



SAFETY DATA SHEET

PIC PLUS

1. IDENTIFICATION

PRODUCT IDENTIFIER: PIC PLUS SDS No.: 186-ZAF-TAF
 OTHER MEANS OF IDENTIFICATION: Chloropicrin, Trichloronitromethane
 RECOMMENDED USE: Pesticide (Pre-Plant Soil Fumigant)

Distributor: Trical Crop Protection Africa (Pty) Ltd P.O. Box 46036 Durbanville, Cape Town, 7551, Republic of South Africa Telephone: +27 861 111 998 E-mail: sds@trical.com	FOR CHEMICAL EMERGENCY (Spill, Leak, Fire, Exposure, or Accident), Call CHEMTREC: 080-098-3611 (24 hours, within South Africa) +1 703-527-3887 (if outside South Africa)
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RESTRICTIONS ON USE: For use by registered pest control operators only. Use only in accordance with the product's pesticide end-use label. If the end-use labeling contains specific instructions or requirements that conflict with this Safety Data Sheet (SDS), **follow the instructions or requirements on the labeling.**

2. HAZARDS IDENTIFICATION

Note: Supplemental information is [bracketed] or noted as such in Section 2

GHS Classification for Product 	H330 Acute Toxicity - Inhalation, Category 1 H301 Acute Toxicity - Oral, Category 3 H312 Acute Toxicity - Dermal, Category 4 H315 Skin Corrosion/Irritation, Category 2 H318 Eye Damage/Irritation, Category 1 [liquid contact] H319 Eye Damage/Irritation, Category 2A [vapour contact] H317 Skin Sensitization, Category 1B H370 Specific Target Organ Toxicity, Single Exposure, Category 1 (respiratory, hemal) H372 Specific Target Organ Toxicity, Repeat Exposure, Category 1 (respiratory, hemal, liver) H304 Aspiration Hazard, Category 1 H400 Hazardous to the Aquatic Environment, Short Term (Acute) Hazard, Category 1 H410 Hazardous to the Aquatic Environment, Long Term (Chronic) Hazard, Category 1
Additional GHS Classification for Product When it is Under Pressure in Cylinder 	H284 Chemicals Under Pressure, Category 3
Signal Word	DANGER
GHS Hazard Statements	<ul style="list-style-type: none"> • Fatal if inhaled. H330 • Toxic if swallowed. H301 • Harmful in contact with skin. H312 • Causes skin irritation. H315 • Causes serious eye damage. [liquid contact] H318 • Causes serious eye irritation. [vapour contact] H319 • May cause an allergic skin reaction. H317 • Causes damage to respiratory system and hemal system by inhalation. H370 • Causes damage to respiratory system, hemal system, and liver through prolonged or repeated exposure. H372 • Very toxic to aquatic life with long lasting effects. H400+H410

Additional GHS Hazard Statement When Product Under Pressure in Cylinder	<ul style="list-style-type: none"> Chemical under pressure: May explode if heated. H284
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GHS PRECAUTIONARY STATEMENTS

Prevention	<ul style="list-style-type: none"> Do not breathe gas or vapours. P260 Do not get in eyes, on skin, or on clothing. P262 Wash hands and face thoroughly after handling. Do not touch eyes. P264+P265 Use only outdoors or in a well-ventilated area. P271 Wear protective gloves, protective clothing, eye/face and respiratory protection. [See section 8 of SDS] P280+P284 Do not eat, drink, or smoke when using this product. P270 Contaminated work clothing should not be allowed out of the workplace. P272 Avoid release to the environment, [except for authorised use]. P273
Response [First Aid, See Section 4 of SDS for additional information]	<ul style="list-style-type: none"> IF INHALED: Remove person to fresh air and keep comfortable for breathing. Get emergency medical help immediately. Specific treatment is urgent (see Section 4 of SDS). P304+P340+P316+P320 IF IN EYES: Immediately rinse 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 vapor contact], If eye irritation persists: Get medical help. P305+P354+P338+P316+P337+P317 IF ON SKIN: Take off contaminated clothing. Wash with plenty of water. Get medical help. Specific treatment (see Section 4 of SDS). If skin irritation or rash occurs: Get medical help. Wash contaminated clothing before reuse. P302+P362+P352+P317+P321+P333+P317+P364 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 Section 4 of SDS). P301+P316+P330+P331+P321 IF exposed or concerned: Get emergency medical help immediately. P308+P316 Get medical help if you feel unwell. P319
Storage [See Section 7 for additional information]	<ul style="list-style-type: none"> Store in a well-ventilated place. Keep container tightly closed. Store locked up. P403+P233+P405
Disposal [See Section 13 for additional information]	<ul style="list-style-type: none"> Collect spillage. P391 Dispose of contents and container in accordance with government regulations. P501
Additional Precautionary Statements for Product When it is Under Pressure in Cylinder	<p>Closed cylinders may rupture or burst if heated by fire.</p> <ul style="list-style-type: none"> Keep away from heat/open flames. P210 [Store away from combustible materials. P220] Stop leak if safe to do so. P376 [In case of fire: Evacuate area. Fight fire remotely due to the risk of cylinder rupture. P370+P380+P375 (modified)]
Hazards Not Otherwise Classified	None.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Identity	Synonyms	CAS No.	Concentration by weight %
Chloropicrin	Trichloronitromethane	76-06-2	86.0 ^{1,2}
Distillates (Petroleum), Hydrotreated Light	Solvent	64742-47-8	14.0

¹ Product label will reflect nominal active ingredient percentages.

² For reporting imports and exports pursuant to Chemical Weapons Convention, use 86.0% Chloropicrin.

4. FIRST AID MEASURES

Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Qualified persons should administer oxygen, if available. If breathing has stopped, give artificial respiration. Symptoms of lung edema (shortness of breath) may develop up to 24 hours after exposure. Immediately call an ambulance if any breathing difficulty persists after removal from exposure area. Call a physician or poison control center for further treatment advice.
Eyes	Hold eyes open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes; then continue rinsing eyes. Immediately call a physician or poison control center if liquid contact occurs. For vapour contact, if eye irritation persists, get medical advice or attention.
Skin	Remove and isolate contaminated clothing and shoes, and other items covering the skin. Rinse skin immediately with plenty of water for 15-20 minutes. Use soap and water for a final cleanse. Call a physician or Poison Control Center immediately. Aerate and then wash any contaminated clothing or shoes separately before reuse. Dispose of heavily contaminated clothing and shoes.
Ingestion	Immediately call a Poison Control Center or physician. Have victim dab inside mouth with dry cloth or paper towel to remove as much product as possible, then thoroughly rinse with water with mouth lowered towards ground to prevent inadvertent swallowing. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting without advice from Poison Control Center or physician. If vomiting occurs, keep head low to minimize aspiration of stomach contents.
Most Important Symptoms/Effects, Acute and Delayed	Chloropicrin is a volatile liquid and a potent lachrymator (eye tearing). Early symptoms of overexposure are lachrymation, respiratory distress, and vomiting. Pulmonary edema and pulmonary symptoms may be delayed. Treat symptomatically.
Indication of Immediate Medical Attention or Special Treatment	Obtain medical assistance at once in case of illness or burn after exposure, or if irritation to eyes and respiratory tract persist. Do not allow conditions that could cause further exposure until recovery is complete.
General Advice	Ensure that medical personnel are aware of the material involved, and that they take precautions to protect themselves from exposure to Chloropicrin vapour from victim's clothing or stomach contents. At lower concentrations (73-150 ppb), Chloropicrin behaves as mild sensory irritant. At concentrations above 150 ppb, cough, headache, nausea, and vomiting may occur. These symptoms are temporary and reversible following termination of exposure. See Section 11 Toxicology Section for more information.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media	All conventional fire extinguishing media are suitable: water spray, dry chemical, carbon dioxide, alcohol-resistant foam.
Unsuitable Extinguishing Media	None.
Specific Hazards Arising from the Chemical	<ul style="list-style-type: none"> • Non-combustible. Substance itself does not burn but may decompose upon heating to produce corrosive, toxic, and/or irritating gases or vapours. • Vapours are not explosive. • Vapours are heavier than air. They can spread along the ground and collect in low or confined areas. • Closed cylinders may rupture or burst if heated by fire. Rapid decomposition may burst closed containers under fire conditions. • NOTE: Cylinders containing Chloropicrin are not equipped with relief valves or fusible overpressure devices.
Hazardous Combustion Products	<ul style="list-style-type: none"> • Carbon monoxide, chlorine, hydrogen chloride, phosgene, nitrosyl chloride, and nitrogen oxides.
Special Protective Equipment	<ul style="list-style-type: none"> • Wear self-contained breathing apparatus and full turnout gear for fire situations.
Precautions for Fire Fighters	<ul style="list-style-type: none"> • 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 meters (500 feet), initially.

	<ul style="list-style-type: none"> • If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2-mile) in all directions; also consider initial evacuation for 800 meters (1/2-mile) in all directions. • Move containers from fire area if you can do it without risk. • Cool containers with flooding quantities of water until well after fire is out. • For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out.
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6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures	<ul style="list-style-type: none"> • Use proper personal protective equipment (PPE) as indicated in Section 8. • Do not touch damaged containers or spilled material unless wearing appropriate PPE. • Avoid breathing vapours and contact with skin and eyes. • Keep unnecessary personnel away. • Avoid low places, ventilate closed spaces before entering, and work upwind if possible. • Do not permit entry into the spill or leak area by any person not wearing proper PPE until Chloropicrin is measured to be less than 0.15 ppm. • After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
Environmental Precautions	<ul style="list-style-type: none"> • Prevent entry into waterways, sewers, basements, or confined areas. • Contact local authorities in case of spillage to drain/aquatic environment.
Methods and Materials for Containment	<ul style="list-style-type: none"> • Stop leak if you can do so without risk. • Dike the spilled material where possible with sand, earth, or vermiculite.
Methods for Cleaning Up Small Liquid Spills 55 gallons or less	<ul style="list-style-type: none"> • Isolate immediate area at least 100 feet (30 m), initially. • Wear recommended PPE. • Chloropicrin readily vaporizes so ensure area is well-ventilated. • Move leaking or damaged cylinders outdoors to an isolated location, if safe to do so. Position cylinder or other packaging to minimize potential for liquid to leak out. • Allow spilled fumigant to evaporate or cover spill with water, soil, or plastic tarp to reduce vapours. • Absorb onto inert material such as vermiculite, dry sand, or dirt, and deposit spill into a sealable polyethylene or steel container that is labeled appropriately. • Ventilate area before allowing re-entry and until the concentration of Chloropicrin is measured to be less than 0.15 ppm.
Methods for Cleaning Up Large Liquid Spills > 55 gallons	<ul style="list-style-type: none"> • Isolate at least 500 feet (150 m) in all directions, initially. • Wear self-contained breathing apparatus (SCBA) and recommended PPE (see Section 8). • Contain with dike and cover diked area with plastic sheeting or with water to reduce vapours.
Other Information	<ul style="list-style-type: none"> • For disposal, see Section 13.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

<p>This product is a highly hazardous material and must be handled with care only by those individuals experienced with its proper use. IF THIS PRODUCT IS BEING USED IN THE FIELD, AND THE INFORMATION IN THIS SDS DIFFERS FROM THAT ON THE END USE LABELING FOR THIS PRODUCT, THE HANDLER MUST FOLLOW THE PRECAUTIONARY STATEMENTS ON THE END USE LABELING.</p> <ul style="list-style-type: none"> • Wear PPE in accordance with Section 8. Leather or other abrasion resistant gloves can be worn when handling or moving closed and capped cylinders. • Wash hands and face before eating, drinking, or smoking after handling material. Handle in accordance with good industrial hygiene and safety practice. • Do not drop, drag, slide or roll cylinders on their sides. • Ropes, slings, hooks, tongs, and similar handling devices should not be used for unloading cylinders. A suitable hand truck, fork truck, or similar device to which the cylinders can be firmly secured should be used for transporting the heavier cylinders. • Keep valves closed and secured with the valve cap, when the cylinder is not in use or is empty. Only hand-tighten valves and caps. Leaving an empty cylinder valve open can introduce moisture and increase potential for internal corrosion.
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- Use an adjustable strap wrench to remove caps that are over-tightened or rusted. Never insert an object (e.g. wrench, screw driver) into cap openings.
 - Ventilation: When possible, open cylinder (slowly) only in a well-ventilated area with the operator “upwind” from the container or provide ventilation to control airborne levels below the permissible exposure limit.
 - NOTE: Passing vapours through activated carbon effectively removes Chloropicrin.
- Do not allow to spill.
 - Avoid contact with incompatible materials. See Section 10 for specific materials to avoid.
 - Do not get in eyes, on skin, on clothing.
 - Always have adequate clean water available to wash the skin.
 - If product splashes or spills on shoes or clothing, remove them at once. Vapours from contaminated area will be an intolerable source of irritation. If liquid contacts skin where rings or bandages are worn, remove them and wash exposed skin with soap and water. Air expose shoes or clothing outside and do not wear until free of all traces of fumigant. Keep and wash PPE and work clothing separately from other laundry. Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product.
 - Keep away from heat or open flame.
 - Containers should never be refilled by the consumer or used for any other product or purpose.
 - Use only dry nitrogen gas to pressurize cylinders. Polyethylene or Teflon® tubing may be used to transfer chloropicrin at low pressures. Regulator must be operated with a secondary pressure relief valve. **DO NOT** use high-pressure hose connection (such as stainless-steel braided hose) between nitrogen cylinder and Chloropicrin cylinder.

CONDITIONS FOR SAFE STORAGE

- Cylinders and containers should be tightly closed and stored in a cool, dry, well-ventilated area under lock and key (secured).
- Keep flammable/combustible liquids, oxidizers, and combustible solid materials away from Chloropicrin-containers.
- Store at temperatures not exceeding 55 °C (131 °F).
- Post as a pesticide storage area.
- Do not contaminate water, food, or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OCCUPATIONAL EXPOSURE LIMITS FOR CHLOROPICRIN (CAS 76-06-2)

SOURCE OF EXPOSURE LIMIT	TYPE	VALUE	
		ppm	mg/m ³
South Africa, Regulations for Hazardous Chemical Agents, 2021	OEL-RL Eight Hour TWA	0,2 ppm	1.4 mg/m ³
US OSHA, Table Z-1 Limits for Air Contaminants, 29 CFR 1910.1000	TWA	0.1 ppm	0.7 mg/m ³
US ACGIH, Threshold Limit Values (TLVs)	TWA	0.1 ppm	0.67 mg/m ³
US NIOSH, Documentation for Immediately Dangerous to Life or Health	IDLH	2.0 ppm	

OELs for DISTILLATES (PETROLEUM) HYDROTREATED LIGHT (CAS 64742-47-8)

Manufacturer of solvent (values are for total hydrocarbons in vapor form only)	RCP-TWA	165 ppm	1200 mg/m ³
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BIOLOGICAL LIMIT VALUES

No biological exposure limits noted for Chloropicrin.

EXPOSURE GUIDELINES

None established for components.

ENGINEERING CONTROLS

General Hygiene:	<ul style="list-style-type: none"> • Wash hands and face before breaks and immediately after handling product. • Handle in accordance with good industrial hygiene and safety practice. • Use personal protective equipment as required. • Keep working clothes separate.
Equipment	Provide easy access to adequate water supply for eye flushing or skin decontamination in the work area. For field handling and application situations, refer to the pesticide end-use label for emergency water requirements.
Ventilation	For indoors, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Lethal concentrations may exist in areas with poor ventilation.

INDIVIDUAL PROTECTION MEASURES

Eyes/Face	<p>To protect against splash and irritating mists during use or manual handling:</p> <ul style="list-style-type: none"> • Full-face shield worn over safety glasses with side shields (consistent with EN 166 or equivalent), or • Full-facepiece respirator meeting standard EN 136 with organic vapour cartridge meeting standard EN 14387, or equivalent for either standard. • NOTE: Eye goggles are not to be worn when handling this product.
Skin	<p>Gloves: During handling or use tasks, use chemical-resistant gloves when contact with liquid product is likely. Butyl, Nitrile, Neoprene are acceptable for incidental contact (<10 minutes). Longer-term protection is provided by PPE constructed of Viton, Teflon, and EVAL barrier laminates. See standard EN374 for chemical resistant glove classifications.</p> <p>Clothing: Wear appropriate splash-resistant clothing to prevent skin exposure.</p>
Respiratory	<p>If working in an environment where the eyes are stinging and watery due to exposure to this product, wear a full-facepiece respirator with an organic vapour cartridge meeting standard EN 14387 or equivalent.</p> <p>For air concentrations greater than 2 ppm (IDLH):</p> <ul style="list-style-type: none"> • A full-facepiece pressure demand SCBA for a minimum service life of thirty minutes. • A combination full-facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply. <p>For emergency or planned entry into unknown concentrations:</p> <ul style="list-style-type: none"> • A full-facepiece pressure demand SCBA for a minimum service life of thirty minutes. • A combination full-facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply. <p>For escape*</p> <ul style="list-style-type: none"> • Air-purifying respirator equipped with full-facepiece and an organic vapour cartridge. • Any air-purifying hood style CBRN escape-certified respirator. • Air-purifying respirator with canisters that include the escape gas mask (canister) respirator, the gas mask (canister) respirator, and the filter self-rescuer. • Any self-contained breathing apparatus with hood or full-facepiece mask. <p>*Respirators certified “escape only” can only be used for escape purposes and CANNOT be used for responding to emergencies.</p> <p>When applying as a pesticide, follow end- use pesticide label instructions for respiratory protection.</p>

Measurement	Air concentration can be measured with a direct reading detection device, such as a Sensidyne or Kitigawa pump, using its Chloropicrin detector tube. (#172S is tube number for Sensidyne).
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PERSONAL PROTECTION FOR SPILLS/EMERGENCY

Fire	If fire only, use normal fire-fighting equipment. If chemical releases and fire involved, wear recommended chemical protective clothing in conjunction with fire-fighting gear.
Spills	Minimum PPE: Full-facepiece air-purifying respirator with organic vapour cartridge and chemical resistant gloves. Upgrade respiratory protection in accordance with the “Respiratory” section above.
Chemical Protective Clothing	<ul style="list-style-type: none"> • For small cleanup where liquid splash is unlikely, loose-fitting or well-ventilated long-sleeved shirt, long pants or coveralls, socks with shoes may be worn. If contact occurs, remove contaminated clothing immediately to prevent skin irritation or burn. • For cleanup where liquid splash is likely, a liquid impervious chemical coverall with booties and head cover may be worn, for example, Tyvek® QC or Saranex™ SL. • In confined areas or areas where substantial vapour levels exist, wear a vapour-tight suit made of a material such as Tychem® TK or Kappler CPF 3. • Use a Dupont™ Responder® level suit or equivalent for use against permeation by Chloropicrin for periods greater than 8 hours. Teflon® withstands permeation from 4 to 8 hours.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, colourless liquid in normal storage. Pale yellow if aged or exposed to air.
Odour	Strong, sharp, irritating (pungent). Chloropicrin is readily identifiable by smell.
Odour Threshold	700 ppb in 2-5 seconds
pH	6.26 @ 25 °C (77 °F)
Melting Point	-69.2 °C (-92.56 °F) [for Chloropicrin]
Freezing Point	-69.2 °C (-92.56 °F) [for Chloropicrin]
Boiling Point, Initial	112 °C (233.6 °F) (757 mm Hg, 100.925kPa) [for Chloropicrin]
Boiling Range	Not available
Flammability (solid, liquid, gas)	Liquid that is not flammable.
Flash Point	> 100 °C (> 212 °F), Pensky-Martens closed cup
Flammability Limits in air, Upper % by volume	Not an applicable parameter for a non-flammable liquid.
Flammability Limits in air, Lower % by volume	Not an applicable parameter for a non-flammable liquid.
Autoignition Temperature	225 °C (437 °F) [for Petroleum Distillates ingredient only]
Evaporation Rate	Fast.
Vapour Pressure	15.65 mm Hg @ 20 °C (68 °F) Volatile
Vapour Density	5.7 (air = 1)
Relative Density (Specific Gravity)	1.53 @ 20 °C (68 °F) H ₂ O = 1
Density	1.438 kg/L @ 20 °C (68 °F) [12.0 lbs./gal]
Solubility	Slightly in water. 0.16 grams/100 ml Soluble in acetonitrile, hydrocarbon solvents.
Partition Coefficient (n-octanol/water)	2.38 log K _{ow}
Decomposition Temperature	127 °C (261 °F) [for Chloropicrin] At its boiling point, Chloropicrin slowly decomposes.
Viscosity (Kinematic)	1.4 cP at 50 rpm and 100 rpm @ 20 °C 1.1 cP at 50 rpm and 100 rpm @ 40 °C (0.785 mm ² /s @ 40 °C) Newtonian liquid
Particle Characteristics	Not applicable for liquids.
% Volatile	100
Corrosivity	Not corrosive to steel packaging up to one year at 25 °C.

Conversion

To convert inhalation results for Chloropicrin:

mg/m ³ to ppm	x 0.14875 (NTP)	x 0.13628 (STP)
ppm to mg/m ³	x 6.72 (NTP)	x 7.3380 (STP)

10. STABILITY AND REACTIVITY

Reactivity	<ul style="list-style-type: none"> Hazardous polymerization is not known to occur. Cylinders containing Chloropicrin can rupture or burst when subjected to fire or temperatures above 60 °C (140 °F). Not corrosive to steel specimens under storage at 25 °C (77 °F) over 12 months.
Chemical Stability	<ul style="list-style-type: none"> Product is stable under normal temperatures and pressures.
Possibility of Hazardous Reactions	<ul style="list-style-type: none"> If heated under confinement, may develop accelerated decomposition.
Conditions to Avoid	<ul style="list-style-type: none"> Contamination with water can lead to the generation of corrosive constituents over time. Unstable under fire conditions. Avoid temperatures above 60 °C (140 °F).
Incompatible Materials	<ul style="list-style-type: none"> Do not use with aluminum and its alloys, organic amines, aniline in presence of heat, sodium methoxide, magnesium and its alloys, or alkali metals. Degrades PVC, dissolves rubber compounds and fiberglass resin, and is mildly corrosive to carbon steel in presence of moisture.
Hazardous Decomposition Products	<ul style="list-style-type: none"> Phosgene, hydrogen chloride, carbon monoxide, chlorine, nitrosyl chloride, and nitrogen oxides at high temperatures.
Explosibility	<ul style="list-style-type: none"> Did not exhibit heat or shock sensitivity when tested per EEC Method A14.

11. TOXICOLOGICAL INFORMATION

[NOTE: Information in this Section is based on the Product unless ingredients Chloropicrin and/or Solvent are indicated]

Information on Possible Routes of Exposure	<ul style="list-style-type: none"> • Eyes (primarily due to vapours in air) • Respiratory tract (by inhalation of vapours) • Skin (primarily by contact with liquid) • Ingestion
Signs & Symptoms of Exposure	<p>Vapour Contact:</p> <ul style="list-style-type: none"> • 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 edema, and death due to pulmonary edema <p>Liquid Contact:</p> <ul style="list-style-type: none"> • Moderate to severe skin and eye irritation • Skin blistering can occur if not removed immediately after exposure

INFORMATION ON TOXICOLOGICAL EFFECTS

Acute Toxicity	Fatal if inhaled. Toxic if swallowed (adverse effects in lung, spleen, liver in rats). Harmful in contact with skin.
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ACUTE TOXICOLOGY STUDIES:

Pic Plus

LC ₅₀ , inhalation rat	0.14 mg/L / 4 hours
LD ₅₀ , dermal rabbit	1414.2 mg/kg, 24-hour
LD ₅₀ , oral rat	97.8 mg/kg/bw, 14-day observation

Trichloronitromethane (Chloropicrin) [CAS 76-06-2] - Human Response Studies

> 2000 ppb / 10 minutes	Life-threatening effects including pulmonary edema can occur.
> 580 ppb / 8 hours	Life-threatening effects including pulmonary edema can occur.
> 300 ppb	Respiratory symptoms may increase in severity and include difficulty breathing.
> 150 ppb	Headache, nausea, and vomiting may occur. These symptoms are temporary and reversible following termination of exposure.
73 to 150 ppb	Mild irritant to eyes and throat.
73 ppb	Sensory irritation threshold (eye irritation).

SHORT TERM (ACUTE, IMMEDIATE), DELAYED, AND CHRONIC (LONG-TERM EFFECTS):

Skin Corrosion/Irritation	Classified Category 2 Product: Brief contact may cause moderate skin irritation with local redness. Direct contact with liquid can cause severe skin irritation (type 4 edema/erythema).
Serious Eye Damage/Irritation	Classified Category 1 Product: Liquid contact resulted in moderate to severe eye irritation, rabbits, 21 days observation that persisted during the 21 days of observation. Classified Category 2A Product: Vapor may cause severe lacrimation (tears), eye irritation, redness, slight corneal injury, blurred vision experienced as mild discomfort that stops following termination of exposure.
Respiratory Sensitization	Classification not possible.
Skin Sensitization	Classified Category 1B Under test conditions with guinea pigs, product produced mild to moderate skin sensitization.

Mutagenicity	<p>Not classified.</p> <p>Chloropicrin: In vitro studies produced mixed and contradictory results for genetic toxicity and mutation. In vivo studies are negative for mutation, DNA damage and chromosome damage.</p> <p>Solvent: In vitro and in vivo mutagenic studies indicates that structurally similar substances (Kerosines) are likely not mutagens.</p>
Carcinogenicity	<p>Not classified.</p> <p>South African Regulations for Hazardous Chemical Agents 2021 Not listed.</p> <p>IARC - International Agency for Research on Cancer Not listed</p> <p>NTP - National Toxicology Program Not listed.</p> <p>Chloropicrin: At least six long-term bioassays have been completed with Chloropicrin to evaluate the potential of this compound to cause chronic and/or carcinogenic effects. Neoplasms were not seen in Chloropicrin-treated animals at an incidence greater than concurrent or historic control animals.</p> <p>Solvent: In studies with Kerosines, no skin tumors were observed.</p>
Reproductive Toxicity	<p>Classification not possible.</p> <p>Chloropicrin: Inhalation exposure to chloropicrin of male and female rats in a 2-generation reproductive function study produced a NOAEL of 1.0 ppm for systemic toxicity and greater than 1.5 ppm for developmental toxicity and reproductive parameters. These data indicate that reproduction fitness is not adversely affected by Chloropicrin inhalation even at systemically toxic levels.</p> <p>Solvent: No evidence indicating reproductive or developmental toxicity in rats for the chemicals in the Kerosines group</p>
Developmental Toxicity	<p>Not classified.</p> <p>Chloropicrin: Developmental toxicity studies in rats and rabbits conducted by the inhalation route of exposure showed that the NOAEL for maternal toxicity in rats was 0.4 ppm and 1.2 ppm for fetal toxicity. In rabbits NOAEL for maternal toxicity was 0.4 ppm and 1.2 ppm for fetal toxicity indicating that the developing fetus is not a target tissue for chloropicrin toxicity.</p> <p>Solvent: No evidence of causing embryonic or teratogenic effects in rats for similarly structured chemicals (C14-C20 Aliphatic Hydrocarbon Solvents ($\leq 2\%$ Aromatics) Category).</p>
Effects on or via Lactation	<p>Not classified. Data not available.</p>
Specific Target Organ Toxicity (Single Exposure)	<p>Classified Category 1</p> <p>Chloropicrin: Respiratory system irritation. Single exposure to high concentration can cause pulmonary edema, damage to bronchial epithelium, and blood disturbances (hemolysis, and methemoglobin formation).</p> <p>Solvent: Data not available.</p>
Specific Target Organ Toxicity (Repeated Exposure)	<p>Classified Category 1</p> <p>Chloropicrin Repeated-Dose Toxicity: Subchronic inhalations studies in mice and rats established that respiratory tissue is the target for chloropicrin inhalation toxicity and that 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 (0.67mg/m³).</p> <p>Chloropicrin Long-term Toxicity: Chronic inhalation studies in mice and rats established that the respiratory tissue is the target for chloropicrin inhalation toxicity and that tissue of the entire respiratory is subject to inflammatory damage. The NOAEL for respiratory system changes in chronic inhalation bioassays is 0.1 ppm for rats and mice.</p> <p>Solvent: Classification is not possible.</p>

Aspiration Hazard	Classified Category 1 Product: Tested for viscosity - 0.785 mm ² /s @ 40 °C and contains 14% concentration of a hydrocarbon.
Ingestion	Ingestion of liquid Chloropicrin can cause burns to and produce permanent damage to the mouth, throat, esophagus and stomach. Ingestion of large quantities of Chloropicrin liquid can be fatal.
Neurotoxicity	Data not available.
Interactive Effects	Data not available.
Confirmation of exposure	There is no biological indicator for exposure to Chloropicrin or the Solvent.

12. ECOLOGICAL INFORMATION

[NOTE: The product Pic Plus has not been tested; information is for ingredients Chloropicrin and/or Solvent as indicated]

Ecotoxicity	Very toxic to aquatic life.
Aquatic Toxicity	Product has not been tested: Chloropicrin Acute: <ul style="list-style-type: none"> EC₅₀ = 0.15 mg/L, 48 hr, Daphnia magna (crustacean), acute, static LC₅₀ = 0.0048 mg/L, 96 hr, Oncorhynchus mykiss (rainbow trout), semi-static Chloropicrin Chronic: <ul style="list-style-type: none"> NOEC = 0.0025 mg/L, 90 d growth, Oncorhynchus mykiss (rainbow trout): ELS flow through NOEC = 0.00427 mg/L, 21 d, Daphnia magna (crustacean): static, reproduction E_rC₅₀ = 0.00016 mg/L, 72 hr, Selenastrum Capricornutum (algae), static, Growth rate E_bC₅₀ = 0.00011 mg/L, 72 hr, Selenastrum Capricornutum (algae), static, Biomass E_rC₅₀ = 0.0379 mg/L, 7 d, Lemna minor (higher plant), semi-static (Fronds EC₅₀) Solvent: Testing of this substance is not technically feasible due to need to test at the water solubility level.
Terrestrial Toxicity	Chloropicrin: <ul style="list-style-type: none"> Honeybee dermal LD₅₀ > 100 µg/L, 48 Hr Acute avian inhalation NOEC = 96 ppb, 4 hours per day for 5 days Terrestrial seedling emergence and vegetative vigor NOEC = 100 µg/L air. Exposure 6 hours per day for two days.
Persistence and Biodegradability (Environmental Fate)	Chloropicrin: Overall, rapidly degrades and is not bioaccumulative <ul style="list-style-type: none"> Atmospheric half-life estimated to be 1 day. Initial photolysis products include phosgene, nitrosyl chloride, and chlorine; subsequently nitrogen dioxide and dinitrogen tetraoxide. Aquatic photolysis half-life = 1.3 days Aerobic soil metabolism half-life = 4.5-10 days; major degradate is carbon dioxide. Evaporation half-life of Chloropicrin in water (light) = 4.8- 9.4 minutes; (dark) 4.1- 15.7 minutes). Solvent: Based on compositional information available and measured or predicted data on key constituents, Kerosine substances are not expected to meet the criteria for ready degradability but are inherently biodegradable.
Bioaccumulative Potential	Chloropicrin: Due to low log K _{ow} (<5.0) not expected to bioaccumulate. Solvent: Constituents of Kerosine substances show measured or predicted values for log K _{ow} greater than 4 and are considered potentially bio-accumulative.
Mobility in Soil	Data not available for Pic Plus
Other Adverse Effects (i.e. ozone)	Hazardous to Ozone Layer - Classification not possible. Product ingredients are not listed in Annexes to the Montreal Protocol
Partition Coefficient (n-octanol/water)	2.38 log K _{ow} (Chloropicrin)

13. DISPOSAL CONSIDERATIONS

Cylinder Management	<ul style="list-style-type: none">• Cylinders should be returned according to instructions on the cylinder.• Close the valve when the cylinder is empty and install the safety cap(s) and bonnet.• Do not ship cylinders without safety caps or valve protection bonnets.• When a cylinder is partially full and there is no further requirement for the product, contact the distributor for return instructions.
Safe Handling	<ul style="list-style-type: none">• Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a national pollutant discharge elimination system (NPDES) permit.• Do not discharge effluent containing this product to sewer systems.
Container Reuse	<ul style="list-style-type: none">• Do not refill this container with any other product and do not use this container for any purpose other than to transport and lawfully dispense this product.
Disposal of Product	<ul style="list-style-type: none">• Do not contaminate water, food, or feed by storage or disposal. Pesticide wastes are toxic. Improper disposal of excess pesticide or rinsate is a violation of national law.• If wastes cannot be disposed of by use according to label instructions, contact your Pesticide or Environmental Control Agency, or the product manufacturer or distributor for guidance.
Container Disposal	<ul style="list-style-type: none">• Containers are the property of the registrant or distributor and must be returned promptly after use for refilling or for disposal.

14. TRANSPORT INFORMATION

US DOT, TDG, IMDG

UN Number	UN1580
Proper Shipping Name	Chloropicrin
Transport Hazard Class(es)	6.1
Packing Group	I
Toxic-Inhalation Hazard/Zone	Yes, Zone B
Environmental Hazards	Aquatic
Marine Pollutant	Yes
Hazardous Substance	No Reportable Quantity (RQ) listed for Chloropicrin
Transport in Bulk per MARPOL	Not applicable
Labels/Placards	US DOT: Class 6.1, Poison Inhalation Hazard IMDG, TDG, ADR, United Nations: Class 6.1, Toxic Substances
Air Transport (IATA/ICAO)	Forbidden for any amount
Emergency Guide	Transport Emergency Card for UN1580 ERG 154 (Emergency Response Guide for USA)
IMDG EmS	F-A, S-A (General Fire Schedule, Spillage Schedule Toxic Substances)
Special Precautions	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.

15. REGULATORY INFORMATION

INTERNATIONAL:

Chemical Weapons Convention: Chloropicrin is listed as a Schedule 3 substance subject to declaration and reporting. For reporting imports/exports of the Chloropicrin in this product, use 86.0% to calculate.

REPUBLIC OF SOUTH AFRICA:

Regulation for Hazardous Chemical Agents on 29 March 2021, of the Occupational Health and Safety Act No. 85 of 1993
National Road Traffic Act No. 93 of 1996 as amended
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act No. 36 of 1947 as amended
Globally Harmonized System of classification and labelling of chemicals (GHS), 2021 9th Edition
SANS 10234:2019 (edition-2)

16. OTHER INFORMATION

HAZARD RATING SYSTEM (USA):

NFPA 704*	
Category	Chloropicrin
Health	4
Flammability	0
Reactivity	3



Hazard Key	
4	- Severe
3	- Serious
2	- Moderate
1	- Slight
0	- Minimal

* NFPA 704 - *Standard System for the Identification of the Hazards of Materials for Emergency Response*

ABBREVIATIONS:

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement concerning the Internal Carriage of Dangerous Goods by Road
CAS	Chemical Abstracts Service
CBRN	Chemical, Biological, Radiological, and Nuclear
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
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.
GHS	Globally Harmonized System
IDLH	Immediately Dangerous to Life and Health: the maximum airborne concentration from which one could escape [within 30 minutes] without any escape-impairing symptoms or any irreversible health effects.
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% test animals die from oral or dermal exposure.
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health (USA)
NOAEL	No Observable Adverse Effect Level
NOEC	No Observed Effect Concentration
NTP	Normal Temperature and Pressure: 20 °C and 760 mmHg or 68 °F and 1 atm
OEL-RL	Occupational Exposure Limit - Restricted Limit
OSHA	Occupational Health and Safety Administration
ppb	Part(s) per billion
ppm	Part(s) per million
PPE	Personal Protective Equipment
RCP-TWA	Reciprocal Calculation Procedure - Time Weighted Average
STEL	Short Term Exposure Limit: workers can be exposed to a maximum of four STEL periods per 8-hour shift, with at least 60 minutes between exposure periods.
STP	Standard Temperature and Pressure: 0 °C and 760 mmHg or 32 °F and 1 atm
TDG	Transport of Dangerous Goods (Canada)
TWA	Time Weighted Average: airborne concentration for a worker in an 8-hour day.
US DOT	United States Department of Transportation

KEY LITERATURE REFERENCES AND SOURCES OF DATA:

- Animal studies on the product
- ECHA database (European Chemicals Agency)
- eCHEM portal database links
- Toxnet - Hazardous Substance Data Base (United States Center for Disease Control)
- Manufacturer data for US EPA
- Manufacturer studies on human response
- Solvent SDS
- Technical Chloropicrin SDS

VERSION 11 DATE: April 12, 2023

Revision History

04-17-13	SDS:	Initial South Africa Version
10-18-13	Section 7:	Removed nitrogen pressure reference
	Section 9:	Corrected decomposition temperature
	Section 10:	Revised possibility of hazardous reactions; added Explodability section and information
11-15-14	Section 2:	Relocated hazards not otherwise specified and added information
01-13-15	Section 1:	Revised distributor address
09-01-15	Section 15:	Removed registration number
06-09-17	Section 2:	Revised hazards identification categories and statements; revised first aid measures
	Section 4:	Revised subsections for inhalation, skin, ingestion
	Section 11, 15:	Revised Information
07-14-17	Section 1:	Revised Other Means of Identification
01-09-18	Section 1:	Revised Recommended Use information
	Section 3, 15:	Revised composition of ingredients to reflect concentration by weight %
02-15-22	Section 2:	Revised to comply with Regulation for Hazardous Chemical Agents, 2021
	Section 11:	Revised Human and Animal Toxicology Studies section - acute dermal toxicity
09-10-22	Section 2:	Revised Acute Toxicity Dermal, Added Aspiration Hazard
04-12-23	Section 2:	Remove Exclamation pictogram

WARRANTY

Notice: The information above is believed to be accurate and represents the best information currently available to us. Seller warrants that this product conforms to its chemical description and is reasonably fit for the purposes stated on the label when used in accordance with directions under normal conditions of use, but neither this warranty nor any other warranty of merchantability or fitness for a particular purpose, express or implied, extends to the use of this product contrary to label instructions, or under abnormal conditions, or under conditions not reasonably foreseeable to seller, and buyer assumes the risk of any such use. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.