

Pentachlorophenol sodium salt

sc-253243

Material Safety Data Sheet



The Power to Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Pentachlorophenol sodium salt

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY:

ChemWatch
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SYNONYMS

C₆-Cl₅-ONa, "phenol, pentachloro-, sodium salt", "pentachlorophenate sodium", "pentachlorophenoxy sodium", "sodium pentachlorophenol", "sodium pentachlorophenolate", "sodium pentachlorophenoxide", "sodium pentachlorophenate", pentaphenate, "sodium PCP", "Dow dormant fungicide", "Dowicide G-ST", "Dowicide G", "Napchlor G", Santobrite, Weedbeads

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max	
Flammability:	1			
Toxicity:	4			
Body Contact:	3			
Reactivity:	1			
Chronic:	2			
				Min/Nil=0 Low=1 Moderate=2 High=3 Extreme=4



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Very toxic by inhalation.

Limited evidence of a carcinogenic effect.

Toxic in contact with skin and if swallowed.

Irritating to eyes, respiratory system and skin.

May cause long-term adverse effects in the environment.

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

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ 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.

■ The most common symptoms of those experiencing pentachlorophenol poisoning include stuffy nose, scratchy throat, and tears in the eyes.

CAUTION: Ingestion causes an increase then decrease of respiration, blood pressure, urinary output; fever; increased bowel action; muscular weakness; collapse with convulsions and death.

EYE

■ This material can cause eye irritation and damage in some persons.

■ Exposure to pentachlorophenol may produce acute inflammation of the conjunctiva and a characteristic corneal opacity, corneal numbness and slight mydriasis.

SKIN

■ Skin contact with the material may produce toxic effects; systemic effects may result following absorption.

■ This material can cause inflammation of the skin on contact in some persons.

■ The material may accentuate any pre-existing dermatitis condition.

■ Direct skin contact has produced exfoliative dermatitis which resolves within 5 days of exposure.

In some instances workers develop allergies to pentachlorophenol with reports of immunological dysfunction appearing in the literature.

■ Chlorinated diphenyl ethers may produce skin irritation; systemic toxicity may occur following absorption.

■ Exposure to the material may result in a skin inflammation called chloracne.

This is characterized by white- and blackheads, keratin cysts, spots, excessive discoloration.

■ 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.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normal handling, may produce severely toxic effects; these may be fatal.

■ The material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

■ BE AWARE: Repeated minor exposures with only mild symptoms may have serious cumulative poisoning effect.

■ Pentachlorophenol dusts tend to cause sneezing and coughing.

Industrial hygiene experience demonstrates pentachlorophenol and its sodium salt to be irritating and to produce systemic toxicity.

CHRONIC HEALTH EFFECTS

■ There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.

Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.

Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

There is some evidence that inhaling this product is more likely to cause a sensitization reaction in some persons compared to the general population.

Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

The long-term effects of pentachlorophenol include lung, liver and kidney damage. Epidemiological evaluations of wood treatment workers found compromised renal function and increased complaints of low-grade inflammation.

Several case reports exist which suggest an association between occupational exposure to the technical product and various types of cancer (leukaemia, soft tissue sarcoma, Hodgkins disease).

Exposure to pentachlorophenol has also been associated with aplastic anemia, and blood disorders. Persons exposed to pentachlorophenol have reported peripheral neuropathy and other problems related to nerve damage (neurotoxicity) that may also be due to exposure to production contaminants. Commercial grade pentachlorophenol has also been demonstrated to suppress the

immune system in mice, an effect that may also be due to penta's contaminants since pure pentachlorophenol was not immunotoxic. These reports are confounded by concomitant exposure to other known or suspected human carcinogens. For example, chlorinated diphenyl ethers (PCDEs) are by-products of the manufacture of chlorinated phenols. Prolonged contact with chlorinated diphenyl ethers may cause skin irritation, weight loss and liver injury. Repeated absorption has produced liver damage in animals. Chlorophenols have been associated with cancers of the throat, nose and connective tissue.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
pentachlorophenol, sodium salt	131-52-2	> 99

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

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.

SKIN

■ If skin or hair contact occurs: · Quickly but gently, wipe material off skin with a dry, clean cloth. · Immediately remove all contaminated clothing, including footwear.

INHALED

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

NOTES TO PHYSICIAN

■ Treat symptomatically.

· Death following exposure to pentachlorophenol is partly caused by fever, but antipyretic drugs are of no use; they can even be dangerous. DO NOT use aspirin or atropine.

· Seriously poisoned patients should receive an intravenous line, cardiac monitoring, supplemental oxygen and an evaluation of acid-base status.

· For hyperpyrexia patients (rectal temperatures greater than 39 deg C):

· the temperature should be reduced rapidly with cooling measures and the body temperature monitored with rectal probe.

· Seizures are treated in the usual sequence with diazepam, phenytoin and phenobarbital. [Ellenhorn & Barceloux]

· Two recent reports suggest forced diuresis to increase the urinary excretion of pentachlorophenol. The clinical efficacy of this procedure in acute poisoning is unproven.

Once in the body, pentachlorophenol is distributed throughout and accumulates in the liver, kidney, brain, spleen and fat. Although pentachlorophenol is not readily metabolized in the body, it can attach (conjugate) to glucuronic acid and break down to tetrachlorohydroquinone. Most pentachlorophenol

however, is eliminated from the body. In 1986, researchers at the Institute of Toxicology in Switzerland have found that humans eliminate half of the pentachlorophenol they are exposed to in 17 days as glucuronic acid conjugates. Their findings were supported by reported cases of penta poisonings but contrasted with previous findings of a 33 hour elimination half life in humans. Pentachlorophenol may therefore have a greater potential for accumulation and persistence in the human body than previously indicated.

Preplacement and periodic (annual) medical examinations should be done on those with a potential for exposure. The emphasis should be on the cardiovascular system, eyes, upper respiratory tract, liver, kidneys, skin.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not applicable.
Upper Explosive Limit (%):	Not Available
Specific Gravity (water=1):	Not available.
Lower Explosive Limit (%):	Not Available

EXTINGUISHING MEDIA

· Water spray or fog.

· Foam.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.

· Wear full body protective clothing with breathing apparatus.

When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.
 - Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Combustion products include: carbon monoxide (CO), carbon dioxide (CO₂), hydrogen chloride, phosgene, other pyrolysis products typical of burning organic material.
- May emit poisonous fumes.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

- Glasses:
Chemical goggles.
- Gloves:
- Respirator:
Type A-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Environmental hazard - contain spillage.
- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS

- Environmental hazard - contain spillage.
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.
- Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
- Do NOT cut, drill, grind or weld such containers.
 - In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- Lined metal can, Lined metal pail/drum
- Plastic pail.

For low viscosity materials

- 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.

All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

- Outside or detached storage is preferred.
- Store in original containers.
- Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
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US - Michigan Exposure Limits for Air Contaminants	pentachlorophenol, sodium salt (Pentachlorophenol)	0.5	
US - Washington Permissible exposure limits of air contaminants	pentachlorophenol, sodium salt (Pentachlorophenol)	0.5	1.5
US OSHA Permissible Exposure Levels (PELs) - Table Z1	pentachlorophenol, sodium salt (Pentachlorophenol)	0.5	
Canada - Northwest Territories Occupational Exposure Limits (English)	pentachlorophenol, sodium salt (Pentachlorophenol - Skin)	0.5	1.5

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

- type a-p filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

- Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- 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) 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) is recommended.
- Contaminated gloves should be replaced.

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.

OTHER

- Overalls.
- Eyewash unit.

ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Mixes with water.

State	Divided solid	Molecular Weight	288.32
Melting Range (°F)	Not available.	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Miscible
Flash Point (°F)	Not Available	pH (1% solution)	Not available
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not Available	Vapour Pressure (mmHG)	Not applicable.
Upper Explosive Limit (%)	Not Available	Specific Gravity (water=1)	Not available.
Lower Explosive Limit (%)	Not Available	Relative Vapor Density (air=1)	Not applicable.
Volatile Component (%vol)	Not applicable.	Evaporation Rate	Not applicable

APPEARANCE

White to light brown powder with a distinctive penetrating odour. Soluble in water, ethanol and acetone; insoluble in benzene.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of heat source and direct sunlight.
- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

- Avoid reaction with oxidizing agents.

Pentachlorophenol:

- decomposes in water to produce hydrochloric acid, chlorinated phenols and carbon monoxide
- is incompatible with strong oxidisers, aluminium chloride, nitrobenzene
- attacks light metals in the presence of moisture.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

pentachlorophenol, sodium salt

TOXICITY AND IRRITATION

PENTACHLOROPHENOL, SODIUM SALT:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 126 mg/kg	Nil Reported
Inhalation (rat) LD50: 11.7 mg/kg	
Dermal (rabbit) LDLo: 250 mg/kg	

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

Side-reactions during manufacture of the parent compound may result in the production of trace amounts of polyhalogenated aromatic hydrocarbon(s). Halogenated phenols, and especially their alkali salts, can condense above 300 deg.

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.

WARNING: Pentachlorophenol can be embryotoxic, foetotoxic, and teratogenic (birth defects) in test animals. No safe exposure level has been established for pregnant women

[Williams, P.L., "Pentachlorophenol, an assessment of the occupational hazard", Am.Ind.Hyg.Assoc.J. 43(11):799-810(1982)].

Hexachlorodibenzodioxin and other higher chlorodioxins and dibenzofurans are known contaminants of pentachlorophenol and that hexachlorodibenzodioxin has been reported to cause cancer and adverse effects on reproduction in animals.

Teratogenicity: EPA has concluded that pentachlorophenol and possibly its hexachlorodibenzo-p-dioxin (HxCDD) contaminants cause birth defects and foetotoxic effects in test animals. Reported adverse effects in fetuses from pentachlorophenol exposure include

distorted sex ratios, increased incidences of resorbed embryos, skeletal anomalies, subcutaneous edema (excessive fluid), reduced survival, and reduced growth. Reported no observable effect levels (NOELs) for teratogenicity range from 3 to 5.8 milligrams per kilogram (mg/ kg) per day for pentachlorophenol and .001 mg/kg per day for HxCDD.

Mutagenicity: The majority of tests in yeast, bacteria, or mammalian cells have reported penta not to be genetically active. Questions have been raised as to the validity of this research since controls, doses, and statistical data were not reported in every study. Other tests have indicated that pentachlorophenol, and tetrachlorophenol, can damage genes. Pentachlorophenol's metabolite, tetrachlorohydroquinone, has also been shown to damage genes. Additional testing of pentachlorophenol in mammalian systems is necessary to determine whether this substance is mutagenic.

Carcinogenicity: The International Agency for Research on Cancer has classified pentachlorophenol as a Group 3 chemical for carcinogens (inadequate data in humans and animals).

EPA had originally classified pentachlorophenol as a Class D carcinogen (inadequate animal evidence), but reclassified it as a Class B2 carcinogen (probable human carcinogen) based on a 1988 National Toxicology Program study. The hexachlorobenzene and hexachlorodibenzo-p-dioxin contaminants in pentachlorophenol are known carcinogens. Agriculture Canada concludes that the combined evidence from epidemiological studies on human with mixed exposures to chlorophenols, dioxins, or pesticides contaminated with these chemicals suggest that occupational exposure to chlorophenols or phenoxy herbicides increases the risk of three kinds of cancer: soft tissue sarcoma, Hodgkin's lymphoma, and non-Hodgkin's lymphoma.

Oral (rat) LD50: 210 mg/kg (SAX)

The solubilities of pentachlorophenol and its salts differ, but their toxic effects are the same. (Patty's)

CARCINOGEN

Chlorophenols (see Polychlorophenols)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	
Polychlorophenols and their sodium salts (mixed exposures)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2B
pentachlorophenol, sodium salt	US - Rhode Island Hazardous Substance List	IARC	C
SODIUM PENTACHLOROPHENATE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	EPA-TRI
CHLOROPHENOLS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	IARC, P65-MC

SKIN

pentachlorophenol, sodium salt	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X
pentachlorophenol, sodium salt	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs) - Skin	Skin	X
pentachlorophenol, sodium salt	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	X
pentachlorophenol, sodium salt	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	X
pentachlorophenol, sodium salt	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	X
pentachlorophenol, sodium salt	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X
pentachlorophenol, sodium salt	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X

Section 12 - ECOLOGICAL INFORMATION

May cause long-term adverse effects in the environment.

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

This material and its container must be disposed of as hazardous waste.

Avoid release to the environment.

Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
pentachlorophenol, sodium salt	HIGH	No Data Available	LOW	MED

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Puncture containers to prevent re-use and bury at an authorized landfill.

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.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. 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.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols: None Hazard class or Division: 6.1

Identification Numbers: UN2567 PG: II

Label Codes: 6.1 Special provisions: IB8, IP2,
IP4, T3,
TP33

Packaging: Exceptions: 153 Packaging: Non- bulk: 212

Packaging: Exceptions: 153 Quantity limitations: 25 kg

Passenger aircraft/rail:

Quantity Limitations: Cargo 100 kg Vessel stowage: Location: A
aircraft only:

Vessel stowage: Other: None S.M.P.: Severe

Hazardous materials descriptions and proper shipping names:

Sodium pentachlorophenolate

Air Transport IATA:

UN/ID Number: 2567 Packing Group: II

Special provisions: None

Cargo Only

Packing Instructions: 100 kg Maximum Qty/Pack: 676

Passenger and Cargo Passenger and Cargo

Packing Instructions: 25 kg Maximum Qty/Pack: 669

Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity

Packing Instructions: 1 kg Maximum Qty/Pack: Y644

Shipping Name: SODIUM PENTACHLOROPHENATE

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: P

UN Number: 2567 Packing Group: II

EMS Number: F-A , S-A Special provisions: None

Limited Quantities: 500 g Marine Pollutant: Yes

Shipping Name: SODIUM PENTACHLOROPHENATE

Section 15 - REGULATORY INFORMATION

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.

■ Possible respiratory sensitiser*.

* (limited evidence).

Ingredients with multiple CAS Nos

Ingredient Name CAS pentachlorophenol, sodium salt 131-52-2, 123333-54-0

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■ 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.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

■ The (M)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.

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