SECTION 1 - PRODUCT & COMPANY IDENTIFICATION

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Substance: chlorpyrifos
Product Name: **AGROPIRIFOS 480 EC**
Product Use: Insecticide
Creation Date: Nov 2010
Revision Date: August 2019

24 Hr Emergency Number:
In case of Poisoning:
Poisons Helpline 0861 555 777
In case of Spillage:
Spill Tech Oil & Chemical Pollution Control 086 100 0366 / 083 253 6618

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Common Name: chlorpyrifos
Chemical Name: *O,O*-diethyl *O*-3,5,6-trichloro-2-pyridyl phosphorothioate (**IUPAC**)
CAS №.: [2921-88-2]
Chemical Family: Organophosphate
Chemical Formula: $C_9H_{11}C\ell_3NO_3PS$
Molecular weight: 350.6
Use: A non-systemic insecticide with contact, stomach and respiratory action. Cholinesterase inhibitor.
Formulation: Chlorpyrifos: 480 g/ℓ
Emulsifiable Concentrate (Liquid)
Hazardous Ingredient:

Inert:	concern:	% present:
chlorpyrifos	very toxic	40 %
solvents	Irritant, Flammable	± 50 %

SYMBOLS: T, F, N
RISK-PHRASE(S): R10, R24/25, R36/38, R50, R65

SECTION 3 - HAZARD IDENTIFICATION

Toxicity class:
WHO (a.i.) II; EPA (formulation): II
Main Hazard:
This compound inhibits cholinesterase enzyme activity in the nervous tissue and is toxic. Contact with skin, inhalation of spray, or swallowing may be fatal.
Fire and explosion hazard:
Product is flammable.
Acute effects of overexposure:
May cause temporary irritation to eyes, nose, throat and respiratory tract. If swallowed and aspirated into the lungs, chemical pneumonia can occur.
Symptoms of exposure to the product include: headache, dizziness, anxiety, tremors of the tongue and eyelids, sweating, nausea, constricted pupils, vision impairment, abdominal cramps, diarrhoea, salivation, respiratory difficulty, cyanosis, convulsions, coma.
May cause skin irritation, eye irritation and conjunctivitis. May be irritating to the respiratory tract and mucous membranes.
Ingestion: Toxic by if swallowed.
Inhalation: Harmful by inhalation.
Skin contact: Toxic in contact with skin. Moderate irritant. May cause dermatitis through defatting of tissue. May cause skin sensitization.
Eye contact: Moderate irritant to the eyes and may cause damage.

SECTION 4 - FIRST AID MEASURES AND PRECAUTIONS

FIRST AID:
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 be performed by qualified medical personnel and should include, if necessary, mouth-to-nose respiration and cardiac massage.

Inhalation:
Immediately remove source of contamination or move patient to fresh air. Keep affected person warm and at rest. If breathing has stopped, perform artificial mouth-to-nose respiration and administer oxygen. **Obtain medical advice immediately.**

Skin contact:
Remove contaminated clothing, shoes and leather goods immediately. Gently wipe of excess chemical. Wash skin gently and thoroughly with clean water and non-abrasive soap or mild detergent until no evidence of chemical remains (approximately 15 to 20 minutes). Persons who become sensitised may require specialised medical management with anti-inflammatory agents. **Obtain medical advice immediately.**

Eye contact:
Flush eyes immediately with large amounts of gently flowing cold water, occasionally lifting upper and lower lids, until no evidence of chemical remains (approximately 15 to 20 minutes). Obtain medical advice.

Ingestion:
Do not induce vomiting, due to aromatic solvent present in product. **Obtain medial advice immediately** and make the container, or label or this Data Sheet available.
Never give anything by mouth to a semi-conscious or unconscious person.
If vomiting occurs, take care to prevent vomit from being inhaled.
Establish and maintain airway. Treat respiratory difficulty with artificial respiration and oxygen.

Advice to physician:
This product contains a cholinesterase inhibitor and an aromatic solvent.
If product is aspirated into the lungs during ingestion or vomiting, mild to severe pulmonary injury may be caused. The stomach should be emptied as soon as possible by careful gastric lavage, using a cuffed endotracheal tube already in place.
An aqueous suspension of activated charcoal can be administered to absorb remaining toxicant.
As early as possible, administer atropine sulfate and pralidoxime chloride or obidoxime chloride intravenously to patients suffering from severe respiratory difficulties, convulsions and unconsciousness.
The dose and frequency of atropine varies with each patient. 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/minute, and flushing skin.
Overdosage with atropine is rarely serious, but underdosage may be fatal in poisoning with organophosphorous compounds.
Important Note: Because of their respiratory-depressant effects, **morphine** and similar drugs are **contra-indicated** for patients poisoned with organophosphorous compounds. **Avoid aminoglycosides** and **succinylcholine,** which have a blocking effect on the neuromuscular junction. **Phenothiazines, reserpine and theophylline** are **contraindicated** in organophosphorous poisoning.

SECTION 5 - FIRE-FIGHTING MEASURES

Flammable properties:
Flammable: Flash point: 52 ^{o}C

Extinguishing agents:
Extinguish fires with carbon dioxide, dry powder, or alcohol-resistant foam. Water spray as a fog 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 without risk. Eliminate all ignition sources in immediate area. 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. Avoid inhaling hazardous vapours. Keep upwind.

Special Hazards:
This product will emit toxic fumes when burned, including hydrogen chloride, sulphur oxides and nitrogen oxides. May produce irritating or poisonous mists or other products of combustion.

Personal protective equipment:
Fire-fighters and others that may be exposed should wear full protective impervious clothing, including gloves and eye protection, and self-contained breathing apparatus. Contact with the fumes and vapours should be avoided by staying upwind.
Clean all clothing before re-use. Severely contaminated clothing cannot be adequately decontaminated, and must be disposed as a hazardous waste. Shower with soap and water after contact with this product.

SECTION 6 - ACCIDENTAL RELEASE MEASURES (SPILLAGE)

Personal precautions:
Do not inhale fumes. Avoid contact with skin, eyes or clothes. Ventilate area of spill or leak, especially confined areas. For personal protection see Section 8.
Environmental precautions:
Do not allow entering drains or watercourses. Spillage or uncontrolled discharges into water courses (or public waters) to be reported immediately to the Police and to the Department of Water/Environmental Affairs.
Occupational spill:
Keep out unprotected persons and animals. Do not touch spilled material; stop leak if you can do it without risk.
Earth all equipment used when handling the product. Do not touch or walk through spilled material. Stop leak if possible without risk. Avoid runoff of product into sewers, water systems, basements or confined areas as it may cause fire/explosion. A vapour-suppressing foam could be used to reduce vapours. Thoroughly wash body areas, which come into contact with the product.
For spills: Use clean, non-sparking tools to collect absorbed material. Soak up with absorptive material such as damp earth or sand or other suitable non-combustible absorbent material. Place the material into a clean, dry container and cover for subsequent disposal. In situations where product comes in contact with water, contain contaminated water for later disposal. Prevent material from spreading by damming in with absorptive material. Do not flush spilled material into drains. Keep spectators away and upwind.
To decontaminate spill area, tools and equipment, wash with a suitable solution (i.e. organic solvent, detergent bleach or caustic). Add the solution to the drums already collected. Label drums with its content and dispose it in accordance with local regulations.
Open burning or dumping of this material is prohibited.

SECTION 7 - HANDLING AND STORAGE REQUIREMENTS

Handling:
Operator should not be alone during handling and application of product. Remove sources of naked flame or sparks. Toxic if swallowed and by skin contact, and harmful if inhaled. Avoid contact with eyes and skin and inhalation of fumes. Avoid exposure to spray. 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 32 ^{0}C) and well-ventilated area. Avoid cross contamination with other pesticides and fertilisers. 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.
Keep away from naked flames and other sources of ignition.

SECTION 8 - EXPOSURE CONTROL/PERSONAL PROTECTION

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 protection.
Respirator:
An approved full-face air-purifying respirator, equipped with organic vapour cartridges or canisters, suitable for protection from mists of pesticides is required. Limitations of respirator use specified by the approving agency and the manufacturer must be observed.
Clothing:
Employee must wear appropriate protective (impervious) clothing (long sleeved cotton overalls, apron, rubber boots, face shield and hat or cap) and equipment to prevent skin contact with the substance.
Gloves:
Employee must wear appropriate chemical resistant protective gloves (PVC or neoprene 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 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.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance:
A clear amber coloured liquid with an aromatic solvent odour.
Flammability:
Flammable.
Flash point:
35 ^{O}C.
Specific gravity:
1.085 ± 0.05 g/mℓ
Solubility in water:
Forms an emulsion with water.

SECTION 10 - STABILITY AND REACTIVITY

Storage stability:
Stable for up to 2 years under normal warehouse and field conditions. Avoid contact with strong acids, strong alkalis and alkaline materials such as lime. Avoid heat and sources of ignition.
Hazardous decomposition:
Product undergoes decomposition at high temperatures and will cause toxic fumes of hydrogen chloride, ethyl sulphate, diethyl sulphate and nitrogen oxides.
Polymerization:
This product will not polymerize.

SECTION 11 - TOXICOLOGICAL INFORMATION

Acute oral LD_{50} rats: *Formulation calculated:* 240 mg/kg
Acute dermal LD_{50} rabbits: *Formulation calculated:* 4000 mg/kg
Inhalation LC_{50} rats: *Technical:* > 0,2 mg/ℓ (4hours)
Acute eye irritation: Moderate irritant
Acute skin irritation: Moderate irritant
May cause dermatitis through defatting of tissue.
Carcinogenicity:
There is no evidence that chlorpyrifos is carcinogenic. There was no increase in the incidence of tumors when rats were fed 10 mg/kg/day for 104 weeks.
Teratogenicity:
Available evidence suggests that chorpyrifos is not teratogenic. No teratogenic effects in offspring were found when pregnant rats were fed doses as high as 15 mg/kg/day for 10 days. When pregnant mice were given doses of 25 mg/kg/day for 10 days, minor skeletal variations and a decrease in fetal length occurred.
Reproductivity:
Current evidence indicates that chlorpyrifos does not adversely affect reproduction. In two studies, no effects were seen in animals tested at dose levels up to 1.2 mg/kg/day. In another study in which rats were fed 1.0 mg/kg/day for two generations, the only effect observed was a slight increase in the number of deaths of newborn offspring.
Mutagenicity:
There is no evidence that chlorpyrifos is mutagenic. No evidence of mutagenicity was found in any of four tests performed.
ADI: 0.01 mg/kg/day

SECTION 12 - ECOLOGICAL INFORMATION

Degradability:
Chlorpyrifos is moderately persistent in soils. The half-life of chlorpyrifos in soil is usually between 60 and 120 days, but can range from 2 weeks to over 1 year, depending on the soil type, climate, and other conditions. Chlorpyrifos was less persistent in the soils with a higher pH. Adsorbed chlorpyrifos is subject to degradation by UV light, chemical hydrolysis and by soil microbes. Chlorpyrifos adsorbs strongly to

soil particles and it is not readily soluble in water. It is therefore immobile in soils and unlikely to leach or to contaminate groundwater. TCP, the principal metabolite of chlorpyrifos, adsorbs weakly to soil particles and appears to be moderately mobile and persistent in soils.
The concentration and persistence of chlorpyrifos in water will vary depending on the type of formulation. For example, a large increase in chlorpyrifos concentrations occurs when emulsifiable concentrations and wettable powders are released into water. As the pesticide adheres to sediments and suspended organic matter, concentrations rapidly decline. Volatilization is probably the primary route of loss of chlorpyrifos from water.

Volatility half-lives of 3.5 and 20 days have been estimated for pond water. Research suggests that this insecticide is unstable in water, and the rate at which it is hydrolyzed increases with temperature, decreasing by 2.5- to 3-fold with each 10 ^{O}C drop in temperature. The rate of hydrolysis is constant in acidic to neutral waters, but increases in alkaline waters. In water at pH 7.0 and 25 ^{O}C, it had a half-life of 35 to 78 days.
Chlorpyrifos is non-systemic in plants and not absorbed from the soil via the roots. Residues taken up by plant tissues are metabolized to 3,5,6-trichloropyridin-2-ol, which is conjugated and sequestered. Residues remain on plant surfaces for approximately 10 to 14 days. Data indicate that this insecticide and its soil metabolites can accumulate in certain crops.

ECOTOXICOLOGY:

Birds: Moderately to very highly toxic to birds.

Oral LD_{50}:	mallard ducks:	490 mg/kg
	house sparrow:	122 mg/kg
Dietary LC50 (8 days):	mallard ducks:	180 ppm
	Bobwhite quail:	423 ppm

Fish: Very highly toxic to fish.

LC_{50} (96 hours):	rainbow trout:	0.007 – 0.051 mg/ℓ
	bluegill sunfish:	0.002 – 0.010 mg/ℓ

Daphnia: Highly toxic to Daphnia.

LC_{50} (48 hours):	*Daphnia magna*	1,7 µg/ℓ

Bees: Serious hazard to honeybees.

LD_{50} (oral):	360 ng/bee
LD_{50} (contact):	70 ng/bee

Algae:

NOEC:	*Selenastrum capricornutum:*	> 0,4 mg/ℓ

Earthworms:

LC_{50} (14 days):	*Eisenia foetida:*	210 mg/kg

SECTION 13 - DISPOSAL CONSIDERATION

Pesticide disposal:
Open dumping or burning of this pesticide is prohibited. 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. Dispose of product waste only in a responsible manner and according to local legislation.

Package product wastes:
Emptied containers retain vapour and product residues. Observe all labelled safeguards. 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 rinsings to the contents of the spray tank before destroying the container.
Do not re-use the empty container for any other purpose. Do not burn the empty container. Dispose of the empty containers only in a responsible manner and according to local legislation.
Comply with any local legislation applying to disposal.
Prevent contamination of food, feedstuffs, drinking water and eating utensils.

SECTION 14 - TRANSPORT INFORMATION

UN No.:	3017
Class:	6.1
Subsidiary risk:	3
Packing group:	III
Shipping name:	Organophosphorus pesticide, liquid, toxic, flammable (chlorpiryfos 480 g/ℓ)

MARINE POLLUTANT

SECTION 15 - REGULATORY INFORMATION

Symbol: T, F, N
Indication of Danger: Toxic substance, Flammable, Environmentally dangerous substance

Risk phrases:

R 10	Flammable
R 24/25	Toxic in contact with skin and if swallow.
R 36/38	Irritating to eyes and skin.
R 50	Very toxic to aquatic organisms.
R 65	Harmful: may cause lung damage if swallowed.

Safety phrases :

S 1/2	Keep locked up and out of reach of children.
S 3/9/14	Keep in a cool, well-ventilated place away from open flames and sparks.
S 23	Do not breath fumes or vapour.
S 24/25	Avoid contact with skin and eyes.
S 27/28	After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and non-abrasive soap.
S 36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
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.
S 62	If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

SECTION 16 - OTHER INFORMATION

Packing and Labelling
Packed in 5, 10, 20 & 25 litre fluorinated plastic containers and labelled according to the South African regulations and guidelines.

Disclaimer:
The information on this sheet is not a specification; it does not guarantee specific properties. The information is intended to provide general guidance as to health and safety based upon our knowledge of the handling, storage use of the product. It is not applicable to unusual or non-standard uses of the product nor where instructions or recommendations are not followed.
All information is given in good faith bit without guarantee in respect of accuracy, and no responsibility is accepted for errors and omissions or the consequence thereof.

Please read all labels carefully before using the product.