AC Bravado

AXICHEM Pty Ltd

Chemwatch Hazard Alert Code: **4**

Chemwatch: **5152-89**
Version No: **5.1**
Safety Data Sheet according to WHS Regulations (Hazardous Chemicals) Amendment 2020 and ADG requirements

Issue Date: **10/12/2021**
Print Date: **13/02/2022**
L.GHS.AUS.EN

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

Product Identifier

Product name	AC Bravado
Chemical Name	Not Applicable
Synonyms	Not Available
Proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains chlorothalonil)
Chemical formula	Not Applicable
Other means of identification	Not Available

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

Relevant identified uses	Agricultural fungicide. Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

Registered company name	**AXICHEM Pty Ltd**
Address	9 Palings Court Nerang QLD 4211 Australia
Telephone	07 5596 1736
Fax	Not Available
Website	www.axichem.com.au
Email	msds@axichem.com.au

Emergency telephone number

Association / Organisation	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	+61 1800 951 288
Other emergency telephone numbers	+61 2 9186 1132

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

Poisons Schedule	S6
Classification [1]	Skin Corrosion/Irritation Category 2, Sensitisation (Skin) Category 1, Serious Eye Damage/Eye Irritation Category 1, Acute Toxicity (Inhalation) Category 1, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Carcinogenicity Category 2, Hazardous to the Aquatic Environment Long-Term 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)	

Page 1 continued...

Signal word	**Danger**

Hazard statement(s)

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P273	Avoid release to the environment.
P284	[In case of inadequate ventilation] wear respiratory protection.
P264	Wash all exposed external body areas thoroughly after handling.
P272	Contaminated work clothing should not be allowed out of the workplace.

Precautionary statement(s) Response

P304+P340	IF INHALED: Remove person to fresh air and keep 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.
P308+P313	IF exposed or concerned: Get medical advice/ attention.
P310	Immediately call a POISON CENTER/doctor/physician/first aider.
P302+P352	IF ON SKIN: Wash with plenty of water.
P333+P313	If skin irritation or rash occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.
P391	Collect spillage.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
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.

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
1897-45-6	54	chlorothalonil
Not Available		(720g/l)
7732-18-5	10-30	water
Not Available	balance	other non hazardous ingredients

Legend:	*1. Classified by Chemwatch; 2. Classification drawn from HCIS; 3. Classification drawn from Regulation (EU) No 1272/2008 - Annex VI; 4. Classification drawn from C&L; * EU IOELVs available*

Continued...

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh 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. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	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.
Inhalation	▸ 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, without delay.
Ingestion	▸ 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. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.
As in all cases of suspected poisoning, follow the ABCDEs of emergency medicine (airway, breathing, circulation, disability, exposure), then the ABCDEs of toxicology (antidotes, basics, change absorption, change distribution, change elimination).
For poisons (where specific treatment regime is absent):

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 L/min.
- Monitor and treat, where necessary, for pulmonary oedema.
- Monitor and treat, where necessary, for shock.
- Anticipate seizures.
- **DO NOT** use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary oedema.
- Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.
EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

SECTION 5 Firefighting measures

Extinguishing media

Continued...

- 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

Advice for firefighters

Fire Fighting	‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves. ‣ Prevent, by any means available, spillage from entering drains or water courses. ‣ Use water delivered as a fine spray to control fire and cool adjacent 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	‣ The material is not readily combustible under normal conditions. ‣ However, it will break down under fire conditions and the organic component may burn. ‣ Not considered to be a significant fire risk. ‣ Heat may cause expansion or decomposition with violent rupture of containers. ‣ Decomposes on heating and may produce toxic fumes of carbon monoxide (CO). ‣ May emit acrid smoke. Decomposition may produce toxic fumes of: carbon dioxide (CO_2) hydrogen chloride phosgene nitrogen oxides (NOx) other pyrolysis products typical of burning organic material.
HAZCHEM	•3Z

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	Environmental hazard - contain spillage. ‣ 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	Environmental hazard - contain spillage. Moderate hazard. ‣ Clear area of personnel and move upwind. ‣ Alert Fire Brigade and tell them location and nature of hazard. ‣ Wear breathing apparatus plus protective gloves. ‣ Prevent, by any means available, spillage from entering drains or water course. ‣ No smoking, naked lights or ignition sources. ‣ Increase ventilation. ‣ 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 solid residues and seal in labelled drums for disposal. ‣ Wash area and prevent runoff into drains. ‣ If contamination of drains or waterways occurs, advise emergency services.

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

Continued...

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	‣ **DO NOT** allow clothing wet with material to stay in contact with skin ‣ Limit all unnecessary personal contact. ‣ Wear protective clothing when risk of exposure occurs. ‣ Use in a well-ventilated area. ‣ When handling **DO NOT** eat, drink or smoke. ‣ Always wash hands with soap and water after handling. ‣ Avoid physical damage to containers. ‣ Use good occupational work practice. ‣ Observe manufacturer's storage and handling recommendations contained within this SDS.
Other information	‣ 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	‣ 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.
Storage incompatibility	‣ Avoid reaction with oxidising agents, bases and strong reducing agents.

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
chlorothalonil	0.13 mg/m3	1.4 mg/m3	8.6 mg/m3

Ingredient	Original IDLH	Revised IDLH
chlorothalonil	Not Available	Not Available
water	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
chlorothalonil	E	≤ 0.01 mg/m³
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

Exposure controls

Appropriate engineering controls	General exhaust is adequate under normal operating conditions.
Personal protection	
Eye and face protection	‣ Safety glasses with side shields. ‣ Chemical goggles. ‣ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy

Continued...

	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 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	‣ Wear chemical protective gloves, e.g. PVC. ‣ Wear safety footwear or safety gumboots, e.g. Rubber **NOTE:** ‣ The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact. ‣ Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.
Body protection	See Other protection below
Other protection	‣ Overalls. ‣ P.V.C apron. ‣ Barrier cream. ‣ Skin cleansing cream. ‣ Eye wash unit.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
AC Bravado

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	White liquid; disperses in water.

Physical state	Liquid	**Relative density (Water = 1)**	1.34
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
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)	100	**Molecular weight (g/mol)**	Not Available
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available

Continued...

Flammability	Not Available	**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)	2.37	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (Not Available%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ 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	Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system. Rat inhalation studies showed high toxicity with a fine 5-8 micron chlorothalonil dust. While there are no human toxicity records, all care is needed to avoid dust inhalation. The inhaled substance produces wheezing, nasal discharge and respiratory difficulties in animals. Histological examination revealed pulmonary congestion and oedema, bronchitis, tracheitis, bronchopneumonia and rhinitis. Systemic effects included liver necrosis
Ingestion	The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum. Symptoms of acute toxicity seen in mice and rats given oral doses of chlorothalonil include dyspnea, diarrhoea, lachrymation, reduced motility, reduced reflexes and haematuria. In dogs treatment also produced vomiting.
Skin Contact	Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. The material may accentuate any pre-existing dermatitis condition Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds 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. Dermal application to rabbits lead to eye irritation, diarrhoea, local erythema and oedema. Patch testing indicated that 10-28% of 88 Japanese farmers were sensitive to chlorothalonil and other pesticides; 35 had acute dermatitis. In some cases photosensitisation was involved.
Eye	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. Chlorothalonil caused severe damage to rabbit eyes with corneal clouding still present two weeks after instillation
Chronic	Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a

Continued...

substantial number of individuals, and/or of producing a positive response in experimental animals.
Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance who are likely to become hyper-responsive.
Substances than can cuase occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing air-way hyper-responsiveness. The latter substances are not classified as asthmagens or respiratory sensitisers
Wherever it is reasonably practicable, exposure to substances that can cuase occupational asthma should be prevented. Where this is not possible the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive.
Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance.
Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following.
On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.
Susceptible persons may develop allergic skin reactions. Contact dermatitis has been reported for personnel working in chlorothalonil manufacturing and in farmers and horticultural workers. Workers in the manufacture of wood products have also developed contact dermatitis on the hands and face when wood preservatives containing chlorothalonil were used.
Long term administration to animals produces kidney and stomach lesions. High concentrations of chlorothalonil in the diet of dogs caused thyroid changes (NOEL 500 mg/kg diet).
The results of subchronic and chronic studies with mice, rats and dogs indicate that the kidney and stomach are the target organs of chlorothalonil toxicity. Non-neoplastic changes in the stomach (hyperplasia, hyperkeratosis) were the result of chronic irritation of the mucosa, those in the kidney took the form of hyperplasia in the proximal tubules with intracytoplasmic inclusions in the tubule cells.
Neoplastic alterations developed in the organs of rats, and to a lesser extent, in mice given high doses of chlorothalonil. Long-term administration to mice and rats resulted in the development of renal tubule adenomas and carcinomas, and forestomach papillomas and carcinomas. Only a small percentage of the tumours were malignant; the overall incidences were low and mostly not dose dependent. In one study with the metabolite, 4-hydroxy-2,5,6-trichloroisophthalic dinitrile, no tumour increases were evident in mice fed 1500 ppm for 24 months.
In studies with rats and rabbits, chlorothalonil doses which were toxic for the dams did not have embryotoxic or teratogenic effects.

AC Bravado	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

chlorothalonil	**TOXICITY**	**IRRITATION**
	Dermal (rabbit) LD50: >2000 mg/kg[2]	Not Available
	Inhalation(Rat) LC50; 0.078 mg/L4h[2]	
	Oral (Mouse) LD50; 3700 mg/kg[2]	

water	**TOXICITY**	**IRRITATION**
	Oral (Rat) LD50; >90000 mg/kg[2]	Not Available

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*

CHLOROTHALONIL

The following information refers to contact allergens as a group and may not be specific to this product.
Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

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

Continued...

	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. for chlorothalanil: Chlorothalonil has low acute oral and dermal toxicity in rats and rabbits, respectively (acute oral and dermal LD50 values are > 10 000 mg/kg body weight). Hammer-milled technical chlorothalonil (MMAD 5-8 um) exhibited high toxicity in rats in an inhalation study, with a 4-h LC50 of 0.1 mg/litre. Chlorothalonil is a skin and eye irritant in the rabbit. Skin sensitization studies in the guinea-pig were inconclusive. The main effects of repeated oral dosing in rats are on the stomach and kidney. Groups of 25 rats of each sex per group were fed chlorothalonil at 0, 1.5, 3, 10 or 40 mg/kg body weight per day in the diet for 13 weeks, and this was followed by a 13-week recovery period. Increased incidences of hyperplasia and hyperkeratosis of the forestomach occurred at 10 and 40 mg/kg; these reversed when treatment ceased. At 40 mg/kg, there was an increased incidence of hyperplasia of kidney proximal tubular epithelium in males at 13 weeks and after the recovery period. The NOEL was 3 mg/kg body weight per day based upon lack of forestomach lesions. The onset of the forestomach and kidney changes was shown to be rapid, with the lesions developing within 4-7 days in male rats at a dietary level of 175 mg/kg body weight per day. In a 13-week study on mice (0, 7.5, 15, 50, 275 or 750 mg/kg in the diet), increased incidences of hyperplasia and hyperkeratosis of the squamous epithelial cells of the forestomach occurred in males and females at 50 mg/kg diet and above. The NOEL, based upon these changes, was 15 mg/kg chlorothalonil in the diet, equivalent to 3 mg/kg body weight per day. In a study on rats (0, 1.8, 3.8, 15 or 175 mg/kg body weight per day), the effects were characterized histologically as an increase in the incidence and severity of hyperplasia, hyperkeratosis, and ulcers and erosions of the squamous mucosa of the forestomach, and as epithelial hyperplasia of the kidney proximal convoluted tubules at 3.8 mg/kg and above. The NOEL for non-neoplastic effects was therefore 1.8 mg/kg. The incidence of renal tumours (adenomas and carcinomas) and forestomach tumours (papillomas and carcinomas) was markedly increased at 175 mg/kg. There was evidence for an increased incidence of kidney tumours in males at 15 mg/kg and of stomach tumours at 3.8 and 15 mg/kg in males and females. The NOEL for neoplastic effects was therefore 1.8 mg/kg body weight per day based upon changes in forestomach tumour incidence. Supporting evidence for the carcinogenic potential of chlorothalonil in the kidney and forestomach of rats was provided by the results from other 2-year studies at higher dose levels. Chlorothalonil was not mutagenic in several *in vitro* and *in vivo* tests, although it was positive in a small number of assays. The monothio, dithio, trithio, dicysteine, tricysteine and monoglutathione derivatives of chlorothalonil, which are potential nephrotoxicants, were shown to be negative in the Ames assay. Chlorothalonil was not teratogenic in rats or rabbits at doses up to 400 and 50 mg/kg body weight per day, respectively. Reproductive parameters such as mating, fertility and gestation length were not affected by chlorothalonil at levels up to 1500 mg/kg in the diet in a two-generation study in rats. The acute oral toxicity of the 4-hydroxy metabolite is greater than that of chlorothalonil itself (acute oral LD50 of 332 mg/kg body weight versus > 10 000 mg/kg body weight). Several studies have been undertaken to characterize the toxicological profile of this metabolite and to establish NOELs About 30% of an oral dose of chlorothalonil is absorbed within 48 h in rats at doses up to 50 mg/kg body weight. At higher doses, absorption is lower, indicating a saturation process. When 14C-chlorothalonil is given orally the radioactivity is distributed into blood and tissues within 2 h. The greatest concentration is found in the kidney, followed by liver and blood. The kidneys contain 0.3% of a 5 mg/kg body weight dose after 24 h. Most of an oral dose of chlorothalonil in rats is found in faeces (> 82% within 48-72 h, regardless of dose). Biliary excretion is rapid, peaking within 2 h after a 5 mg/kg body weight oral dose, and is saturated at 50 mg/kg body weight and above. Urinary excretion accounts for 5-10% of the dose in rats. Faecal excretion is the main route in dogs and monkeys but urinary excretion (< 4%) is less than in rats. Metabolic studies in rats indicate that chlorothalonil is conjugated with glutathione in the liver as well as in the gastrointestinal tract. Some of the glutathione conjugates may be absorbed from the intestine and transported to the kidneys, where they are converted by cytosolic ß-lyase to thiol analogues that are excreted in the urine. When germ-free rats are dosed with chlorothalonil, the thiol metabolites appear in urine in much smaller amounts than with normal rats, indicating the involvement of intestinal microflora in the metabolism of chlorothalonil. Dogs or monkeys dosed orally with chlorothalonil excrete little or no thiol derivatives in urine. When 14C-chlorothalonil was applied to rat skin, approximately 28% of the dose was absorbed within 120 h. About 18% of the dose was found in faeces and 6% in urine within 120 h. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans. ADI: 0.01 mg/kg/day NOEL: 1.5 mg/kg/day
WATER	No significant acute toxicological data identified in literature search.

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

Toxicity

	Endpoint	Test Duration (hr)	Species	Value	Source
AC Bravado					

Continued...

	Not Available	Not Available	Not Available	Not Available	Not Available

chlorothalonil

Endpoint	Test Duration (hr)	Species	Value	Source
BCF	1008h	Fish	<0.1-2.7	7
NOEC(ECx)	48h	Crustacea	0.032mg/l	1
LC50	96h	Fish	0.013-0.05mg/l	4
EC50	72h	Algae or other aquatic plants	0.57mg/l	1
EC50	48h	Crustacea	0.059mg/l	1
EC50	96h	Algae or other aquatic plants	0.002mg/l	4

water

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 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 chlorothalonil:
Chlorothalonil is a colourless, odourless, crystalline solid with a melting point of 250 C and a vapour pressure of 7.63 × 10-5 Pa (5.72 × 10-7 mm Hg) at 25 C. It has low water solubility (0.6-1.2 mg/litre at 25 C) and an octanol/water partition coefficient (log Kow) of 2.882. It is hydrolysed in water slowly at pH 9 but is stable at pH 7 or below (at 25 C).
Environmental fate:
Chlorothalonil adsorbs strongly to organic matter in soil and suspended material in water. It is not, therefore, leached from soil to groundwater. It is removed rapidly from surface water to suspended material and to a lesser extent to bottom sediment
Chlorothalonil is removed from aqueous media by strong adsorption on suspended matter. Modelled data suggest little or no partition to bottom sediment. Abiotic degradation of chlorothalonil in water through photolysis does not occur. Some hydrolysis does take place at higher pH.
Half-life (hr) soil : 2208
Biodegradation may occur in natural waters with enzyme processes being involved. Microbial degradation is the major cause of dissipation in soil ; this involves several parallel processes, one of which leads to formation of the 4-hydroxy metabolite. Chlorothalonil is rapidly degraded in soil, and degradation may occur in water with the production of the 4-hydroxy metabolite, 4-hydroxy-2,5,6-trichloroisophthalonitrile. Half-lives for dissipation of the 4-hydroxy metabolite in soils range between 6 and 43 days. Chlorothalonil does not translocate from the site of application to other parts of a plant. It is metabolized only to a limited extent on plants and the 4-hydroxy metabolite is usually < 5% of the residue. Chlorothalonil is metabolised in fish via glutathione conjugation to give more polar excretory products. The enzyme glutathione- *S*-transferase is involved with this conversion. High concentrations of radiolabel found in the gall bladder and bile, after exposure of rainbow trout to 14C-chlorothalonil, are consistent with the excretion of the compound as glutathione conjugates. The concentrations of radiolabel accumulating in the gall bladder and other organs fell rapidly when the fish were placed in clean water. Chlorothalonil does not bioaccumulate in aquatic organisms.
Ecotoxicity:
Highly toxic to fish, aquatic invertebrates. LC50: < 0.5 mg/L.
MATC (Maximum Allowable Toxicant Concentration) two generation Daphnia magna reproduction study was 0.035 mg/L.
Classified - relatively non toxic to bees.
At recommended application rate - non toxic to earth worms.
With minor exceptions, chlorothalonil is not phytotoxic. The LC50 of a suspension concentrate formulation (500 g chlorothalonil/litre) in artificial soil for earthworms was > 1000 mg/kg soil (14 days). Earwigs suffered increased mortality when in contact with chlorothalonil residues on peanut foliage or ingesting it as a food source in laboratory tests; there was no other indication of insecticidal action. Chlorothalonil is of low toxicity to birds with a reported acute oral LD50 of 4640 mg/kg diet in the mallard duck. No significant reproductive effects were reported. A field study of aquatic organisms exposed following chlorothalonil application suggests that the toxicity is less than that predicted from laboratory studies; this is again consistent with the physicochemical properties of the compound. Deaths were seen in some species exposed experimentally in the field. There have been no reported incidents of kills in the environment. However, despite the short residence time of chlorothalonil in environmental media, kills would be expected to occur. Linking kills to the compound would be difficult given that residues would not persist long enough for chlorothalonil to be identified.
Chlorothalonil is algicidal for a number of algal species. The fungicide does not inhibit bacterial growth except at very high concentrations in laboratory culture. Field and laboratory evidence shows no effects on nitrogen fixation or nitrification at recommended application rates and minimal effects at higher application rates in temperate soils. There was insufficient information to assess effects on the nitrogen cycle in tropical soils.
Chlorothalonil is classified as "relatively non-toxic" to honey-bees. Earwigs exposed to residues topically and via food showed some mortality (20-55%), but there is no other evidence of insecticidal action. Chlorothalonil has low toxicity to birds in acute or dietary tests. The low acute toxicity of chlorothalonil to laboratory mammals tempered with its short persistence in the environment suggests minimal hazard to wild mammal species.
DO NOT discharge into sewer or waterways.

Persistence and degradability

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

Continued...

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
chlorothalonil	LOW (BCF = 125)

Mobility in soil

Ingredient	Mobility
chlorothalonil	LOW (KOC = 2392)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	‣ Recycle wherever possible or consult manufacturer for recycling options. ‣ Consult State Land Waste Authority for disposal. ‣ Bury or incinerate residue at an approved site. ‣ Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 Transport information

Labels Required

	
Marine Pollutant	
HAZCHEM	•3Z

Land transport (ADG)

UN number	3082
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains chlorothalonil)
Transport hazard class(es)	Class: 9 Subrisk: Not Applicable
Packing group	III
Environmental hazard	Environmentally hazardous
Special precautions for user	Special provisions: 274 331 335 375 AU01 Limited quantity: 5 L

Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082
are not subject to this Code when transported by road or rail in;
(a) packagings;
(b) IBCs; or
(c) any other receptacle not exceeding 500 kg(L).
- Australian Special Provisions (SP AU01) - ADG Code 7th Ed.

Air transport (ICAO-IATA / DGR)

UN number	3082
UN proper shipping name	Environmentally hazardous substance, liquid, n.o.s. * (contains chlorothalonil)

Continued...

Transport hazard class(es)	ICAO/IATA Class	9
	ICAO / IATA Subrisk	Not Applicable
	ERG Code	9L
Packing group	III	
Environmental hazard	Environmentally hazardous	
Special precautions for user	Special provisions	A97 A158 A197 A215
	Cargo Only Packing Instructions	964
	Cargo Only Maximum Qty / Pack	450 L
	Passenger and Cargo Packing Instructions	964
	Passenger and Cargo Maximum Qty / Pack	450 L
	Passenger and Cargo Limited Quantity Packing Instructions	Y964
	Passenger and Cargo Limited Maximum Qty / Pack	30 kg G

Sea transport (IMDG-Code / GGVSee)

UN number	3082	
UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains chlorothalonil)	
Transport hazard class(es)	IMDG Class	9
	IMDG Subrisk	Not Applicable
Packing group	III	
Environmental hazard	Marine Pollutant	
Special precautions for user	EMS Number	F-A , S-F
	Special provisions	274 335 969
	Limited Quantities	5 L

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

Not Applicable

Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
chlorothalonil	Not Available
water	Not Available

Transport in bulk in accordance with the ICG Code

Product name	Ship Type
chlorothalonil	Not Available
water	Not Available

SECTION 15 Regulatory information

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

chlorothalonil 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 6
Australian Inventory of Industrial Chemicals (AIIC)
Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B: Possibly carcinogenic to humans

water is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

Continued...

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (chlorothalonil; water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	No (chlorothalonil)
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.*

SECTION 16 Other information

Revision Date	10/12/2021
Initial Date	26/09/2014

SDS Version Summary

Version	Date of Update	Sections Updated
4.1	01/11/2019	One-off system update. NOTE: This may or may not change the GHS classification
5.1	10/12/2021	Classification change due to full database hazard calculation/update.

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
ES: Exposure Standard
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
AIIC: Australian Inventory of Industrial Chemicals
DSL: Domestic Substances List
NDSL: Non-Domestic Substances List

Continued...

IECSC: Inventory of Existing Chemical Substance in China
EINECS: European INventory of Existing Commercial chemical Substances
ELINCS: European List of Notified Chemical Substances
NLP: No-Longer Polymers
ENCS: Existing and New Chemical Substances Inventory
KECI: Korea Existing Chemicals Inventory
NZIoC: New Zealand Inventory of Chemicals
PICCS: Philippine Inventory of Chemicals and Chemical Substances
TSCA: Toxic Substances Control Act
TCSI: Taiwan Chemical Substance Inventory
INSQ: Inventario Nacional de Sustancias Químicas
NCI: National Chemical Inventory
FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

end of SDS