system effects that may lead to misdiagnosis of acute alcoholism.

OVEREXPOSURE EFFECTS:
After inhalation of vapours or aerosols effects appear within minutes: ocular and respiratory effects generally appear first. These include marked meiosis, ocular pain, conjunctival congestion, diminished vision, ciliary spasm
and brow ache. With acute systemic absorption, meiosis may not be evident due to systemic absorption; meiosis may not be evident due to sympathetic discharge in response to the hypertension. In addition to rhinorrhea and hyperemia of the upper respiratory tract, respiratory effects consist of “tightness” in the chest and wheezing respiration caused by the combination of bronchoconstriction and increased bronchial secretion. Gastrointestinal symptoms occur earliest after ingestion and include anorexia, nausea and vomiting, abdominal cramps, and diarrhoea. With percutaneous absorption of liquid, localised sweating and muscular fasciculation in the immediate vicinity are generally the earliest manifestations.

**Severe intoxication** is manifested by extreme salivation, involuntary defecation and urination, sweating, lacrimation, penile erection, bradycardia and hypotension. The airway should be kept clear to maintain respiration, particularly when the patient is unconscious or has vomited. The mouth and pharynx should be cleared and denatures removed. The jaw should be supported and the patient placed in a face down position with the head down and turned to one side, with the tongue drawn forward. First aid should include, if necessary, mouth-to-nose respiration, cardiac massage and avoidance of injury in patients with trauma.

**Inhalation:**
Remove source of contamination or move victim to fresh air. Keep affected person warm and at rest. Supply oxygen if necessary. Treat symptomatically and supportively.

**Seek medical advice immediately.**

**Skin contact:**
Remove contaminated clothing, shoes and leather goods. Gently wipe of excess chemical. Wash skin gently and thoroughly with water and non-abrasive soap. Seek medical advice if necessary. Persons who become sensitised may require specialised medical management with anti-inflammatory agents.

**Eye contact:**
Immediately flush eyes with gently flowing cold water or saline solution for 20 minutes, holding the eyelid(s) open.

**Seek medical attention immediately.**

**Ingestion:**
Have victim rinse mouth thoroughly with water. Do not induce vomiting, due to the aromatic solvent. Seek medical advice immediately.

**Advice to physician:**
Atropine must be administered as early as possible and could save lives, if given in time and in an adequate dosage. Patients with organophosphate poisoning require amounts of atropine far in excess of doses usually employed in medical practice. The therapeutic objective is to achieve atropinisation, as evidenced by dilation of the pupils, drying secretion, pulse rate of over 120 per minute and flushing skin. To prevent gastrointestinal absorption in unconscious that have swallowed this product, perform stomach lavage using bicarbonate solution and activated charcoal.

In less severe cases begin with 2 mg atropine intravenously for adults or 0.05 mg atropine/kg body weight intravenously for children under 12 years of age and repeat administration of the drug at 15 to 30 minute intervals. In severe cases a total atropine dose of 20 to 80 mg in the first hour may be necessary, with repeated drug administrations at 3 to 10 minute intervals. When signs of atropinisation appear, the dose and frequency of administration should be reduced to a schedule that will maintain full atropinisation for at least 24 hours. Over dosage with atropine is rarely serious, but under dosage may be fatal in poisoning with organophosphorous compounds.

In any severe progressive case of poisoning a cholinesterase reactivator e.g. pralidoxime (2PAM), if available, should be administered, preferably within 8 hours after intoxication. An average dose is 1 g for an adult (up to 50 mg/kg for children), usually given half as a single intramuscular or intravenous injection and the other half as an intravenous infusion with glucose and or saline. In severe cases this treatment may be repeated in 1 to 2 hours, then at 10 to 12 hour intervals if needed, but not beyond 24 hours, or 48 hours at the most. Pralidoxime should be administered very slowly. If respiration is depressed during or after pralidoxime injection, pulmonary ventilation should be assisted mechanically.

Toxogonin is a more recent cholinesterase reactivator. It can be administrated instead of 2PAM at a dose of 250 mg intramuscularly for adults (4 to 8 mg/kg for children) and, if necessary, repeated after 1 to 2 hours. Diazepam should be included in the therapy of severe cases and whenever convulsions appear. Doses of 5 to 10 mg for adults (2 to 5 mg for children) can be administered intravenously or subcutaneously or per rectum, and repeated as required.

**NOTE**
Because of their respiratory-depressant effects, morphine and similar drugs are contraindicated for patients poisoned with organophosphorous compounds. Avoid
amino-glycosides and succinylcholine, which have a blocking effect on the neuromuscular junction. Phentolamines, reserpine and theophylline are contraindicated in organophosphorous poisoning.

5. FIRE FIGHTING MEASURES

Extinguishing agents:
Extinguish small fires with carbon dioxide, dry powder, or alcohol-resistant foam. Water spray can be used for cooling of unaffected stock, but avoid water coming in contact with the product. Contain water used for fire-fighting for later disposal. Avoid the accumulation of polluted run-off from the site.

Fire fighting:
Remove spectators from surrounding area. Remove container from fire area if possible. Fight fire from maximum distance. For massive fire, use unmanned hose holder or monitor nozzles. Contain fire control agents for later disposal. Use a recommended extinguishing agent for the type of surrounding fire. Water can be used to cool unaffected containers but must be contained for later disposal. Avoid inhaling hazardous vapours. Keep upwind.

Special Hazards:
Fire may produce irritating or poisonous vapours (toxic fumes of hydrogen cyanide, chlorine, and oxides of nitrogen and carbon), mists or other products of combustion.

Personal protective equipment:
Fire fighters and others that may be exposed should wear full protective clothing and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES (SPILLAGE)

Personal precautions:
Do not inhale fumes. Ventilate area of spill or leak, especially confined areas. Avoid contact with skin, eyes or clothes. For personal protection see Section 8.

Environmental precautions:
Do not allow entering drains or watercourses. When the product contaminates public waters, inform appropriate authorities immediately in accordance with local regulations.

Occupational spill:
For small spills, soak up sand or suitable non-combustible absorbent material, place into containers for subsequent disposal. Thoroughly wash body areas, which come into contact with the product. Avoid runoff to sewer as it may cause fire/explosion. Do not allow the product to come in contact with water systems. For large spills contact the manufacturer. Contain liquid far ahead of spill. Contain spillage and contaminate water for subsequent disposal. Do not flush spilled material into drains. Keep spectators away and upwind.

7. HANDLING AND STORAGE REQUIREMENTS

Handling:
Remove sources of naked flame or sparks. Harmful by inhalation or if swallowed. Avoid contact with eyes and skin and inhalation of fumes. Use with adequate ventilation. Wash hands before eating, drinking, chewing gum, smoking or using the toilet. Operators should change and wash clothing daily. Remove clothing immediately if the insecticide gets inside. Then wash skin thoroughly using a non-abrasive soap and put on clean clothing. Do not apply directly to areas where surface water is present, or to intertidal areas below the mean high water mark. Water used to clean equipment must be disposed of correctly to avoid contamination.

Storage:
Store in its original container in isolated, dry, cool (avoid temperatures above 40°C) and well-ventilated area. Avoid cross contamination with other pesticides and fertilizers. Product hydrolysed rapidly in alkaline media and hydrolysed slower in acidic and neutral aqueous media. Keep under lock and key out of reach of unauthorised persons, children and animals. Store away from incompatible substances. Not to be stored next to foodstuffs and water supplies. Local regulations should be complied with.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Occupational exposure limits:
No occupational limits established by OSHA, ACGIH or NIOSH.

Engineering control measures:
It is essential to provide adequate ventilation. Ensure that control systems are properly designed and maintained. Only spark-resistant equipment should be used. Comply with occupational safety, environmental, fire and other applicable regulations.

PERSONAL PROTECTIVE EQUIPMENT:
If engineering controls and work practices are not effective in controlling exposure to this material, then wear suitable personal equipment including approved respiratory
Respirator:
An approved full-face respirator suitable for protection from mists of pesticides is required. Limitations of respirator use specified by the approved agency and the manufacturer must be observed.

Clothing:
Employee must wear appropriate protective (impervious) clothing and equipment to prevent skin contact with the substance.

Gloves:
Employee must wear appropriate chemical resistant protective gloves to prevent contact with this substance.

Eye protection:
Employee must wear splash-proof safety goggles and face-shield to prevent contact with this substance.

Emergency eyewash:
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, light yellow liquid.

Flammability:
Flammable.

Explosive properties:
No information currently available.

Flash point:
25 °C

Oxidising properties:
No information currently available.

pH:
No information currently available.

Relative density:
0.95 g/l at 25°C

Persistent foaming:
No information currently available.

Storage stability:
Stable for up to 2 years under normal warehouse and field conditions. Product hydrolysed rapidly in alkaline media and hydrolysed slower in acidic and neutral aqueous media.

Susceptibility:
No information currently available.

Solubility in water:
Immediately forms an emulsion in water.

Solubility in organic solvents:
(All solubility figures for technical material at 25°C.)
Readily soluble in common polar organic solvents (alcohols, ketones, chlorinated hydrocarbons).
dichloromethane: 200 g/l
isopropanol: 200 g/l
toluene: 200 g/l

Partition-coefficient in n-octanol / water:
\( K_{ow} (\log P_{ow}) = 21 \) (data for active substance).

Melting point:
Not applicable

10. STABILITY AND REACTIVITY

Stability:
The product is stable at room temperature. Product hydrolysed rapidly in alkaline media and hydrolysed slower in acidic and neutral aqueous media.

Incompatibility:
The product is compatible with most other common pesticides but incompatible with alkaline materials such as Bordeaux mixture or Lime Sulphur.

Do not physically mix concentrate directly with other herbicides or pesticide concentrates; always dilute first.

Hazardous decomposition:
Product undergoes decomposition at high temperatures. Avoid heating above ambient temperature. Oxides of carbon, phosphorus and sulphur are released when the product decomposes on heating.

11. TOXICOLOGICAL INFORMATION

Acute oral LD_{50}:
160 mg/kg body weight in rats.

Acute dermal LD_{50}:
1200 mg/kg in rabbits.

Acute inhalation LD_{50} (4 h):
0.13 mg/l of air in rats.

Inhalation of the solvents’ vapours at high doses have also resulted in an increased incidence of malformations and decreased fetal weight in laboratory animals.

Acute skin irritation:
This product is classified as highly toxic and a mild irritant.

Acute eye irritation:
This product is classified as highly toxic and irritant for the eyes.

Dermal sensitisation:
This product is a non-sensitising substance to guinea pigs.
Carcinogenicity:
Studies did not detect carcinogenic activity. No human information available.

Teratogenicity / Reproductive hazard:
Studies did not detect any tetragenic effects. No human information available.

Mutagenicity:
Studies indicate that the product display a mutagenic activity.

12. ECOLOGICAL INFORMATION

Degradability: (Technical material)
This product is an organophosphate insecticide that is widely applied to soil to control insect pests. The pathway of degradation in soil involves both chemical and microbial processes. The major products of degradation have been identified as the hydrolysis product 3,5,6-trichloro-2-pyridinol (TCP), the secondary metabolite 3,5,6-trichloro-2-methoxy-pyridine (TCMP) and eventually CO₂ resulting from mineralization of the aromatic ring. Laboratory - determined soil degradation half-lives vary tremendously, and half-life estimates in different soils have ranged from less than 10 days to greater than 120 days. Environmental factors can greatly influence the degradation rate in soil; the most important being moisture, pH, organic content, and pesticide formulation. This product in formulation can be classified as non-persistent.

Mobility:
No information currently available.

Accumulation:
Contamination of ground water is unlikely to occur, accumulation in the air or contamination by wet or dry deposition is not to be expected.

ECOTOXICOLOGY:

Birds:
Toxic to birds

Fish:
Highly toxic to fish

Daphnia:
Toxic to Daphnia magna

Bees:
Toxic to bees.

Earthworms:
No information currently available

Soil micro-organisms:
No information currently available

13. DISPOSAL CONSIDERATION

Pesticide disposal:
Open dumping or burning of this pesticide is prohibited. Waste resulting from the use of this product cannot be re-used or reprocessed. Never pour untreated waste or surplus products into public sewers or where there is any danger of run-off or seepage into water systems. Do not contaminate rivers, dams or any other water sources with the product or used containers. Comply with local legislation applying to waste disposal.

Container disposal:
Emptied containers retain vapour and product residues. Observe all labelled safeguards until container is destroyed.

TRIPLE RINSE empty containers in the following manner: Invert the empty container over the spray or mixing tank and allow to drain for at least 30 seconds after the flow has slowed down to a drip. Thereafter rinse the container three times with a volume of water equal to a minimum of 10 % of that of the container. Add the rinsing to the contents of the spray tank before destroying the container in the prescribed manner. Do not re-use the empty container for any other purpose, but destroy it by perforation and flattening and bury in an approved dump site. Prevent contamination of food, feedstuffs, drinking water and eating utensils. Comply with local legislation applying to waste disposal.

14. TRANSPORT INFORMATION

UN NUMBER: 3017
ADR/IRD:
Substance ID NR: 3017
Hazard ID NR: 663
Label: 6.1 + 3

AIR/IATA:
Class: 6.1
Subsidiary Risk: 3
Hazard Label: POISON & FLAMMABLE
Packaging group: I
Passenger aircraft: 603 (max 1 L)
Cargo aircraft: 604 (max 30 L)

IMG/IMO:
Packaging group: I
Label of class: 6.1
Subsidiary Risk: 3
Shipping Name: FLAMMABLE, PESTICIDE, POISON, LIQUID
15. REGULATORY INFORMATION

Symbol: T, F, Xi, N
Indication of danger: Toxic, Flammable and Environmentally dangerous also an irritating substance.

Risk phrases:
R 10 Flammable.
R 24/25 Toxic in contact with skin and if swallowed.
R 39/28 Very toxic: danger of very serious irreversible effects if swallowed.
R 50/ R 53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R 57 Toxic to bees.

Safety phrases:
S 1 Keep locked up
S 2 Keep out of reach of children
S 28 After contact with skin wash immediately with plenty of water and non-abrasive soap.
S 36/37 Wear suitable protective clothing, and gloves.
S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
S 61 Avoid release to the environment. Refer to special instructions / Safety data sheets.

16. PACKING AND LABELLING

Packed in 5, 10, 20, 25, 50 and 100 litres fluorinated plastic containers and labelled according to South African regulations and guidelines.

17. OTHER INFORMATION

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

18. REFERENCES

- Applicable own physical and chemical, toxicity and ecotoxicity research studies.
- Pestline; Material Safety Data Sheets for Pesticides and Related Chemicals; Volume II; Occupational Health Services Inc., 1991.
- EuroChem Monitor; European Community Legislation on the Marketing and Use of Dangerous Substances and Preparations, Volume 1 and 5.
- Guidelines for personal protection when using pesticides in hot climates. GIFAP, G8/7 5M/989/ENG/QUA.

END OF DOCUMENT

Compiled: August 1998
Reviewed: September 2009