

Surefire Fortune 500 Multipurpose Insecticide and Termiticide

PCT Holdings Pty Ltd

Chemwatch Hazard Alert Code: 4

Chemwatch: 5428-30
 Version No: 2.1.1.1
 Safety Data Sheet according to WHS and ADG requirements

Issue Date: 09/10/2020
 Print Date: 12/10/2020
 S.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	Surefire Fortune 500 Multipurpose Insecticide and Termiticide
Synonyms	APVMA Code: 55755
Proper shipping name	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC (contains chlorpyrifos)
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Termiticide and insecticide for use as described on the product label. Use according to manufacturer's directions.
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Details of the supplier of the safety data sheet

Registered company name	PCT Holdings Pty Ltd
Address	1/74 Murdoch Circuit Acacia Ridge QLD 4110 Australia
Telephone	1800 630 877
Fax	Not Available
Website	Not Available
Email	Not Available

Emergency telephone number

Association / Organisation	Poison Information centre
Emergency telephone numbers	13 1126
Other emergency telephone numbers	Not Available

SECTION 2 Hazards identification

Classification of the substance or mixture

COMBUSTIBLE LIQUID, regulated for storage purposes only

Poisons Schedule	S6
Classification [1]	Flammable Liquid Category 4, Acute Toxicity (Oral) Category 3, Acute Toxicity (Dermal) Category 3, Acute Toxicity (Inhalation) Category 2, Skin Corrosion/Irritation Category 2, Serious Eye Damage Category 1, Specific target organ toxicity - single exposure Category 3 (narcotic effects), Specific target organ toxicity - repeated exposure Category 2, Aspiration Hazard Category 1, Chronic Aquatic Hazard Category 1
Legend:	1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI

Label elements

Hazard pictogram(s)	
Signal word	Danger

Hazard statement(s)

H227	Combustible liquid.
H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H330	Fatal if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H336	May cause drowsiness or dizziness.

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H373	May cause damage to organs through prolonged or repeated exposure.
H304	May be fatal if swallowed and enters airways.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260	Do not breathe mist/vapours/spray.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P273	Avoid release to the environment.
P284	Wear respiratory protection.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P320	Specific treatment is urgent (see advice on this label).
P322	Specific measures (see advice on this label).
P330	Rinse mouth.
P331	Do NOT induce vomiting.
P362	Take off contaminated clothing and wash before reuse.
P370+P378	In case of fire: Use alcohol resistant foam or fine spray/water fog for extinction.
P302+P352	IF ON SKIN: Wash with plenty of water.
P391	Collect spillage.
P332+P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
2921-88-2	30-60	chlorpyrifos
Not Available		(500g/L)
64742-94-5	30-60	solvent naphtha petroleum, heavy aromatic
Not Available		(488 g/L)
Not Available	1-10	Ingredients determined not to be hazardous

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If product comes in contact with skin:</p> <ul style="list-style-type: none"> ▶ Contact a Poisons Information Centre or a doctor. ▶ DO NOT allow clothing wet with product to remain in contact with skin, strip all contaminated clothing including boots. ▶ Quickly wash affected areas vigorously with soap and water. ▶ DO NOT give anything by mouth to a patient showing signs of narcosis, i.e. losing consciousness. ▶ Give atropine if instructed. ▶ DO NOT delay, get to a doctor or hospital quickly.

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Inhalation	<ul style="list-style-type: none"> ▶ If spray mist, vapour are inhaled, remove from contaminated area. ▶ Contact a Poisons Information Centre or a doctor at once. ▶ Lay patient down in a clean area and strip any clothing wet with spray. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ DO NOT give anything by mouth to a patient showing signs of narcosis, i.e. losing consciousness. ▶ Give atropine if instructed. ▶ Get to doctor or hospital quickly.
Ingestion	<ul style="list-style-type: none"> ▶ Avoid giving milk or oils. ▶ Avoid giving alcohol. <p>If swallowed:</p> <ul style="list-style-type: none"> ▶ Contact a Poisons Information Centre or a doctor at once. ▶ If swallowed, activated charcoal may be advised. ▶ Give atropine if instructed. ▶ REFER FOR MEDICAL ATTENTION WITHOUT DELAY. ▶ In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition. ▶ If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the SDS should be provided. ▶ Further action will be the responsibility of the medical specialist. ▶ If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the SDS. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Indication of any immediate medical attention and special treatment needed

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For petroleum distillates

- In case of ingestion, gastric lavage with activated charcoal can be used promptly to prevent absorption - decontamination (induced emesis or lavage) is controversial and should be considered on the merits of each individual case; of course the usual precautions of an endotracheal tube should be considered prior to lavage, to prevent aspiration.
- Individuals intoxicated by petroleum distillates should be hospitalized immediately, with acute and continuing attention to neurologic and cardiopulmonary function.
- Positive pressure ventilation may be necessary.
- Acute central nervous system signs and symptoms may result from large ingestions of aspiration-induced hypoxia.
- After the initial episode, individuals should be followed for changes in blood variables and the delayed appearance of pulmonary oedema and chemical pneumonitis. Such patients should be followed for several days or weeks for delayed effects, including bone marrow toxicity, hepatic and renal impairment. Individuals with chronic pulmonary disease will be more seriously impaired, and recovery from inhalation exposure may be complicated.
- Gastrointestinal symptoms are usually minor and pathological changes of the liver and kidneys are reported to be uncommon in acute intoxications.
- Chlorinated and non-chlorinated hydrocarbons may sensitize the heart to epinephrine and other circulating catecholamines so that arrhythmias may occur. Careful consideration of this potential adverse effect should precede administration of epinephrine or other cardiac stimulants and the selection of bronchodilators.

BP America Product Safety & Toxicology Department

- ▶ Most organophosphate compounds are rapidly well absorbed from the skin, conjunctiva, gastro-intestinal tract and lungs.
- ▶ They are detoxified by Cytochrome P450-mediated monooxygenases in the liver but some metabolites are more toxic than parent compounds.
- ▶ Metabolites are usually detected 12-48 hours postexposure.
- ▶ Organophosphates phosphorylate acetylcholinesterase with resultant accumulation of large amounts of acetylcholine causing initial stimulation, then exhaustion of cholinergic synapse.
- ▶ gamma-aminobutyric acid (GABA)-ergic and dopaminergic pathways provide compensatory inhibition.
- ▶ The clinical manifestation of organophosphate toxicity results from muscarinic, nicotinic and CNS symptoms.
- ▶ A garlic-like odour emanating from the patient or involved container may aid the diagnosis.
- ▶ Immediate life-threatening symptoms usually are respiratory problems.
- ▶ Frequent suction and, if necessary, endotracheal intubation and assisted ventilation may be necessary to maintain adequate oxygenation.
- ▶ Theophylline compounds, to treat bronchospasm, should be used cautiously as they may lower the seizure threshold.
- ▶ Excessive secretions and bronchospasm should respond to adequate doses of atropine.
- ▶ Diazepam is the drug of choice for convulsions.
- ▶ Usual methods of decontamination, (activated charcoal and cathartics) should be used when patients present within 4-6 hours postexposure.
- ▶ The administration of atropine, as an antidote, does not require confirmation by acetylcholinesterase levels. Severely poisoned patients develop marked resistance to the usual doses of atropine. [Atropine should not be given to a cyanosed patient - ICI] **NOTE:** Hypoxia must be corrected before atropine is given. For adult: 2 mg repeatedly SC or IV until atropinization is achieved and maintained (atropinization is characterised by decreased bronchial secretions, heart rate >100 bpm, dry mouth, diluted pupils).
- ▶ Pralidoxime (2-PAM, Protopam) is a specific antidote when given within 24 hours and perhaps up to 36-48 hours postexposure. Although it ameliorates muscle weakness, fasciculations and alterations of consciousness, it does not relieve bronchospasm or bronchorrhea and must be given concurrently with atropine. **NOTE:** Pralidoxime should be given as an adjunct to, **NOT** a replacement for atropine and should be given in every case where atropine therapy is deemed necessary. Traditional dose: 1 g (or 2 g in severe cases) by slow IV injection over 5-10 minutes. 1-2 g, 4 hourly (maximum dose 12 g in 24 hours) until clinical and analytical recovery is achieved and maintained.
- ▶ Avoid parasympathomimetic agents. Phenothiazines and antihistamines may potentiate organophosphate activity. [Ellenhorn and Barceloux: Medical Toxicology]

NOTE: Acute pancreatitis in organophosphate intoxication may be more common than reported. The possible pathogenesis of pancreatic insult are excessive cholinergic stimulation of the pancreas and ductular hypertension. Early recognition and appropriate therapy for acute pancreatitis may lead to an improved prognosis.

Cheng-Tin Hsiao, et al; *Clinical Toxicology* 34(3), 343-347 (1996)

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
1. Cholinesterase activity in red cells	70% of individual's baseline	Discretionary	NS

B: Background levels occur in specimens collected from subjects **NOT** exposed

NS: Non-specific determinant; Also observed after exposure to other materials

SQ: Semi-quantitative determinant; Interpretation may be ambiguous. Should be used as a screening test or confirmatory test.

Some jurisdictions require that health surveillance be conducted on occupationally exposed workers. Such surveillance should emphasise

- ▶ demography, occupational and medical history and health advice
- ▶ physical examination

- ▶ baseline estimation of red cell and plasma cholinesterase activity levels by the Ellman method. Estimation of red cell and plasma cholinesterase activity towards the end of the working day

SECTION 5 Firefighting measures

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. ▶ Use fire fighting procedures suitable for surrounding area. ▶ Do not approach containers suspected to be hot. ▶ Cool fire exposed containers with water spray from a protected location. ▶ If safe to do so, remove containers from path of fire. ▶ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Combustible. ▶ Slight fire hazard when exposed to heat or flame. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. ▶ On combustion, may emit toxic fumes of carbon monoxide (CO). ▶ May emit acrid smoke. ▶ Mists containing combustible materials may be explosive. <p>Combustion products include: carbon dioxide (CO₂) hydrogen chloride phosgene nitrogen oxides (NO_x) phosphorus oxides (PO_x) sulfur oxides (SO_x) other pyrolysis products typical of burning organic material. May emit poisonous fumes.</p>
HAZCHEM	2X

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ Remove all ignition sources. ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb spill with sand, earth, inert material or vermiculite. ▶ Wipe up. ▶ Place in a suitable, labelled container for waste disposal.
Major Spills	<p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> ▶ DO NOT touch the spill material ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear full body protective clothing with breathing apparatus. ▶ Prevent, by any means available, spillage from entering drains or water course. ▶ Stop leak if safe to do so. ▶ Contain spill with sand, earth or vermiculite. ▶ Collect recoverable product into labelled containers for recycling. ▶ Neutralise/decontaminate residue (see Section 13 for specific agent). ▶ Collect solid residues and seal in labelled drums for disposal. ▶ Wash area and prevent runoff into drains. ▶ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▶ If contamination of drains or waterways occurs, advise emergency services.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

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Safe handling	<p>The conductivity of this material may make it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is considered semi-conductive if its conductivity is below 10 000 pS/m., Whether a liquid is nonconductive or semi-conductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid.</p> <ul style="list-style-type: none"> ▶ Containers, even those that have been emptied, may contain explosive vapours. ▶ Do NOT cut, drill, grind, weld or perform similar operations on or near containers. ▶ DO NOT allow clothing wet with material to stay in contact with skin ▶ Electrostatic discharge may be generated during pumping - this may result in fire. ▶ Ensure electrical continuity by bonding and grounding (earthing) all equipment. ▶ Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<=1 m/sec until fill pipe submerged to twice its diameter, then <= 7 m/sec). ▶ Avoid splash filling. ▶ Do NOT use compressed air for filling discharging or handling operations. ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ Prevent concentration in hollows and sumps. ▶ DO NOT enter confined spaces until atmosphere has been checked. ▶ DO NOT allow material to contact humans, exposed food or food utensils. ▶ Avoid contact with incompatible materials. ▶ When handling, DO NOT eat, drink or smoke. ▶ Keep containers securely sealed when not in use. ▶ Avoid physical damage to containers. ▶ Always wash hands with soap and water after handling. ▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▶ Use good occupational work practice. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Other information	<ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. ▶ Store away from incompatible materials and foodstuff containers. ▶ Protect containers against physical damage and check regularly for leaks. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks. <p>For low viscosity materials</p> <ul style="list-style-type: none"> ▶ Drums and jerricans must be of the non-removable head type. ▶ Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> ▶ Removable head packaging; ▶ Cans with friction closures and ▶ low pressure tubes and cartridges <p>may be used.</p> <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *.</p> <p>-</p> <p>In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *.</p> <p>-</p> <p>* unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p>
Storage incompatibility	<ul style="list-style-type: none"> ▶ Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic rings and strong oxidising agents. ▶ Aromatics can react exothermically with bases and with diazo compounds. ▶ A number of phosphate and thiophosphate esters are of limited thermal stability and undergo highly exothermic self-accelerating decomposition reactions which may be catalysed by impurities. ▶ The potential hazards can be reduced by appropriate thermal control measures. <p>BREThERICK L.: Handbook of Reactive Chemical Hazards</p> <p>Thermal decomposition of organophosphate esters, in the presence of trimethylolpropane or its homologues (common components of synthetic lubricants), may produce bicyclic phosphates and phosphites. These may occur be produced in as little as 5 minutes at 650 deg C. These bicyclic compounds are a class of materials with neurotoxic properties which produce convulsive seizures in test animals. The formation of these compounds does not occur, for example, in the presence of a pentaerythritol base (another common component of synthetic lubricants).</p> <ul style="list-style-type: none"> ▶ Avoid strong acids, bases. ▶ Alkyl esters of thiophosphates are often temperature sensitive and decompose if overheated. Thermal decomposition products include highly toxic and odiferous hydrogen sulfide and extremely odorous alkyl mercaptans. Both species can be detected at extremely low concentrations and vapours may travel long distances (sometimes kilometers). These decomposition vapours are flammable and may ignite suddenly when mixed with air in the presence of an ignition source such as sparks or flames. ▶ Low temperature storage may produce crystallisation from solution. ▶ CARE: If heating to liquefy, use tepid water or oil, Avoid temperatures in excess of 50 deg. C. If heated, product temperature should be constantly monitored and product should be agitated to avoid localised temperatures in the container. Higher temperature will produce degradation of product and eventually cause decomposition. ▶ If the material is overheated, especially in the presence of water hydrogen sulfide may be released; this can cause rapid respiratory collapse, coma and death without necessarily any warning odour being sensed. ▶ If decomposition is suspected, or if the product has been overheated, do not open the container, discontinue heating and secure the unit. Initiate emergency procedures, taking all necessary precautions to avoid exposure to noxious or flammable gases (e.g. hydrogen sulfide), such as evacuation of contaminated areas, and use of suitable respiratory protection . ▶ Extreme caution must be used in tank gauging or similar operations as lethal concentration of hydrogen sulfide may accumulate in the head space of containers. <p>Incompatible materials and coatings include:</p> <ul style="list-style-type: none"> ▶ butyl rubber

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- ▶ butadiene rubber
- ▶ styrene rubber

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	chlorpyrifos	Chlorpyrifos	0.2 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
chlorpyrifos	Chlorpyrifos; (Dursban)	0.6 mg/m3	15 mg/m3	44 mg/m3

Ingredient	Original IDLH	Revised IDLH
chlorpyrifos	Not Available	Not Available
solvent naphtha petroleum, heavy aromatic	Not Available	Not Available

Exposure controls

	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.</p> <p>Employers may need to use multiple types of controls to prevent employee overexposure.</p> <p>Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. An approved self contained breathing apparatus (SCBA) may be required in some situations.</p> <p>Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.</p> <table border="1" data-bbox="384 1128 1485 1384"> <thead> <tr> <th>Type of Contaminant:</th> <th>Air Speed:</th> </tr> </thead> <tbody> <tr> <td>solvent, vapours, degreasing etc., evaporating from tank (in still air).</td> <td>0.25-0.5 m/s (50-100 f/min.)</td> </tr> <tr> <td>aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)</td> <td>0.5-1 m/s (100-200 f/min.)</td> </tr> <tr> <td>direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)</td> <td>1-2.5 m/s (200-500 f/min.)</td> </tr> <tr> <td>grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).</td> <td>2.5-10 m/s (500-2000 f/min.)</td> </tr> </tbody> </table> <p>Within each range the appropriate value depends on:</p> <table border="1" data-bbox="384 1420 1118 1585"> <thead> <tr> <th>Lower end of the range</th> <th>Upper end of the range</th> </tr> </thead> <tbody> <tr> <td>1: Room air currents minimal or favourable to capture</td> <td>1: Disturbing room air currents</td> </tr> <tr> <td>2: Contaminants of low toxicity or of nuisance value only.</td> <td>2: Contaminants of high toxicity</td> </tr> <tr> <td>3: Intermittent, low production.</td> <td>3: High production, heavy use</td> </tr> <tr> <td>4: Large hood or large air mass in motion</td> <td>4: Small hood-local control only</td> </tr> </tbody> </table> <p>Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.</p>	Type of Contaminant:	Air Speed:	solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)	grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)	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Personal protection																					
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material may be under pressure. ▶ Chemical goggles whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted. ▶ Full face shield (20 cm, 8 in minimum) may be required for supplementary but never for primary protection of eyes; these afford face protection. ▶ Alternatively a gas mask may replace splash goggles and face shields. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in 																				

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	a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]
Skin protection	See Hand protection below
Hands/feet protection	<p>▶ Elbow length PVC gloves</p> <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> frequency and duration of contact, chemical resistance of glove material, glove thickness and dexterity <p>Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).</p> <ul style="list-style-type: none"> When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended. Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use. Contaminated gloves should be replaced. <p>As defined in ASTM F-739-96 in any application, gloves are rated as:</p> <ul style="list-style-type: none"> Excellent when breakthrough time > 480 min Good when breakthrough time > 20 min Fair when breakthrough time < 20 min Poor when glove material degrades <p>For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.</p> <p>It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.</p> <p>Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers' technical data should always be taken into account to ensure selection of the most appropriate glove for the task.</p> <p>Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:</p> <ul style="list-style-type: none"> Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of. Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential <p>Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.</p>
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> Overalls. Eyewash unit. Barrier cream. Skin cleansing cream. Ensure that there is a supply of atropine tablets on hand Ensure all employees have been informed of symptoms of organophosphorus or carbamate poisoning and that the use of atropine in first aid is understood.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties**Information on basic physical and chemical properties**

Appearance	Clear, pale yellow liquid with mercaptan odour; miscible with water.		
Physical state	Liquid	Relative density (Water = 1)	1.072
Odour	Not Available	Partition coefficient n-octanol / water	Not Available

Surefire Fortune 500 Multipurpose Insecticide and Termiticide

Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Applicable
Flash point (°C)	>65	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Combustible.	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	2.7	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	<p>There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.</p> <p>Inhaling high concentrations of mixed hydrocarbons can cause narcosis, with nausea, vomiting and lightheadedness. Low molecular weight (C2-C12) hydrocarbons can irritate mucous membranes and cause incoordination, giddiness, nausea, vertigo, confusion, headache, appetite loss, drowsiness, tremors and stupor.</p> <p>Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal.</p> <p>Inhalation of aerosols containing chlorpyrifos has been shown to depress cholinesterase activity.</p> <p>Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination.</p> <p>Inhalation of vapours, aerosols (mists, fumes) or dusts, generated by the material during the course of normal handling, may produce severely toxic effects; these may be fatal.</p>
Ingestion	<p>Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.</p> <p>Symptoms of chlorpyrifos poisoning include headache, fatigue, dizziness, blurred vision, weakness, nausea, cramps, diarrhoea, chest discomfort, sweating, pupil constriction, excess secretion of tears, salivation, vomiting, bluish discoloration of the extremities and muscle twitching. In advanced cases convulsions, coma, loss of reflexes, and loss of sphincter control may occur. Decreased levels of the enzyme cholinesterase have been observed. Chlorpyrifos-oxon, an active metabolite, is very potent in producing delayed nerve damage.</p> <p>Ingestion of petroleum hydrocarbons can irritate the pharynx, oesophagus, stomach and small intestine, and cause swellings and ulcers of the mucous. Symptoms include a burning mouth and throat; larger amounts can cause nausea and vomiting, narcosis, weakness, dizziness, slow and shallow breathing, abdominal swelling, unconsciousness and convulsions.</p>
Skin Contact	<p>This material can cause inflammation of the skin on contact in some persons.</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.</p> <p>Toxic effects of chlorpyrifos are dose related; as four repeated doses of 25 mg/kg each applied to the skin of human volunteers for 12 hours caused depression of the plasma enzyme, plasma cholinesterase; four repeated doses of 10 mg/kg each did not show this effect.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> <p>Skin contact with the material may produce toxic effects; systemic effects may result following absorption.</p>
Eye	<p>If applied to the eyes, this material causes severe eye damage.</p>
Chronic	<p>This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.</p> <p>Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.</p> <p>Constant or exposure over long periods to mixed hydrocarbons may produce stupor with dizziness, weakness and visual disturbance, weight loss and anaemia, and reduced liver and kidney function. Skin exposure may result in drying and cracking and redness of the skin.</p> <p>Alkyl thiophosphates may be decomposed under certain circumstances, to produce hydrogen sulphides and alkyl mercaptans.</p> <p>Prolonged skin contact may cause irritation and slight burns. Studies have shown that children exposed to chlorpyrifos before birth, may develop a variety of birth defects involving a number of organs, including the brains, eyes, ears, palate, teeth, heart, feet, nipples and genitalia. In particular, nearsightedness, poor vision, narrowing of the visual fields and damage to the retina may occur.</p>

Surefire Fortune 500 Multipurpose Insecticide and Termiticide

Harmful: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

Surefire Fortune 500 Multipurpose Insecticide and Termiticide	TOXICITY	IRRITATION
	Not Available	Not Available
chlorpyrifos	TOXICITY	IRRITATION
	504 mg/kg ^[2]	Not Available
	Dermal (rabbit) LD50: 2000 mg/kg ^[2]	
	dermal (rat) LD50: 202 mg/kg ^[2]	
	Inhalation (rat) LC50: >0.2 mg/l/4H ^[2]	
	Inhalation (rat) LC50: 78 mg/l ^[2]	
	Oral (rabbit) LD50: 10002000 mg/kg ^[2]	
Oral (rat) LD50: 82 mg/kg ^[2]		
solvent naphtha petroleum, heavy aromatic	TOXICITY	IRRITATION
	5000 mg/kg ^[1]	Eye (rabbit): Irritating
	Inhalation (rat) LC50: >0.59 mg/l/4H ^[2]	Eye: no adverse effect observed (not irritating) ^[1]
	Oral (rat) LD50: <5000 mg/kg ^[1]	Skin: adverse effect observed (irritating) ^[1]
	Oral (rat) LD50: >2000 mg/kg ^[1]	
	Oral (rat) LD50: 4820 mg/kg ^[1]	
Oral (rat) LD50: 5800 mg/kg ^[1]		

Legend: 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. * Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of Chemical Substances

CHLORPYRIFOS	<p>Oral (rat) LD50: 135-163 mg/kg * Oral (rabbit) LD50: 1000-2000 mg/kg * Inhalation (rat) LC50: >0.2 mg/l(14 ppb)/ 4-6hr * NOEL (2 y) based on blood plasma cholinesterase activity, for rats 0.03, dogs 0.01 mg/kg daily * ADI 0.01 mg/kg b.w. * Toxicity Class WHO II;EPA II * Non-teratogenic *</p> <p>Common symptoms include headache, sweating, nausea, vomiting, diarrhoea, abdominal cramps, reduced heart rate, blurred vision, shrinking of the pupil, narrowing of the airway with excess phlegm, fluid in the lung, and difficulty in breathing. There may be muscle twitch, salivation, excess secretion of tears, "pins and needles", lightheadedness, headache and memory impairment which may last weeks or months after the initial symptoms have resolved. Children may show a decline in school performance for up to about 6 months from exposure. Long term exposure has been linked to unstable blood pressure and pulse.</p> <p>Dithiophosphate alkyl esters is corrosive and toxic to the tissues on skin or oral exposure depending on its concentration. Symptoms included diarrhoea, skin and gastrointestinal irritation, lethargy, reduced food intake, staining about the nose and eye; occasionally, there was drooping of the eyelid, hair standing up, inco-ordination and salivation. Toxicity is reduced following inhalation (due to vapour pressure and high viscosity). It may produce reproductive, developmental and genetic toxicity on experimental animals, but no substantive data is available to establish effect on humans.</p> <p>[* The Pesticides Manual, Incorporating The Agrochemicals Handbook, 10th Edition, Editor Clive Tomlin, 1994, British Crop Protection Council]</p>
SOLVENT NAPHTHA PETROLEUM, HEAVY AROMATIC	<p>Animal studies indicate that normal, branched and cyclic paraffins are absorbed from the gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length, with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent than iso- or cyclo-paraffins.</p> <p>The major classes of hydrocarbons are well absorbed into the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with fats in the diet. Some hydrocarbons may appear unchanged as in the lipoprotein particles in the gut lymph, but most hydrocarbons partly separate from fats and undergo metabolism in the gut cell. The gut cell may play a major role in determining the proportion of hydrocarbon that becomes available to be deposited unchanged in peripheral tissues such as in the body fat stores or the liver.</p> <p>For petroleum: This product contains benzene, which can cause acute myeloid leukaemia, and n-hexane, which can be metabolized to compounds which are toxic to the nervous system. This product contains toluene, and animal studies suggest high concentrations of toluene lead to hearing loss. This product contains ethyl benzene and naphthalene, from which animal testing shows evidence of tumour formation.</p> <p>Cancer-causing potential: Animal testing shows inhaling petroleum causes tumours of the liver and kidney; these are however not considered to be relevant in humans.</p> <p>Mutation-causing potential: Most studies involving gasoline have returned negative results regarding the potential to cause mutations, including all recent studies in living human subjects (such as in petrol service station attendants).</p> <p>Reproductive toxicity: Animal studies show that high concentrations of toluene (>0.1%) can cause developmental effects such as lower birth weight and developmental toxicity to the nervous system of the foetus. Other studies show no adverse effects on the foetus.</p> <p>Human effects: Prolonged or repeated contact may cause defatting of the skin which can lead to skin inflammation and may make the skin more susceptible to irritation and penetration by other materials.</p> <p>Animal testing shows that exposure to gasoline over a lifetime can cause kidney cancer, but the relevance in humans is questionable.</p>

Acute Toxicity	✓	Carcinogenicity	✗
Skin Irritation/Corrosion	✓	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✓
Mutagenicity	✗	Aspiration Hazard	✓

Legend: ✗ – Data either not available or does not fill the criteria for classification
 ✓ – Data available to make classification

SECTION 12 Ecological information

Surefire Fortune 500 Multipurpose Insecticide and Termiticide

Toxicity

Surefire Fortune 500 Multipurpose Insecticide and Termiticide	Endpoint	Test Duration (hr)	Species	Value	Source
	Not Available	Not Available	Not Available	Not Available	Not Available

chlorpyrifos	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	48	Crustacea	0.000058mg/L	5
	NOEC	624	Fish	0.0003mg/L	5

solvent naphtha petroleum, heavy aromatic	Endpoint	Test Duration (hr)	Species	Value	Source
	LC50	96	Fish	0.58mg/L	2
	EC50	48	Crustacea	0.76mg/L	2
	EC50	72	Algae or other aquatic plants	<1mg/L	1
	NOEC	96	Algae or other aquatic plants	0.12mg/L	2

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

For dithiophosphate alkyl esters and their (zinc) salts:

The physical and chemical properties of dithiophosphate alkyl esters exhibit a common similarity. All members of this category are within a narrow molecular weight range (256-354 daltons) and are highly acidic. In addition, modelling data indicate they have similar melting and boiling points, low water solubility, low vapour pressure, and are lipophilic in nature. Members of the zinc dialkyldithiophosphate category contain alkyl chain lengths that range from C3-10, or tetrapropenylphenol (range = C10-15, C12 enriched). It is common for zinc dialkyldithiophosphates to contain mixed alkyl esters (e.g., C4, C5), although derivatives with single chain lengths (e.g., C8) are included in the category. As a result of this diversity in alkyl side chain length, the molecular weight distribution for the members of the category is broad, 578 to 1303 gm/mol. due to the predominant influence of carbon chain length on molecular weight. The zinc dialkyldithiophosphates are generally regarded to be poorly soluble in water.

Fate and Transport Characteristics: Members of this category are expected to be poorly biodegradable. The members of the category are resistant to hydrolysis at room temperature, but are degraded when heated and are unstable at temperatures >120 C. This decomposition mechanism is key to how the zinc salts provide anti-wear and anti-oxidation performance enhancements in engine oils. Photodegradation is not expected to cause significant physical degradation of dithiophosphate alkyl esters. These substances have low vapour pressure, which indicates that they have a low potential to partition into the air to a significant extent where they would be subject to indirect photodegradation. These substances are not expected to partition to water or air if released into the environment due to their low water solubility and low vapour pressure. They are also hydrophobic in nature, which suggests that any which reaches the water compartment will be immobilized through binding to the organic component of soils and sediments. Studies indicate a bioaccumulation factor of less than 100 for a C4-5 ester zinc dithiophosphate indicating a low potential for bioconcentration or cumulative effects. The hydrocarbon portion of these compounds that is susceptible to biodegradation is present in both the zinc dialkyldithiophosphates and the dithiophosphate alkyl esters. Therefore, it is expected that the dithiophosphate alkyl esters will behave similarly. The zinc salts are poorly biodegradable.

Ecotoxicity: The low water solubility suggests that the acute aquatic toxicity of these substances should be low due to limited bioavailability to aquatic organisms. However, the length of the alkyl side chains on these substances will influence their relative water solubility, and, hence, their relative toxicity. Diethyl dithiophosphate for example is highly toxic to Daphnids. Zinc O,O-bis (isooctyl) dithiophosphate (CAS RN 28629-66-5) also appears to be harmful to aquatic organisms such as fish and Daphnids.

Studies on various thiophosphates indicated complete mineralization within three weeks by acclimation. A water stability study demonstrated the nature of hydrolysis involves the attack of water molecule on the phosphorus ester involving P-O bond fission. .

for chlorpyrifos:

log Kow : 4.96-5.11

Koc : 4381-13600

Environmental Fate: Plants - Non-systemic in plants, not absorbed from soil via roots. Residues taken up by plant tissues are metabolised to 3,5,6-trichloro-2-pyridinol which is conjugated and sequestered. Soil and Water - In soil, chlorpyrifos is slowly degraded, with a half-life of about 60-120 days to 3,5,6-trichloropyridin-2-ol which is degraded to organochlorine compounds and carbon dioxide.

Half-life (hr) air : 6.34

Half-life (hr) H2O surface water : 840-1872

Half-life (hr) soil : 240-1344

Henry's atm m3 /mol: 7.80E-05

BCF : 14

log BCF : 2.5-3.54

*Handbook of Pesticide Toxicology (Hayes, Wayland, J. Jr & Laws E.R.), Vol.2 pg 1065, Academic Press Inc.1991

The vapor pressure of chlorpyrifos is 1.9x10⁻⁵ mm Hg at 25 C (2.5x10⁻⁸ atm), suggesting that while chlorpyrifos is in the atmosphere, it will exist primarily in the vapor phase but will also partition to available airborne particulate. As the removal rate by dry deposition is low for such compounds, depending on its reactivity characteristics and the amount of available airborne particulate, chlorpyrifos may travel long distances in the air. The low solubility of chlorpyrifos indicates that dry deposition is a more important process than wet deposition. The transport of chlorpyrifos from water to air can occur due to volatilisation. The estimated volatilisation half-life from a river 1 meter deep flowing 1 m/set with a wind velocity of 3 m/sec is estimated to be 9 days.

Both chlorpyrifos and its degradation product, TCP, have ultraviolet (UV) absorbencies above 295 nm, indicating their susceptibility to photodegradation by sunlight. The photodegradation half-life of chlorpyrifos in the laboratory is approximately 2.6 days. While in the atmosphere, chlorpyrifos will react with photochemically induced hydroxyl radicals. Its estimated half-life is 6.34 hours. The processes primarily responsible for the transformation and degradation of chlorpyrifos in water are abiotic hydrolysis and photosensitised oxidation. Neutral hydrolysis is favored below pH 9, whereas alkaline hydrolysis dominates above pH 9. Neutral hydrolysis yields O-ethyl-O-3,5,6-trichloro-2-pyridyl phosphorothioate, while alkaline hydrolysis produces TCP and phosphorothioic acid.

Under field conditions, chlorpyrifos exhibits very short persistence in the water compartment of aquatic ecosystems, and half-lives as short as several hours have been observed. This is due to its considerable volatility from water (arising from low solubility and moderate vapor pressure) and its high association with sediment.

In macrophyte-dominated freshwater model ecosystems, Elodea nuttallii vegetation adsorbed a large proportion of the dose of chlorpyrifos applied and limited mixing of the insecticide in the water column. As a result, only a relatively small proportion of the applied dose became incorporated in the sediment. In contrast, when applied to open water model ecosystems, mixing was rapid and chlorpyrifos readily partitioned to the sediment compartment, which was a sink for chlorpyrifos.

The transport processes that may move chlorpyrifos from soil to other media are volatilisation, leaching, runoff, and biotransfer by plants. Post-application volatilisation of chlorpyrifos applied as an agricultural insecticide, and subsequent atmospheric transport, is thought to be a primary means by which chlorpyrifos is dispersed throughout the environment.

Volatilisation is affected by soil cultivation practices (no-till cultivation increase losses).

Volatilisation rates, which result from the complex interplay between chlorpyrifos sorbed to soil, dissolved in the soil pore water, and present in the soil air spaces, can be quite variable.

Leaching studies have shown chlorpyrifos to have little mobility in soil, indicating that runoff of chlorpyrifos is of minor environmental significance.

Chlorpyrifos may undergo degradation on the surface of soils by photo-induced reactions. Laboratory photodegradation of chlorpyrifos on soil surfaces with UV light (254 nm from mercury lamps) demonstrated that three different photochemical processes (hydrolysis, dechlorination, and oxidation) take place simultaneously. The oxidative and dehalogenated products formed during photo-irradiation of soil undergo further photolysis to form chloropyridinols and O,O-diethyl phosphorothioic acid. The oxon is unstable; it tends to hydrolyse

more rapidly than chlorpyrifos and does not accumulate in the soil. With the passage of time, the percentage of chlorinated pyridinols also decreased, suggesting that these products are mineralised in the soil under UV-photo-irradiation conditions.

Chlorpyrifos undergoes transformation in soil by the processes of abiotic hydrolysis and microbial degradation.

In a study of persistence of chlorpyrifos in a silt loam soil, the disappearance rate was fast in the first 15 days, but slowed after that. The calculated half-lives ranged from 15.8 to 17.3 days.

Research has shown that only very small levels of chlorpyrifos are taken up by plant roots, translocated, or metabolised by plant tissues. Chlorpyrifos is expected to have reduced bioavailability from soil and water as it is adsorbed strongly to soil.

Ecotoxicity:

Birds: Acute oral LD50 for chickens 32-102 mg/kg;

LC50 for bobwhite quail 423 ppm

LD50 for duck 76 mg/kg *

Fish LC50 (96 h) for rainbow trout 0.003, roach 0.25 mg/l

Bees: Toxic to bees. LD50 (contact) 59 ng/bee, (oral) 250 ng/bee

Daphnia EC50 (48 h) 1.7 ug/l

For Organophosphorus Compounds:

Environmental Fate: Organophosphate, (OP), compounds are a diverse group of chemicals used in domestic/industrial settings. Examples of organophosphates include insecticides (e.g. malathion, parathion, diazinon), herbicides, and nerve gases, among others. OP compounds are relatively non-persistent in the environment, with half-lives ranging from hours to several weeks, or months. Only rarely are pesticides found in crops beyond the growing season during which they are applied.

Atmospheric Fate: These substances rapidly break down in sunlight. OPs react in the atmosphere to form other, generally more oxidized compounds and will degrade rapidly by vapor-phase reactions with hydroxyl radicals. These reactions occur during both daytime and nighttime hours, leading to the formation of phosgene and dimethyl phosphate as major products, with little aerosol formation.

Terrestrial Fate: As a rule, these compounds do not represent a serious problem as soil contaminants. Breakdown products are usually non-toxic and easily degraded and utilized by micro-organisms. The disappearance of these substances is affected by their interaction with the physical characteristics/water/microflora content of the soil. In certain soil types, strong binding may make them unavailable for biological decomposition. In such soils, even running water produces little movement and thus, minimal contamination of water supplies is expected to occur. Less tightly bound substances are also unlikely to produce substantial contamination because of rapid breakdown. These substances are rapidly broken down by sunlight on soil. In soil, however, there is a greater likelihood of the presence and buildup of toxic residues.

Aquatic Fate: As a rule, these substances are not expected to be a significant contributor to water pollution and are broken down by water, (hydrolysis). Most OP pesticides are stable under acidic condition but, under alkaline conditions, hydrolysis is rapid - these rates increase 10-fold for each pH unit above 7. An increase of 10 deg. C of temperature will increase the hydrolysis rate approximately 4-fold. In general only minute amounts of residue and their breakdown products are found in natural water systems. Sunlight will break these substances down in water.

Ecotoxicity: Organophosphorus compounds are very highly acutely toxic to bees, wildlife, fish, and humans.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
chlorpyrifos	HIGH	HIGH

Bioaccumulative potential

Ingredient	Bioaccumulation
chlorpyrifos	HIGH (LogKOW = 5.5527)
solvent naphtha petroleum, heavy aromatic	LOW (BCF = 159)

Mobility in soil

Ingredient	Mobility
chlorpyrifos	LOW (KOC = 6829)

SECTION 13 Disposal considerations



Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"> ▶ Containers may still present a chemical hazard/ danger when empty. ▶ Return to supplier for reuse/ recycling if possible. <p>Otherwise:</p> <ul style="list-style-type: none"> ▶ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill. ▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product. <p>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.</p> <p>A Hierarchy of Controls seems to be common - the user should investigate:</p> <ul style="list-style-type: none"> ▶ Reduction ▶ Reuse ▶ Recycling ▶ Disposal (if all else fails) <p>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.</p> <ul style="list-style-type: none"> ▶ DO NOT allow wash water from cleaning or process equipment to enter drains. ▶ It may be necessary to collect all wash water for treatment before disposal. ▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▶ Where in doubt contact the responsible authority. ▶ Recycle wherever possible. Special hazard may exist - specialist advice may be required. ▶ Consult manufacturer for recycling options. ▶ Consult State Land Waste Management Authority for disposal. ▶ Bury or incinerate residue at an approved site. ▶ Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed. ▶ Puncture containers to prevent re-use and bury at an authorised landfill.
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Surefire Fortune 500 Multipurpose Insecticide and Termiticide

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	
HAZCHEM	2X

Land transport (ADG)

UN number	3018	
UN proper shipping name	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC (contains chlorpyrifos)	
Transport hazard class(es)	Class	6.1
	Subrisk	Not Applicable
Packing group	III	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	61 223 274
	Limited quantity	5 L

Air transport (ICAO-IATA / DGR)

UN number	3018	
UN proper shipping name	Organophosphorus pesticide, liquid, toxic * (contains chlorpyrifos)	
Transport hazard class(es)	ICAO/IATA Class	6.1
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	6L
Packing group	III	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	A3 A4
	Cargo Only Packing Instructions	663
	Cargo Only Maximum Qty / Pack	220 L
	Passenger and Cargo Packing Instructions	655
	Passenger and Cargo Maximum Qty / Pack	60 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y642
	Passenger and Cargo Limited Maximum Qty / Pack	2 L

Sea transport (IMDG-Code / GGVSee)

UN number	3018	
UN proper shipping name	ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC (contains chlorpyrifos)	
Transport hazard class(es)	IMDG Class	6.1
	IMDG Subrisk	Not Applicable
Packing group	III	
Environmental hazard	Marine Pollutant	
Special precautions for user	EMS Number	F-A , S-A
	Special provisions	61 223 274
	Limited Quantities	5 L

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

Surefire Fortune 500 Multipurpose Insecticide and Termiticide

chlorpyrifos is found on the following regulatory lists

Australia Chemicals with non-industrial uses removed from the Australian Inventory of Chemical Substances (old Inventory)

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australia Model Work Health and Safety Regulations - Hazardous chemicals (other than lead) requiring health monitoring

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6

Chemical Footprint Project - Chemicals of High Concern List

solvent naphtha petroleum, heavy aromatic is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals

Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

National Inventory Status

National Inventory	Status
Australia - AIIC	No (chlorpyrifos)
Australia - Non-Industrial Use	No (solvent naphtha petroleum, heavy aromatic)
Canada - DSL	Yes
Canada - NDSL	No (chlorpyrifos; solvent naphtha petroleum, heavy aromatic)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (solvent naphtha petroleum, heavy aromatic)
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	No (chlorpyrifos)
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets)

SECTION 16 Other information

Revision Date	09/10/2020
Initial Date	09/10/2020

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average

PC—STEL: Permissible Concentration-Short Term Exposure Limit

IARC: International Agency for Research on Cancer

ACGIH: American Conference of Governmental Industrial Hygienists

STEL: Short Term Exposure Limit

TEEL: Temporary Emergency Exposure Limit.

IDLH: Immediately Dangerous to Life or Health Concentrations

OSF: Odour Safety Factor

NOAEL :No Observed Adverse Effect Level

LOAEL: Lowest Observed Adverse Effect Level

TLV: Threshold Limit Value

LOD: Limit Of Detection

OTV: Odour Threshold Value

BCF: BioConcentration Factors

BEI: Biological Exposure Index

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