POLYCHLORINATED BIPHENYLS (PCB'S)

Chemwatch Material Safety Data Sheet (REVIEW) **CHEMWATCH 2315**
Issue Date: 21-Mar-2002
A477TC

TABLE OF CONTENTS

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

POLYCHLORINATED BIPHENYLS (PCB'S)

STATEMENT OF HAZARDOUS NATURE

Considered a Hazardous Substance according to the criteria of the New Zealand Hazardous Substances New Organisms legislation.

OTHER NAMES

C12-H(8-x)-Cl(2+x), C12-H(10-x)-Clx, "Aroclor 1 Series", "biphenyl, polychloro", "Kanechlor 400", PCB, Arochlor, "polychlorinated biphenyl", Montar, PCBs, "Aroclor 1016", polychloropolyphenyls, Noflamol, "Aroclor 1221", "chlorinated biphenyls (%Cl)", Phenochlor, "Aroclor 1232", "chlorinated diphenyl", Phenoclor, "Aroclor 1242", "chlorinated diphenylene", polychlorobiphenyl, "Aroclor 1248", "chloro biphenyl", "halogenated waxes", "Aroclor 1254", chlorobiphenyls, Pyralene, "Aroclor 1260", "chloro 1, 1-biphenyl", Pyranol, "Aroclor 1262", "chlorodiphenyl (%Cl)", "Santotherm FR", "Aroclor 1268", Chlophen, Sovol, "Aroclor 2565", Chlorextol, "Therminol FR-1", "Aroclor 4465", Dykanol, "Therminol FR series", "Aroclor 5442", Fenclor, Askarels, Inerteen, Chlorentol, "Kanechlor 300"

PROPER SHIPPING NAME

POLYCHLORINATED BIPHENYLS, LIQUID

PRODUCT USE

PCBs were formerly used as dielectric fluids in transformers and capacitors. Prior to 1972, PCBs were used as hydraulic and other industrial fluids (e.g. in vacuum pumps, as lubricants and cutting oils), in paints, inks and fire retardants. They were also used in heat transfer systems, gas-transmission turbines, in carbonless reproducing paper, adhesives, as plasticisers in epoxy paints, in fluorescent light ballasts, as wax extenders, coolants, dedusting agents, pesticide extenders, in surface treatments and coatings, in sealants and in caulking materials. This is one of a group of once widely used industrial chemicals whose high stability contributed both to their commercial usefulness and their deleterious environmental health effects. Consequently their use has been phased out. Their manufacture in the U.S.A. was discontinued in 1977 and their importation banned in 1979. Conditions for use are restricted by and in various jurisdictions.

SUPPLIER

Company: Huntsman Chemical Company
Address:
PO Box 62
Footscray West
VIC, 3012
AUS
Telephone: +61 3 9316 3333
Fax: +61 3 9316 3236

Company: Monsanto Australia Ltd/searle Pharmaceuticals
Address:
Priv. Bag 13905
Johnsonville
Wellington, 4
NZL

Company: Monsanto Chemical Co
Address:
800 N Lindbergh Blvd
St Louis
MO, 63167
USA
Telephone: +1 314 694 2094
Emergency Tel: +1 314 694 1000

Company: Huntsman Chemical Company (Chemplex Aust.)
Address:
Monsanto New Zealand Ltd
Private Bag
Johnsonville Wellington,
NZL
Telephone: +61 3 9316 3333
Fax: +61 3 9316 3236

Company: Monsanto Australia Ltd/searle Pharmaceuticals
Address:
Level 12, 600 St Kilda Rd
Melbourne
VIC, 3004
AUS
Telephone: +61 3 9522 7122
Emergency Tel: 1800 033 111
Fax: +61 3 9525 2253

HAZARD RATINGS

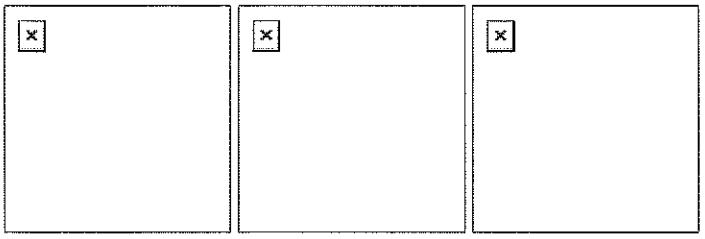
Flammability	0	
Toxicity	2	
Body Contact	2	
Reactivity	1	
Chronic	3	

SCALE: Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4

Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Terrestrial Hazard Category 3
Acute Toxicity (Oral) Category 4
Carcinogen Category 1B
Chronic Aquatic Hazard Category 1
Eye Irritation Category 2B
Organ Damage Category 2
Reproductive Toxicity Category 1B
Respiratory Irritation Category 3
Skin Irritation Category 3



EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by Chemwatch using GHS/HSNO criteria:
6.1D 6.3B 6.4A 6.7A 6.8A 6.9B 6.XA 9.1A 9.2C
Harmful if swallowed
Causes mild skin irritation
Causes eye irritation
May cause CANCER
May damage the unborn child
May cause damage to organs through prolonged or repeated exposure.
May cause respiratory irritation
Very toxic to aquatic life with long lasting effects
Harmful to life in the soil

PRECAUTIONARY STATEMENTS

Disposal

Dispose of contents and container in accordance with relevant legislation.

Prevention

Obtain special instructions before use.
Do not breathe dust/fume/gas/mist/vapours/spray.
Use personal protective equipment as required.
Do not handle until all safety precautions have been read and understood.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response

If eye irritation persists, get medical advice/attention.
If exposed or concerned: Get medical attention advice.
Get medical advice/attention if you feel unwell.
Wear eye/face protection.
Specific treatment: refer to Label or MSDS.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If skin irritation occurs, seek medical advice/attention.

Storage

Store locked up.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
polychlorinated biphenyls (PCB's)	1336-36-3	100

of formula C12-H(10-x)-Clx; i.e. when 54% chlorine content
composition is; where x = 2 approx. 0.5 %
3 1 %
4 21 %
5 48 %
6 23 %
7 6 %
May also contain 0-2 ppm of highly toxic
polychlorinated dibenzofurans (PCDF)
Used PCB's can contain contaminants of
higher toxicity (typically)

1,2,3,4-tetrachlorodibenzo-p-dioxin 30746-58-8

Section 4 - FIRST AID MEASURES

SWALLOWED

· For advice, contact a Poisons Information Centre or a doctor at once.
· Urgent hospital treatment is likely to be needed.
· If swallowed do NOT induce vomiting.
· If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
· Observe the patient carefully.
· Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
· Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
· Transport to hospital or doctor without delay.

EYE

If this product comes in contact with the eyes:
· 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

If skin contact occurs:
· Immediately remove all contaminated clothing, including footwear
· Flush skin and hair with running water (and soap if available).
· Seek medical attention in event of irritation.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area.
· Lay patient down. Keep warm and rested.
· 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.
· Transport to hospital, or doctor.

NOTES TO PHYSICIAN

Treat symptomatically.
Presentation:
A: Acute symptoms related to overexposure to the PCBs and dioxins (PCDDs and PCDFs) and, presumably, other polyhalogenated polyaromatics (PHAHs) include irritation of the skin, eyes and mucous membranes and nausea, vomiting and myalgias.
B: After a latency period which may be prolonged (up to several weeks or more), chloracne, porphyria cutanea tarda, hirsutism, or hyper- pigmentation may occur. Elevated levels of hepatic transaminases and blood lipids may be found. Polyneuropathies with sensory impairment and lower-extremity motor weakness may also occur.
C: Useful laboratory studies might include glucose, electrolytes, BUN, creatinine, liver transaminase, and liver function tests, and uroporphyrins (where porphyria is suspected)
Treatment:
A: Emergency and Supportive Measures: Treat skin, eye and respiratory irritation symptomatically
B: There is no specific antidote
C: Decontamination:
· Inhalation; remove victims from exposure and give supplemental oxygen if available.
· Eyes and Skin: remove contaminated clothing and wash affected skin with copious soap and water; irrigate exposed eyes with copious tepid water or saline.
· Ingestion; (a) Prehospital: Administer activated charcoal if available. Ipecac-induced vomiting may be useful for initial treatment at the scene if it can be given within a few minutes exposure (b) Hospital: Administer activated

charcoal. Gastric emptying is not necessary if activated charcoal can be given promptly.
D: Enhanced elimination: There is no known role for these procedures.
POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition
· If large amounts of PCB are ingested, gastric lavage is suggested.
· In the case of splashes to the eyes, a petrolatum-based ophthalmic ointment may be applied to the eye to relieve the irritating effects of PCBs.
· If electrical equipment arcs over, PCB dielectric fluids may decompose to produce hydrogen chloride (HCl), a respiratory irritant. [MONSANTO] Preplacement and annual medical examination of workers, likely to be exposed to PCBs and their congeners, is recommended; examination should emphasise liver function, skin condition, and reproductive history. [ILO].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA
Foam.
· Alcohol stable foam.
Dry chemical powder.

FIRE FIGHTING
POLLUTANT -contain spillage.
Non combustible . 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 courses.
Use fire fighting procedures suitable for surrounding area.
Cool fire exposed containers with water spray from a protected location.
Avoid spraying water onto liquid pools.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD
Non combustible liquid . POLLUTANT -contain spillage.
PCBs decompose on heating to produce acrid black soot and toxic fumes of aldehydes, hydrogen chlorides (HCl), chlorides and extremely toxic polychlorinated dibenzofurans (PCDF) and polychlorinated dibenzodioxin (PCDD).

FIRE INCOMPATIBILITY
Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Personal Protective Equipment
Breathing apparatus.
Gas tight chemical resistant suit.
Limit exposure duration to 1 BA set30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

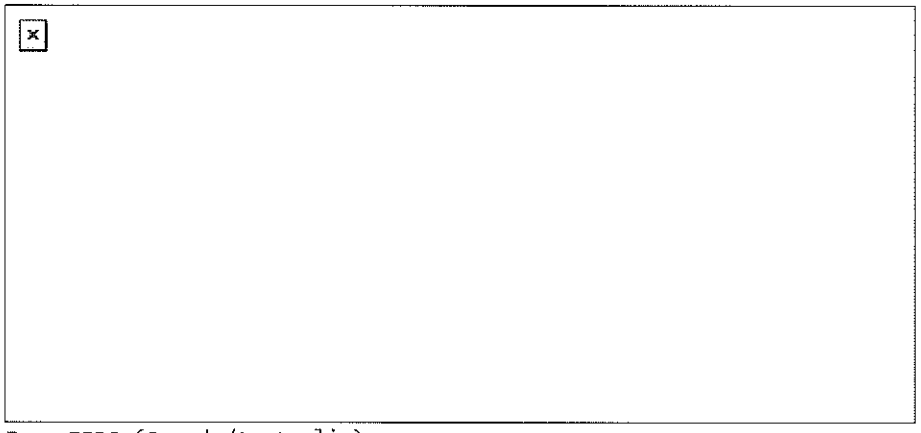
EMERGENCY PROCEDURES

MINOR SPILLS
POLLUTANT -contain spillage . Clean up all spills immediately.
Environmental hazard - contain spillage.
Avoid breathing vapours and contact with skin and eyes.
Wear protective clothing, impervious gloves and safety glasses.
Contain spill with sand, earth or vermiculite.
Wipe up and absorb small quantities with vermiculite or other absorbent material. Place spilled material in clean, dry, sealable, labelled container.

MAJOR SPILLS
POLLUTANT -contain spillage . Clear area of personnel.
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 courses.
Stop leak if safe to do so.
Contain spill with sand, earth or vermiculite.
Collect recoverable product into labelled containers for recycling.
Absorb remaining product with sand, earth or vermiculite.
Collect residues and seal in labelled drums for disposal.
After clean up operations, decontaminate and launder all protective clothing and

equipment before storing and re-using.
If equipment is grossly contaminated, decontaminate and destroy.
If contamination of drains or waterways occurs, advise emergency services.

PROTECTIVE ACTIONS FOR SPILL



From IERG (Canada/Australia)
Isolation Distance 15 metres
Downwind Protection Distance 50 metres
IERG Number 48

FOOTNOTES
1 PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the downwind protective action distance.
2 PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.
3 INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localised wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.
4 SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered "small spills".
LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a "one-tonne" compressed gas cylinder.
5 Guide 171 is taken from the US DOT emergency response guide book.
6 IERG information is derived from CANUTEC - Transport Canada.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
polychlorinated biphenyls (PCB's) 5 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
polychlorinated biphenyls (PCB's) 5 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:
polychlorinated biphenyls (PCB's) 3 mg/m³

The threshold concentration below which most people. will experience no appreciable risk of health effects:
polychlorinated biphenyls (PCB's) 1 mg/m³

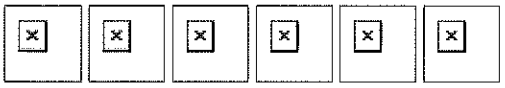
American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+ X + X 0 +

+: May be stored together
O: May be stored together with specific preventions
X: Must not be stored together

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

DO NOT allow clothing wet with material to stay in contact with skin.
Use good occupational work practice. Observe manufacturer's storing and handling recommendations.
Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.
Avoid all personal contact, including inhalation.
Wear protective clothing and gloves when handling containers.
Avoid physical damage to containers.
Use in a well-ventilated area and Use only in completely enclosed system.
Avoid contact with incompatible materials.
When handling, DO NOT eat, drink or smoke.
Wash hands with soap and water after handling.
Work clothes should be laundered separately: NOT at home.

SUITABLE CONTAINER

Packaging as recommended by manufacturer.
· Check that containers are clearly labelled.
Metal can or Metal drum or Steel drum with plastic liner.

STORAGE INCOMPATIBILITY

Avoid storage with oxidisers . Segregate from chlorine.
Avoid contamination of water, foodstuffs, feed or seed.

STORAGE REQUIREMENTS

Observe manufacturer's storing and handling recommendations.
Keep containers securely sealed . Store in a bunded area. and Keep locked up.
Store in a well-ventilated area. Store away from foodstuff containers.
Store under cover in a fenced compound or in a fireproof chemical store. Small quantities may be stored in buildings separated by fire proof walls.
Floors should be covered or coated with acid resistant material.
Protect containers against physical damage.
Check regularly for spills and leaks.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our record under the following CAS or Chemwatch (CW) numbers
polychlorinated biphenyls (PCB's): No data available for CAS:1336-36-3
1,2,3,4-tetrachlorodibenzo-p-dioxin: No data available for CAS:30746-58-8

The following materials had no OELs on our record under the following CAS or Chemwatch (CW) numbers
polychlorinated biphenyls (PCB's): No data available for CAS:1336-36-3
1,2,3,4-tetrachlorodibenzo-p-dioxin: No data available for CAS:30746-58-8

Exposure limits with "skin" notation indicate that vapour and liquid may be absorbed through intact skin. Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation. Contact with eyes and mucous membranes may also contribute to overall exposure and may also invalidate the exposure standard.
Exposure at or below the recommended TLV-TWA is thought to provide reasonably good protection against systemic intoxication but may NOT guarantee complete freedom from chloracne. NIOSH adopts a much lower value because it considers all PCBs to be carcinogens.

REPRODUCTIVE HEALTH GUIDELINES

Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits.

Ingredient	ORG	UF	Endpoint	CR	TLV Adeq
polychlorinated biph	0.0014 mg/m³	30	D	3.3	-

These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.
CR = Cancer Risk/10000; UF = Uncertainty factor:
TLV believed to be adequate to protect reproductive health:
LOD: Limit of detection
Toxic endpoints have also been identified as:
D = Developmental; R = Reproductive; TC = Transplacental carcinogen
Jankovic J., Drake F.: A Screening Method for Occupational Reproductive American Industrial Hygiene Association Journal 57: 641-649 (1996).

INGREDIENT DATA

1,2,3,4-TETRACHLORODIBENZO-P-DIOXIN:
No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION

EYE

- Safety glasses with side shields.
- Chemical goggles.
- Full face shield.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens 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 a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

Impervious gloves, Viton gloves, Butyl rubber gloves or Neoprene gloves.
Protective footwear.

OTHER

- Impervious protective clothing.
Overalls · Impervious apron.
- Eyewash unit.
Ensure there is ready access to a safety shower.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half-face Respirator	Full-Face Respirator
1000	10	A-AUS P	-
1000	50	-	A-AUS P
5000	50	Airline *	-
5000	100	-	A-2 P
10000	100	-	A-3 P
	100+		Airline**

* - Continuous Flow ** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Provide adequate ventilation in warehouse or closed storage areas.
If inhalation risk of overexposure exists, wear SAA approved organic-vapour respirator.

In confined spaces where there is inadequate ventilation, wear full-face air supplied breathing apparatus.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Clear, colourless to yellow-green, mobile oily to viscous liquid, or sticky to hard resin, or white crystalline solids, depending on degree of chlorination. Slightly soluble in glycerol and glycols. Soluble in organic solvents and lipids. Viscosity range: 71 - 2500 Saybolt unit sec. @ 38 C.

PHYSICAL PROPERTIES

Liquid.
Does not mix with water.
Sinks in water.

Molecular Weight: 188.66 - 395	Boiling Range (°C): approx. 290-420
Melting Range (°C): approx. 16 - 198	Specific Gravity (water=1): 1.18 - 1.8
Solubility in water (g/L): Insoluble	pH (as supplied): Not applicable
pH (1% solution): Not applicable.	Vapour Pressure (kPa): Negligible
Volatile Component (%vol): Not available	Evaporation Rate: Non Vol. @ 38C
Relative Vapour Density (air=1): Not available.	Flash Point (°C): 141 - >420
Lower Explosive Limit (%): Not applicable	Upper Explosive Limit (%): Not applicable
Autoignition Temp (°C): > 240	Decomposition Temp (°C): Not available
State: Liquid	

log Kow: 5.5-8.65

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Considered an unlikely route of entry in commercial/industrial environments.
The material is moderately discomforting to the gastro-intestinal tract and may be harmful if swallowed in large quantity.
Ingestion may result in nausea, pain, vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.
Digestion of PCBs and related substances can lead to nausea and vomiting, abdominal pain, loss of appetite, jaundice, liver damage, coma and death.
Headache, dizziness, lethargy, depression, nervousness, loss of libido and muscle and joint pain may also occur. Symptoms and death may be delayed for months; the substance occurs in the breastmilk of women and is toxic to babies.

EYE

The vapour/liquid is moderately discomforting and may be harmful to the eyes.
Vapours of PCBs may be irritating and may be absorbed by the eye.

SKIN

The liquid is harmful to the skin, it is rapidly absorbed and is capable of causing skin reactions.
Direct contact of the skin with liquid PCBs may result in irritation and defatting leading to dermatitis. PCBs may be absorbed by skin and as a result may be retained in body tissues.
Exposure to the material may result in a skin inflammation called chloracne. This is characterised by white- and blackheads, keratin cysts, spots, excessive discolouration. These mainly involve the skin under the eyes and behind the ears. The reaction may be delayed. There may also be excess hair growth, degeneration of elastic tissue as a result of sunlight, and scarring of the membrane of the penis.

INHALED

Not normally a hazard due to non-volatile nature of product.
Inhalation of vapour is more likely at higher than normal temperatures.
The vapour/mist is discomforting and may be extremely toxic if inhaled.
Inhalation of vapours containing PCBs may cause respiratory irritation, eczema and skin burns.

CHRONIC HEALTH EFFECTS

Primary route of exposure is usually by skin contact/absorption. Exposure to polychlorinated biphenyls (PCBs) over a long time can cause eczema and internal effects; various systems may be affected. On the skin, there may be thickening, swelling of the eyelids, feet and hands, itchy red eruptions, discolouration of nails and changes in hair follicles, hair loss, acne, eye discharge, and discolouration of the oral cavity. Effects on the digestive system include nausea and vomiting, abdominal pain and loss of appetite. There may be damage to the liver indicated by jaundice, which can be fatal. Nervous system effects include headache, dizziness, fatigue, impotence, joint and muscle pain. The airways may also be irritated and lung capacity reduced. PCBs cross the placenta and cause a variety of defects in the foetus and newborn including browning of the skin and liver damage. Growth may be retarded for many years with learning difficulties. The risk of miscarriages and stillbirths is increased. There may be a relationship between exposure to PCBs and the risk of developing various cancers, including melanomas, growths of the digestive system, lymphomas and leukaemias. Polyhalogenated aromatic hydrocarbons (PHAHs) can cause effects on hormones and mimic thyroid hormone. Acne, discharge in the eye, eyelid swellings and visual disturbances may occur. Babies born to exposed mothers can also exhibit these effects. There is an increased risk of liver cancer among those who have taken PHAHs.

TOXICITY AND IRRITATION

as CAS RN 1336-36-3
Oral (human) LDLo: 500 mg/kg* Nil reported
Oral (rat) LD50: 3980 mg/kg**
as CAS RN 12672-29-6 * [OHMTADS]
Oral (human) TDLo: 28 mg/kg **[CHRIS]
Oral (rat) LD50: 1100 mg/kg
Dermal (rabbit) LDLo: 1269 mg/kg
as CAS RN 53469-21-9
Inhalation (human) TCLo: 10 mg/m³
Other CAS numbers are applicable under polychlorinated biphenyl.
WARNING: This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.
WARNING: Polychlorinated biphenyls [CAS RN: 1336-36-3] in general and [CAS RN: 11097-69-1] in particular, are classified by IARC as Group 2A - Probably Carcinogenic to humans
Use strict occupational hygiene practices to minimise all personal contact.

1,2,3,4-TETRACHLORODIBENZO-P-DIOXIN:
No significant acute toxicological data identified in literature search.
The substance is classified by IARC as Group 3:
NOT classifiable as to its carcinogenicity to humans.
Evidence of carcinogenicity may be inadequate or limited in animal testing.
Use control measures and personal protective equipment to prevent personal contact.

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant:Extreme
"Hazardous Air Pollutant:" Yes

PCB limit for Marine water = 0.004 ugram/litre equals 0.000004 mg/L.
PCBs and other polyhalogenated polyaromatic hydrocarbons (including the dioxins and brominated species) are resistant to chemical and biological degradation and because of their solubility in fats and oils they tend to be bioconcentrated in living organisms. The highly chlorinated PCBs are retained in animals longer and seem to delay the excretion of the lower chlorinated PCBs. This is presumably true of other halogenated species and halogenated polyaromatic systems. They have become widely dispersed in the world environment and in the food-chain since their introduction. They are now recognised internationally to be a major environmental pollutant, their persistence causing ecological damage via water pollution. Consequently the loss of these materials to the environment is to be avoided at all costs.

PCBs are exceptionally persistent in the food chain, some even more so than the organochlorine insecticides with which they are often confused. In general the higher the degree of chlorination, the more resistant to degradation and more persistent environmentally they become.

Bioconcentration factors of PCBs in aquatic species such as fish, shrimp, and oysters range from 26000 to 60000. The health effects of PCBs are well established. These include interference with reproduction in wildlife and experimental animals and effects in birds and mammals including microsomal enzyme induction, porphyrogenic activity, tumour promotion, oestrogen activity and immunosuppression. Because of their high lipophilicity and their stability, the potential to bioaccumulate is great and long-term effects may be significant.
Classification of waste materials contaminated by PCB's are:

PCB Materials	PCB content greater than 10%
Scheduled Wastes	PCB content greater than 0.005% = 50 mg/kg or 50 ppm.
Non Scheduled Wastes	PCB content greater than 0.0002% = 2 mg/kg or 2ppm.
PCB Free Wastes	PCB content less than 0.0002% = 2 mg/kg or 2 ppm.

[Polychlorinated Biphenyls Management Plan - Waste Management Secretariat]
Materials with more than 0.005% = 50 ppm. are Worksafe Hazardous.
Refer to data for ingredients, which follows:

1,2,3,4-TETRACHLORODIBENZO-P-DIOXIN:
log Kow: 5.5-8.65
Half-life (hr) air: 88
Half-life (hr) H2O surface water: 15.8-65
Henry's Pa m^3 /mol: 3.77
log BCF: 2.2-4.02
processes Abiotic: oxid
PCBs and other polyhalogenated polyaromatic hydrocarbons (including the dioxins and brominated species) are resistant to chemical and biological degradation and because of their solubility in fats and oils they tend to be bioconcentrated in living organisms. The highly chlorinated PCBs are retained in animals longer and seem to delay the excretion of the lower chlorinated PCBs. This is presumably true of other halogenated species and halogenated polyaromatic systems. They have become widely dispersed in the world environment and in the food-chain since their introduction. They are now recognised internationally to be a major environmental pollutant, their persistence causing ecological damage via water pollution. Consequently the loss of these materials to the environment is to be avoided at all costs.

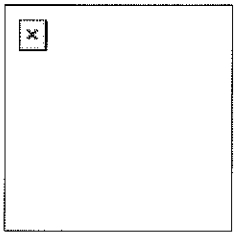
PCBs are exceptionally persistent in the food chain, some even more so than the organochlorine insecticides with which they are often confused. In general the higher the degree of chlorination, the more resistant to degradation and more persistent environmentally they become.

Bioconcentration factors of PCBs in aquatic species such as fish, shrimp, and oysters range from 26000 to 60000. The health effects of PCBs are well established. These include interference with reproduction in wildlife and experimental animals and effects in birds and mammals including microsomal enzyme induction, porphyrogenic activity, tumour promotion, oestrogen activity and immunosuppression. Because of their high lipophilicity and their stability, the potential to bioaccumulate is great and long-term effects may be significant.

Section 13 - DISPOSAL CONSIDERATIONS

Recycle wherever possible. Consult manufacturer for recycling options.
Consult State Land Waste Management Authority for disposal.
Due to their environmental persistence and potential health hazards, PCBs and dioxins cannot be disposed of in landfills or dumped at sea. The only environmentally acceptable method of disposal of PCBs and dioxins is by high temperature incineration. However this option is costly and uncertain.
Currently, most PCB and dioxin wastes must be stored in an approved manner until satisfactory arrangements can be made for their disposal. All wastes and residues containing PCBs and/or dioxins (e.g. wiping clothes, absorbent materials, used disposable protective gloves, contaminated clothing, etc.) should be collected, placed in proper containers, labelled and disposed of in the manner prescribed by government regulations. Regulations may require the compulsory reporting of all spills.

Section 14 - TRANSPORTATION INFORMATION



Labels Required
miscellaneous

HAZCHEM

2X

Land Transport UNDG:

Dangerous Goods Class:	9	Subrisk:	None
UN Number:	2315	Packing Group:	II

Shipping Name:POLYCHLORINATED BIPHENYLS, LIQUID

Air Transport IATA:

ICAO/IATA Class:	9	ICAO/IATA Subrisk:	None
UN/ID Number:	2315	Packing Group:	II
ERG Code:	9L		

Shipping Name: Polychlorinated biphenyls, liquid

Maritime Transport IMDG:

IMDG Class:	9	IMDG Subrisk:	None
UN Number:	2315	Packing Group:	II
EMS Number:	None	Marine Pollutant:	Extreme

Shipping Name: POLYCHLORINATED BIPHENYLS, LIQUID

Section 15 - REGULATORY INFORMATION

REGULATIONS

polychlorinated biphenyls (PCB's) (CAS: 1336-36-3) is found on the following regulatory lists;
International Agency for Research on Cancer (IARC) Carcinogens
Stockholm Convention on Persistent Organic Pollutants - Annex A - Elimination (Chinese)
Stockholm Convention on Persistent Organic Pollutants - Annex A - Elimination (English)
Stockholm Convention on Persistent Organic Pollutants - Annex A - Elimination (French)
Stockholm Convention on Persistent Organic Pollutants - Annex A - Elimination (Spanish)

Specific advice on controls required for materials used in New Zealand can be found at http://www.ermanz.govt.nz/search/registers.html

Section 16 - OTHER INFORMATION

NEW ZEALAND POISONS INFORMATION CENTRE
0800 POISON (0800 764 766)
NZ EMERGENCY SERVICES: 111

Issue Date: 21-Mar-2002
Print Date: 30-Aug-2006