SAFETY DATA SHEET

Tri-Form™ 60

Section 1 - Identification

Product Identifier: **Tri-Form™ 60** **SDS No.:** 160-NZL-TNZ

Other Means of Identification: Chloropicrin; 1,3-Dichloropropene

Recommended Use: As a pre-plant soil fumigant for agricultural purposes.

Restrictions on Use: Use of this product requires supervision by a Certified Handler for pesticide fumigation. Read all labels carefully before using product.

Importer/Distributor: Leicester's New Zealand Ltd.
6 Waitane Place, Onekawa, Napier 4110
Telephone: 06 843 5330 or 0800 658 158

Emergency Phone No.: Leicester's New Zealand Ltd: **0800 658 158** (24/7)
National Poisons Centre: **0800 764 766** (24/7)

NOTE: If the end-use labelling contains specific instructions or requirements that conflict with this safety data sheet (SDS), **follow the instructions or requirements on the labelling**.

Section 2 - Hazard Identification

HAZARD CLASSIFICATION OF THE CHEMICAL MIXTURE

Flammable Liquid	Category 3
Acute Toxicity Oral	Category 2
Acute Toxicity Dermal	Category 2
Acute Toxicity Inhalation	Category 1
Skin Corrosion	Category 1C
Serious Eye Damage	Category 1
Respiratory Sensitisation	Category 1
Skin Sensitisation	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 2
Specific Target Organ Toxicity - Single Exposure	Category 1
Specific Target Organ Toxicity - Repeated Exposure	Category 1
Hazardous to the Aquatic Environment Short Term (Acute) Hazard	Category 1
Hazardous to the Aquatic Environment, Long Term (Chronic) Hazard	Category 1
Hazardous to Soil Organisms, Terrestrial Vertebrates and Invertebrates	

ADDITIONAL HAZARD CLASSIFICATION WHEN PRODUCT IS PACKAGED IN A CYLINDER

Chemicals Under Pressure	Category 2

LABEL ELEMENTS, INCLUDING PRECAUTIONARY STATEMENTS

Flammable Toxicity Corrosion Health Hazard Environmental

Additional Pictogram When Product is Packaged in a Cylinder

Compressed Gas

Signal Word: DANGER

HAZARD STATEMENTS:

H226: Flammable liquid and vapour
H330: Fatal if inhaled.
H300: Fatal if swallowed.
H310: Fatal in contact with skin.
H314: Causes severe skin burns and eye damage.
H318: Causes serious eye damage.
H319: Causes serious eye irritation. [vapour contact]
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317: May cause an allergic skin reaction.
H341: Suspected of causing genetic defects.
H351: Suspected of causing cancer via the oral route.
H370: Causes damage to the respiratory system and hemal system by inhalation.
H372: Causes damage to respiratory system, hemal system, and liver through prolonged or repeated exposure.
H400: Very toxic to aquatic life.
H410: Very toxic to aquatic life with long lasting effects.
H422: Toxic to the soil environment
H431: Very toxic to terrestrial vertebrates
H442: Toxic to terrestrial invertebrates

Additional Hazard Statement When Product is Packaged in a Cylinder:

H283: Flammable chemical under pressure: May explode if heated.

PRECAUTIONARY STATEMENTS:

PREVENTION

P203: Obtain, read and follow all safety instructions before use.
P210: Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
P211+P241+P242+P243: Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use non-sparking tools. Take action to prevent static discharges.
P260: Do not breathe gas or vapours.
P262: Do not get in eyes, on skin, or on clothing.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves, protective clothing, and eye protection. [See Section 8 of SDS]
P284: In case of inadequate ventilation, wear respiratory protection.
P264+P265: Wash hands and face thoroughly after handling. Do not touch eyes.
P272: Contaminated work clothing should not be allowed out of the workplace.
P270: Do not eat, drink or smoke when using this product.
P273: Avoid release to the environment. [except for intended use]

RESPONSE

IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing. Get emergency medical help immediately. Specific treatment is urgent (see First Aid section of label and Section 4 of SDS). P304+P340+P316+P320

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get emergency medical help immediately [for liquid contact]. [For vapour contact], if eye irritation persists, get medical help]. P305+P354+P338+P316+[P337+P317]

IF ON SKIN: Take off immediately all contaminated clothing. Immediately rinse with water for several minutes. Get emergency medical help immediately. Specific treatment (see Section 4 of SDS). Wash contaminated clothing before reuse. P302+P361+P364+P354+P316+321+P363

IF SWALLOWED: Get emergency medical help immediately. [Dab material from mouth with dry cloth first, if possible.] Rinse mouth. Do NOT induce vomiting. Specific treatment (see First Aid section of label and Section 4 of SDS). P301+P316+P330+P331+P321

IF exposed or concerned, or if experiencing respiratory symptoms: Get emergency medical help immediately. P308+P342+P316

If skin irritation or rash occurs: Get medical help. P333+P317
Get medical help if you feel unwell. P319
In case of fire: Use dry chemical or alcohol-resistant foam to extinguish.

STORAGE

P403+P233+P235+P405: Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up.

DISPOSAL

P391: Collect spillage.

P501: Dispose of contents and container in accordance with government regulations.

Additional Precautionary Statements When Product is Packaged in a Cylinder:

P381+P376: In case of leakage, eliminate all ignition sources. Stop leak if safe to do so
Store away from combustible materials.
In case of fire: Evacuate area. Fight fire remotely due to the risk of cylinder rupture.
Note: Closed cylinders may rupture or burst if heated by fire.

Section 3 - Composition and Information on Ingredients

Ingredients*	CAS No	Synonyms	Concentration by Weight %
Chloropicrin	76-06-2	Trichloronitromethane	60.0
1,3-Dichloropropene	542-75-6	1,3-D	40.0

* Product label will reflect nominal active ingredient percentages.

Section 4 - First-aid Measures

DESCRIPTION OF NECESSARY FIRST AID MEASURES

Inhalation: If inhalation occurs, call the National Poisons Centre. Urgent hospital treatment is likely to be needed. Remove source of contamination or move victim to fresh air. Keep at rest in a position comfortable for breathing. If breathing is difficult, oxygen may be beneficial if administered by trained personnel, preferably on a doctor's advice. DO NOT allow victim to move about unnecessarily. If breathing has stopped, trained personnel should immediately begin artificial respiration or, if the heart has stopped, cardiopulmonary resuscitation (CPR).

Skin Contact: Seek urgent medical attention. Flush contaminated area with lukewarm, gently flowing water for at least 15 to 20 minutes. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting (show paramedics this SDS and take their advice). Under running water, remove contaminated clothing, shoes and leather goods (e.g., watchbands, belts). Chemical burns must be treated by a doctor.

Eye Contact: Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 15 to 20 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. Neutral saline solution may be used as soon as it is available. DO NOT INTERRUPT FLUSHING. If necessary, keep emergency vehicle waiting (show paramedics this SDS and take their advice). Take care not to rinse contaminated water into the unaffected eye or onto face. Call the National Poisons Centre or a doctor urgently.

Ingestion: If swallowed, do NOT induce vomiting; rinse mouth thoroughly with water. Urgent hospital treatment is likely to be needed. Call the National Poisons Centre or a doctor at once. Give activated charcoal if instructed. Never give an unconscious person anything to drink.

MOST IMPORTANT SYMPTOMS AND EFFECTS, ACUTE AND DELAYED, FROM EXPOSURE

Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include eyes stinging, tearing, redness, swelling, and blurred vision. Causes respiratory distress and irritation. Early symptoms may include throat and nose irritation, nausea or vomiting. May cause an allergic skin reaction. Dermatitis. Rash. Prolonged exposure may cause chronic effects. Symptoms of pulmonary oedema can be delayed up to 48 hours after exposure.

MEDICAL ATTENTION AND SPECIAL TREATMENT

Material, if aspirated into the lungs, may cause rapid absorption through the lungs which may result in systemic effects. If the product is ingested, probable mucosal damage may contraindicate the use of gastric lavage. Treat the affected person appropriately. In case of ingestion, the decision of whether or not to induce vomiting should be made by the attending physician. Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

Note to Physician: If lavage is performed, endotracheal and/or esophageal control is suggested. Danger from lung toxicity must be weighed against toxicity when considering emptying the stomach.

GENERAL INFORMATION

Take off immediately all contaminated clothing. Aerate contaminated clothing in a secure area downwind and away from people. If exposed or concerned: Get medical help. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse. Discard any shoes or clothing items that cannot be decontaminated, after aerating. You should call the **National Poisons Centre** if you feel that you may have been poisoned, burned or irritated by this product. The number is **0800 764 766 (24 hours)**. Have this SDS with you when you call.

Section 5 – Fire-fighting Measures

Suitable Extinguishing Equipment: All conventional fire extinguishing media are suitable: water spray, dry chemical, carbon dioxide, alcohol-resistant foam. Water fog or fine spray is the preferred media for large fires. Try to contain spills and minimise spillage entering drains or water courses.

Unsuitable Extinguishing Media: Do not use water jet as an extinguisher, as this will spread the fire.

Specific Hazards Arising from the Chemical: The major hazard in fires involving this product is usually inhalation of heated and toxic and/or oxygen deficient fire gases. Fire combustion products from this product may produce corrosive, toxic, and /or irritating gases or vapours. Combustion products include: carbon monoxide, carbon dioxide, chlorine, hydrogen chloride, phosgene, nitrosyl chloride, nitrogen oxides.

For products packaged in cylinders: Closed cylinders may rupture or burst if heated by fire. Cylinders are not equipped with relief valves or fusible overpressure devices per transport regulations.

Special Protective Equipment: Wear positive-pressure self-contained breathing apparatus and full turnout gear.

Precautions for Firefighters: Stay upwind. DO NOT approach containers suspected to be hot. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Evacuate area at least 150 metres (500 feet), initially. Move containers from fire area if you can do so without risk. Cool containers with flooding quantities of water until well after fire is out.

Section 6 - Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: Evacuate the spill area and deny entry to unnecessary and unprotected personnel. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. Move leaking or damaged containers outdoors or to an isolated location, observing strict safety precautions. Local authorities should be advised if significant spillages cannot be contained. Wear full protective chemically resistant clothing including eye/face protection, gauntlets and self-contained breathing apparatus. See Individual Protection Measures in Section 8 regarding personal protective equipment (PPE). Eye/face protective equipment should comprise, as a minimum, protective glasses and, preferably, goggles. If there is a chance that vapours or mists are present in the area, use a respirator. Consult the New Zealand Standard mentioned below (Section 8) to determine the type of respirator to wear. Do not permit entry into the spill or leak area by any person not wearing proper PPE until chloropicrin is measured to be 0.15 ppm or less. Thoroughly launder protective clothing before storage or re-use.

Environmental Precautions: Avoid release to the environment. In the event of a major spill, prevent spillage from entering drains or water courses. If a significant quantity of material enters drains, advise emergency services. Full details regarding disposal of used containers, spillage and unused material may be found on the label. If there is any conflict between this SDS and the label, instructions on the label prevail. Ensure legality of disposal by consulting regulations prior to disposal.

Methods and Materials for Containment and Cleaning Up: Stop leak if safe to do so, and contain spill. Because of the toxicity and corrosiveness of this product, special personal care should be taken in any clean-up operation.

For small spills - Wipe up with absorbent material (e.g., cloth, fleece, sand, vermiculite or other non-combustible material). Collect contaminated spillage material into a labelled polyethylene or steel container that can be sealed. Clean surface thoroughly to remove residual contamination.

For large spills (>35 litres) - If spill is too large or if absorbent material is not available, create a dike to stop material spreading or going into drains or waterways, if this is without risk. Use water spray to reduce vapours or divert vapour cloud drift. Use a non-combustible material like vermiculite, clay, sand or earth to soak up the product and shovel into labelled containers for later disposal. Prevent entry into waterways, sewer, basements or confined areas.

After spill clean-up - Following product recovery, flush area with water, preventing runoff from entering drains. Never return spills to original containers for re-use. For waste disposal, see Section 13 of the SDS.

Section 7 - Handling and Storage

Precautions for Safe Handling: Certified Handler and CSL required. Do not handle until all safety precautions have been read and understood. Comply with HSNO and WorkSafe controls. Flammable liquid and vapour. Do not handle, store or open near an open flame, sources of heat or sources of ignition. No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating /lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharge.

Do not bump or drag containers or subject them to other rough handling. Use a suitable hand truck or forklift to move heavier containers. Do not heat container by any means to increase the discharge rate of product from the container. Keep exposure to this product to a minimum, and minimise the quantities kept in work areas. Check Section 8 of this SDS for details of personal protective measures, and make sure that those measures are followed. The measures detailed below under "Storage" should be followed during handling in order to minimise risks to persons using the product in the workplace.

For cylinders, Do not use hooks, rope sling, etc. to unload. Use hand or fork trucks to firmly cradle cylinders. Use only dry nitrogen gas (180 psig maximum) to pressurize cylinders and tanks. Polyethylene or Teflon tubing may be used to transfer product at low pressures.

Do not use containers or application equipment made of magnesium, aluminum, zinc or cadmium. Avoid contact with strong bases.

Do not breathe vapour. Do not get this material in contact with eyes. Do not get this material in contact with skin. Do not taste or swallow. Avoid prolonged exposure. Do not get this material on clothing. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. When using, do not eat, drink or smoke. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Protect from inadvertent release to the environment. Do not empty into drains.

Conditions for Safe Storage, Including Incompatibilities: Observe all relevant regulations regarding sale, transport and storage of this poison. Store cylinders (and other containers) upright with valves closed and secure the take-off fitting cap and valve bonnet. Store locked up, in a cool, well-ventilated area, out of direct sunlight. Check containers periodically for leaks. Containers should be kept closed in order to minimise contamination. Store away from seeds, foods/feed-stuffs and human and animal habitation. Make sure that the product does not come into contact with substances listed under "Incompatibilities" in Section 10. Check the packaging - there may be further storage instructions on the label. Also, avoid contact or contamination of product with incompatible materials listed in Section 10. Store at temperatures not exceeding 55°C.

Section 8 - Exposure Controls and Personal Protection

OCCUPATIONAL EXPOSURE LIMITS

WES Values	WES-TWA (ppm)	TWA (mg/m^3)	Other Exposure Considerations
Chloropicrin	0.1	0.67	
1,3-Dichloropropene	1.0	4.5	Skin absorption, Dermal sensitiser

Workplace Exposure Standard Time Weighted Averages (WES-TWA) are derived on an eight-hour work day and 40-hour work week. When shifts are longer than this, either over a day or a week, the WES-TWA needs to be adjusted to account for the longer period of exposure and shorter recovery time.

Biological Monitoring: No biological exposure limits noted for the ingredient(s).

Control Banding: Not assigned.

Engineering Controls: No special ventilation requirements are normally necessary for this product during its intended use outdoors as an agricultural soil fumigant. However, in the event the product is handled indoors, such as in a lab environment, make sure that the work environment remains clean and that vapours and mists are minimised. Good general ventilation (typically 10 air changes per hour) should be used. If applicable, use explosion-proof general and local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.

Eyebaths or eyewash stations and safety deluge showers or water flushing facilities should, if practical, be provided near to where this product is being handled commercially.

INDIVIDUAL PROTECTION MEASURES

The following instructions are for bulk handling or where regular exposure in an occupational setting occurs without proper containment systems.

Eye Protection: Your eyes must be completely protected from this product by splash resistant goggles with face shield. All surrounding skin areas must be covered. Emergency eye wash facilities must also be available in an area close to where this product is being used.

Skin Protection: Avoid contact with the skin. Because of the dangerous nature of this product, make sure that all skin areas are completely covered by impermeable gloves, overalls, hair covering, apron and face shield. See below for suitable material types.

Protective Material Types: It is recommended that chemical protective gloves be made from the following materials: nitrile, butyl rubber, neoprene. Chemical protective clothing may include Tyvek®, Saranex®, and/or Tychem®.

Respirator: If sensory irritation (tearing, burning of the eyes or nose) is experienced or if there is a significant chance that vapours or mists are likely to build up in the area where this product is being used, use a full-facepiece air-purifying respirator. It should be fitted with a type A cartridge, suitable for organic vapours.

For emergency or planned entry into unknown concentrations or Immediately Dangerous to Life (IDLH) conditions (chloropicrin measured in air at 2 ppm or greater): Any self-contained breathing apparatus that has a full-facepiece and is operated in a pressure-demand or other positive-pressure mode.

General Hygiene Considerations:

Pesticide handlers and applicators must follow the end-use pesticide label instructions for each of the task situations that require personal protective equipment.

When using, do not eat, drink or smoke. Do not get this material on clothing. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

Relevant New Zealand Standards:

The following New Zealand Standards will provide general advice regarding safety clothing and personal protective equipment (PPE):

Respiratory equipment: **AS/NZS 1715/1716.** Protective Gloves: **AS/NZS 2161.** Occupational Protective Clothing: **AS/NZS 4501 2008**. Industrial Eye Protection: **AS/NZS 1336** and **AS/NZS 1337.** Occupational Protective Footwear: **AS/NZS 2210**.

Section 9 - Physical and Chemical Properties

Appearance:	Transparent liquid. Colourless to pale yellow, or brown if in prolonged contact with metals.
Odour:	Pungent sweet penetrating odour.
Odour Threshold:	700 ppb in 2-5 seconds (chloropicrin)
pH:	2.56 (as 1% v/v in water)
Melting Point/Freezing Point:	No specific data. Liquid at normal temperatures.
Boiling Point:	Not available.
Flash point:	49 °C (Tag Closed Cup)
Evaporation Rate:	Rapid.
Flammability:	Liquid will burn in a fire.
Upper Flammability/Explosive Limit:	No data available.
Lower Flammability/Explosive Limit:	No data available.
Vapour Pressure:	No data available.
Vapour Density:	No data available.
Relative Density (specific gravity):	1.453 at 20°C (H_2O = 1)
Density:	1.45 g/L at 20°C
Solubility:	No data available.

Volatility:	No data available.
Partition coefficient: n-octanol/water:	2.38 (chloropicrin) 1.82 (1,3-dichloropropene)
Autoignition temperature:	No data available.
Decomposition Temperature:	No data available.
Viscosity (Kinematic):	0.595 cSt (at 40 °C) 0.709 cSt (at 20 °C)
Particle Characteristics:	There are no nano-particles in product.

Section 10 - Stability and Reactivity

Reactivity: This product is unlikely to react or decompose under normal conditions of use, storage, or transport. However, if you have any doubts, contact the supplier for advice on shelf life properties.

Chemical Stability: Material is stable under normal conditions.

Possibility of Hazardous Reactions: Polymerisation reactions are unlikely; they are not expected to occur. If heated under confinement, may develop accelerated decomposition.

Conditions to Avoid: Store in the closed original container in a dry, cool, well-ventilated area out of direct sunlight. Keep away from sources of sparks or ignition. Keep isolated from combustible materials. Contamination with water can lead to the generation of corrosive constituents over time. Avoid temperatures above 60 °C (140 °F) to minimize risk of accelerated decomposition.

Incompatible Materials: Acids, bases, strong oxidising agents, amines, copper, aluminium, zinc, cadmium, magnesium and their alloys. Chloropicrin degrades PVC, dissolves rubber compounds and fiberglass resin, and is mildly corrosive to carbon steel in presence of moisture.

Hazardous Decomposition Products: Hazardous products may be produced due to the decomposition of the chemical during use, storage or heating. Combustion forms carbon dioxide, and if incomplete, carbon monoxide and possibly smoke. Water is also formed. May form nitrogen and its compounds, and under some circumstances, oxides of nitrogen. Occasionally hydrogen cyanide gas in reducing atmospheres. May form hydrogen chloride gas, other compounds of chlorine. Phosgene, nitrosyl chloride may be generated.

Section 11 - Toxicological Information

Note: Information in this section is for the product unless a specific component listed in Section 3 is noted.

Acute Toxicity:

Product can be fatal if inhaled or swallowed. Prolonged or widespread skin contact may result in absorption of toxic amounts.

Components	Route of Entry	Animal	Test Results
Chloropicrin (CAS 76-06-2)			
Acute	Inhalation, LC_{50}	Rat	18.9 ppm, 4 hours, (126.6 mg/m^3) For both sexes with 95% confidence limits of 16.5 to 21.6 ppm (110.6-144.7 mg/m^3)
	Oral, LD_{50}	Rat	37.5 mg/kg
	Dermal, LD_{50}	Rabbit	926 mg/kg
1,3-Dichloropropene (CAS 542-75-6)			
Acute	Inhalation, LC_{50}	Rat	> 595 ppm, 4 hours (> 2.7 mg/L)
	Oral, LD_{50}	Rat	> 110 mg/kg
	Dermal, LD_{50}	Rabbit	> 333 mg/kg

Skin Corrosion/Irritation:

Contact with liquid can cause skin irritation, redness, and/or severe skin burns.

Serious Eye Damage/Irritation:

Exposure to vapour concentrations from 73-150 ppb can produce mild eye irritation or tearing but stops following termination of exposure. Exposure to higher concentrations will produce an increase in severity and earlier onset of irritation and tearing. Vision may be temporarily impaired. Direct contact with liquid chloropicrin can cause burns to the eyes and produce permanent damage.

Respiratory Sensitisation:

No relevant data found.

Skin Sensitisation:

Chloropicrin is not a skin sensitiser.

1,3-Dichloropropene - Animal data indicate that it is a potential skin sensitiser.

Germ Cell Mutagenicity:

Chloropicrin - In vitro studies of mammalian cell chromosomes for damage (breaks, exchange figures, fragments, etc.) produced evidence suggestive of a clastogenic effect but were mixed with contradictory results on genetic toxicity and mutation. In vivo studies are negative for mutation, DNA damage and chromosome damage.

1,3-Dichloropropene - In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were negative.

Carcinogenicity:

Chloropicrin - Six long-term bioassays have been performed to evaluate the potential of chloropicrin to cause carcinogenic effects by inhalation, oral, and gavage dosing. No neoplastic or tumorigenic response was produced in any species tested by the three routes of exposure.

1,3-Dichloropropene - Has been shown to cause cancer in laboratory animals by the oral route. Inhalation exposure resulted in an increase in the normal occurrence of benign lung tumors in male mice.

International Agency for Research on Cancer (IARC) Monographs. Overall Evaluation of Carcinogenicity

1,3-Dichloropropene (CAS 542-75-6) Group 2B Possibly carcinogenic to humans.

There is sufficient evidence in experimental animals for the carcinogenicity of mixed isomers of technical grade 1,3-dichloropropene.

National Toxicology Program (NTP) Report on Carcinogens (14th Report)

1,3-Dichloropropene (CAS 542-75-6) Reasonably Anticipated to be a Human Carcinogen.

Reproductive Toxicity:

Not classified.

Chloropicrin - Data indicate that reproduction fitness and the developing fetus are not adversely affected by chloropicrin inhalation even at systemically toxic levels.

- Inhalation exposure to chloropicrin by male and female rats in a 2-generation reproductive function study produced an NOAEL of 1.0 ppm for systemic toxicity and greater than 1.5 ppm for developmental toxicity and reproductive parameters.
- In a study with sexually mature virgin female Sprague-Dawley rats exposed by whole body inhalation to chloropicrin vapour for six hours per day for days 6-15 of gestation, there were no treatment-related fetal malformations.

1,3-Dichloropropene - In animal studies, did not cause birth defects or other effects in the fetus, even at doses which caused toxic effects in the mother.

Specific Target Organ Toxicity (STOT)—Single Exposure:

Causes respiratory tract damage and irritation.

Specific Target Organ Toxicity (STOT)—Repeated Exposure:

Chloropicrin - Subchronic inhalations studies in mice and rats established that respiratory tissue is the target for chloropicrin inhalation toxicity and that tissue of the entire respiratory tract is subject to inflammatory damage. Portal-of-entry effects occur in the upper respiratory tissue of animals inhaling chloropicrin vapour for 90 days at concentrations at or above 0.1 ppm (0.67 mg/m^3).

1,3-Dichloropropene - In animals, effects have been reported on the following organs: Bladder, Nasal tissue, Liver, Lung, Gastrointestinal tract, Respiratory tract, Bone marrow and Spleen (blood-forming organs).

Aspiration Hazard:

Not classified as an aspiration hazard (per New Zealand CCID)

Information on Possible Routes of Exposure:

- Eyes (mainly due to vapours in air)
- Respiratory Tract (by inhalation of vapours)
- Skin (mainly by contact with liquid)

Early Onset of Symptoms Related to Exposure:

Vapour Contact:

- Eye irritation, stinging, tearing at low concentrations
- Throat irritation, coughing
- Dripping nasal mucous
- Nausea, vomiting, abdominal pain, headache
- Dizziness, drowsiness, unconsciousness
- Breathing difficulty, cyanosis (bluish looking skin/lips)
- Pulmonary oedema, and death due to pulmonary oedema

Liquid Contact:

- Skin blistering
- Skin, eye, and portal tissue burns

Delayed Health Effects from Exposure:

- Severe pulmonary responses can be delayed following onset of acute exposure.

Exposure Levels and Health Effects:

Inhalation (Chloropicrin)

73 ppb	Human sensory irritation threshold (eye irritation).
73 ppb to 150 ppb	Human response - mild irritant to eyes and throat.
> 150 ppb	Human response - headache, nausea, and vomiting may occur. Dripping nasal mucus may occur. These symptoms are temporary and reversible following termination of exposure.
> 300 ppb	Human response - respiratory symptoms may increase in severity and include difficulty in breathing.
> 580 ppb (8 hrs) or 2000 ppb (10 minutes)	Human response - life-threatening effects including pulmonary oedema can occur.

Ingestion (Chloropicrin)

Ingestion of liquid can cause burns to and produce permanent damage to the mouth, throat, esophagus, and stomach. Ingestion of large quantities can be fatal.

Interactive Effects:

No data available**.**

Section 12 - Ecological Information

NOTE: There is no ecological information for the product. Information below is presented for each of the main components.

Ecotoxicity:

Product is expected to be highly toxic to aquatic life on an acute basis.

Chloropicrin:

Aquatic Toxicity (Fish)	• LC_{50} = 0.0048 mg/L, 96-hr, *Oncorhynchus mykiss* (rainbow trout), semi-static • LC_{50} = 0.105 mg/L, 96-hr, *Lepomis macrochirus* (bluegill sunfish) • NOEC = 0.0025 mg/L, 90-day growth, *Oncorhynchus mykiss* (rainbow trout): ELS flow through
Toxicity (Aquatic Invertebrates)	• EC_{50} = 0.15 mg/L, 48-hr, *Daphnia magna* (crustacean), acute, static • EC_{50} = 6.4 µg/L, 96-hr, *Crassostrea cucullata* (eastern oyster) • NOEC = 0.00427 mg/L, 21-day, *Daphnia magna* (crustacean): static, reproduction
Toxicity (Algae/Aquatic Plants)	• ErC_{50} = 0.00016 mg/L, 72-hr, *Selenastrum capricornutum* (algae), static, growth rate • EbC_{50} = 0.00011 mg/L, 72-hr, *Selenastrum capricornutum* (algae), static, Biomass • ErC_{50} = 0.0379 mg/L, 7-day, *Lemna minor* (higher plant), semi-static (Fronds EC_{50})
Terrestrial Toxicity	• LD_{50} = > 100 µg/L, 48-hr, Honeybee dermal • Acute avian inhalation NOEC = 96 ppb, 4 hours per day for 5 days
Effects on Birds	• Little information is available about the effects of chloropicrin on bird life. A feeding study in chickens demonstrated no adverse effects at doses as high as 100 ppm for 120 days. This was the highest dose tested.
Effects on Other Animals	• When used according to label, exposure to nontarget species is unlikely. However, because of its toxicity to mammals and invertebrates, it can be assumed that chloropicrin may be harmful to many nontarget organisms.

I,3-Dichloropropene:

Aquatic Toxicity (Fish)	• LC_{50} = 2.78 mg/L, 96-hr, *Oncorhynchus mykiss* (rainbow trout) • LC_{50} = 0.87 mg/L, 96-hr, *Cyprinodon variegatus* (sheepshead minnow) • LC_{50} = 3.7 mg/L, 96-hr, *Lepomis macrochirus* (bluegill sunfish) • NOEC = 0.0318 mg/L, 33-day, flow-through test, survival, *Pimephales promelas* (fathead minnow)
Acute Toxicity (Aquatic Invertebrates)	• EC_{50} = 3.58 mg/L, 48-hr, *Daphnia magna* (water flea) • EC_{50} = 0.64 mg/L, 48-hr, *Crassostrea virginica* (eastern oyster) • NOEC = 0.0701 mg/L, 21-day, *Daphnia magna* (water flea), number of offspring
Acute Toxicity (Algae/Aquatic Plants)	• EbC_{50} = 14.9 mg/L, 72-hr, *Pseudokirchneriella subcapitata* (green algae), static test, Biomass • EC_{50} = 2.35 mg/L, 120-hr, *Navicula* sp. (diatom algae), Biomass
Terrestrial Toxicity	• LC_{50} = 55.6 mg/kg, 14-day, *Eisenia fetida* (earthworms)
Effects on Birds	• Material moderately toxic to birds on acute basis (LD_{50} between 51 and 500 mg/kg) • Material is practically non-toxic to birds on a dietary basis (LC_{50} > 5000 ppm).
Effects on Other Animals	• No data available.

Persistence and Degradability (Environmental Fate):

Biodegradability:

Chloropicrin

- Atmospheric half-life: 20 days (simulated sunlight).
  Chloropicrin is efficiently photolysed in the atmosphere. Initial photolysis products include phosgene and nitrosyl chloride and chlorine; subsequently nitrogen dioxide and dinitrogen tetraoxide.
- Aquatic photolysis half-life: 1.3 days.
- Aerobic soil metabolism half-life: 4.5 to 10 days; major degradate is carbon dioxide, then nitrate and chloride.
- Soil half-life: 8-24 hours (sandy loam).

- Water half-life: 31.1 hours to 72 hours (surface layers).
  Readily volatises and will photodegrade in surface layers of water with carbon dioxide, bicarbonate, chloride, nitrate and nitrite being the breakdown products.
- Evaporation half- life in water: 4.8 to 9.4 minutes (light); 4.1 to 5.7 minutes (dark)

1,3-Dichloropropene

- 10-day Window: Fail (not readily biodegradable)
- Biodegradation: 4.9 % Method: OECD Test Guideline 301D or Equivalent
- Biodegradation may occur under aerobic conditions (in the presence of oxygen).
- Atmospheric half-life: 7 to 12 hours
- Half-life in water: 2.3 to 4.75 days

Bioaccumulative Potential:

Chloropicrin

Partition coefficient, n-octanol (Log_{10} K_{ow}): 2.50 at 25°C (low bioaccumulative potential = <5.0)

It would not be expected to bioaccumulate in mammalian cells or in aquatic organisms.

1,3-Dichloropropene

Partition coefficient: n-octanol/water (Log P_{ow}): 1.82 to 2.1 (measured)

Bioconcentration potential is low if BCF <100 or Log P_{ow} <3

Mobility in Soil:

Chloropicrin

Moves rapidly in soils within 12 inches of injection but may diffuse to a maximum depth of four feet in sandy soil.

1,3-Dichloropropene

Partition Coefficient (K_{oc}) - 44.7 (measured)

Potential for mobility in soil is very high (K_{oc} between 0 and 50)

Other Adverse Effects:

The product is not recognized as a threat to the ozone layer nor as a contributor to climate change.

Section 13 - Disposal Considerations

Disposal Methods:

The product label will give general advice regarding disposal of small quantities, and how to cleanse containers. DO NOT contaminate water, food or feed by storage or disposal. DO NOT use empty containers to store any other material. Empty cylinders must be returned to supplier for refilling with pesticide only.

Section 14 - Transport Information

In accordance with NZ5433:2020 Transport of Dangerous Goods on Land; Land Transport Rule: Dangerous Goods 2005, Rule 45001/2005 1 April 2021; Dangerous Goods Regulations of IATA; and IMDG Code criteria.

UN Number:	3489
Proper Shipping Name:	TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. (Chloropicrin; 1,3-Dichloropropene)
Transport Hazard Class:	Class 6.1 (Toxic)
Subsidiary Risk:	Class 3 (Flammable) Class 8 (Corrosive)
Packing Group:	I
Environmental Hazards for Transport Purposes:	Marine Pollutant (Chloropicrin; 1,3-Dichloropropene) per IMDG Code and per ADG 2.9.3.3 (acute and chronic aquatic toxicity) LC_{50} = 0.0048 mg/L, 96-hr, *Oncorhynchus mykiss* (rainbow trout) EC_{50} = 0.64 mg/L, 48-hr, *Crassostrea virginica* (eastern oyster)

Special Precautions for User: Packages must be secured against all movement during transport. Keep markings, labels or placards on package until cleaned and purged of residue including bulk and non-bulk packages. For cylinders, ensure valve is closed and safety cap(s) and valve protection are in place prior to transport.

Additional Information: This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorised sales or customer service representative. It is the responsibility of the transporting organisation to follow all applicable laws, regulations and rules relating to the transportation of the material.

Hazchem Code: 2WE [Hazard Identification Number (HIN) is 663]

Air Transport: Forbidden for any amount.

Section 15 - Regulatory Information

This SDS prepared in accordance with the Hazardous Substances (Safety Data Sheets) Notice 2017 (EPA Consolidation 30 September 2022) and the UN Purple Book 7th Edition [Globally Harmonized System of Classification and Labeling of Chemicals (GHS)], and the UN Purple Book 8th Edition in regards to Chemicals Under Pressure.

NEW ZEALAND REGULATIONS:

Hazardous Substances and New Organisms (HSNO) Act 1996

Approval Code: HSR101451

Refer to www.epa.govt.nz / Approved hazardous substances with controls - Tri-Form 60

For additional controls refer to www.worksafe.govt.nz

Health and Safety at Work (Hazardous Substances) Regulations 2017 (HSW HS Regulations)

Health and Safety at Work (Hazardous Substances-Requirements for Specified Fumigants) Safe Work Instrument 2017

Health and Safety at Work (Hazardous Substances-Requirements for Specified Fumigants) Amendment Safe Work Instrument (No 2) 2022

Health and Safety at Work Act 2015 (HSW Act)

CERTIFIED HANDLER and TRACKING Controls apply

Users require Controlled Substance License (CSL)

Additional restrictions and requirements apply

Tolerable Exposure Limits

Chloropicrin:	TEL(air):	0.0004 mg/m³ (0.000059 ppm) (chronic exposure)
1,3-Dichloropropene:	TEL(air):	0.02 mg/m³ (chronic exposure)

Environmental Exposure Limits

None set at this time

Agricultural Compounds and Veterinary Medicines Act 1997 (ACVM) Act 1997

Registration approval: P8550

Refer to www.foodsafety.govt.nz for Registration Conditions

INTERNATIONAL:

Montreal Protocol on Substances that Deplete the Ozone Layer:

Components not listed

Stockholm Convention on Persistent Organic Pollutants:

Components not listed

Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade:

Components not listed in Annex III

Section 16 - Any Other Relevant Information

Current Version 4: May 29, 2024

Revision History: Revision Date Format: dd:mm:yyyy

22/08/2013	Initial version
22/02/2019	SDS: Updated SDS to GHS format
25/06/2019	Add reference to product label and operating manual in Section 7
29/05/2024	Section 2: Add Chemicals Under Pressure information/statements

Acronyms:

ADG	Australia Dangerous Goods
CAS number	Chemical Abstracts Service Registry Number (CASRN)
CCID	Chemical Classification and Information Database (New Zealand)
CSL	Controlled Substance License
EC_{50}	Half Maximal Effective Concentration - concentration of a material in water, a single dose which is expected to cause a biological effect on 50% of a group of test species.
EPA	New Zealand Environmental Protection Authority
ErC_{50}	The concentration of a test substance which results in a 50% reduction in growth rate relative to the control within 72 hours exposure. Regarded as an acute endpoint.
EbC_{50}	The concentration of test substance which results in a 50% reduction in biomass growth relative to the control within 72 hours exposure. Regarded as acute endpoint.
GHS	Globally Harmonised System
Hazchem Code	Emergency action code of numbers and letters that provide information to emergency services especially firefighters.
HSNO	Hazardous Substances and New Organisms
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC_{50}	Lethal Concentration - median dose at which 50% of test animals die from inhalation
LD_{50}	Lethal Dose - median dose at which 50% of test animals die from oral or skin exposure
NOAEL	No-observed-adverse-effect level
NOEC	No observed effect concentration. It is usually the highest test concentration at which no toxic effects are observed. It can also be regarded as chronic endpoint.
N.O.S.	Not otherwise specified
ppm	part(s) per million
ppb	part(s) per billion
SDS	Safety Data Sheet
TEL	Tolerable Exposure Limits
UN	United Nations
US EPA	United States Environmental Protection Agency
WES	Workplace exposure standards

Key Literature References and Sources of Data:

- National Library of Medicine - PubChem - Hazardous Substance Data Base
- The International Uniform Chemical Information Database (IUCLID) – Organization for Economic Cooperation and Development (OECD)
- Manufacturer pesticide registration data for US EPA and for State of California
- Manufacturer studies on human response
- SDSs for Ingredients
- RTECS - Registry of Toxic Effects of Chemical Substances

THIS SDS SUMMARISES OUR BEST KNOWLEDGE OF THE HEALTH AND SAFETY HAZARD INFORMATION OF THE PRODUCT AND HOW TO SAFELY HANDLE AND USE THE PRODUCT IN THE WORKPLACE. EACH USER MUST REVIEW THIS SDS IN THE CONTEXT OF HOW THE PRODUCT WILL BE HANDLED AND USED IN THE WORKPLACE.

IF CLARIFICATION OR FURTHER INFORMATION IS NEEDED TO ENSURE THAT AN APPROPRIATE RISK ASSESSMENT CAN BE MADE, THE USER SHOULD CONTACT THE SUPPLIER OR MANUFACTURER TO OBTAIN ADDITIONAL INFORMATION.