CARDINAL PROFESSIONAL PRODUCTS

SAFETY DATA SHEET

Chloropicrin Warning Agent

1. IDENTIFICATION

PRODUCT IDENTIFIER:	Chloropicrin Warning Agent	Date: April 29, 2015
OTHER MEANS OF IDENTIFICATION:	Chloropicrin, Trichloronitromethane	SDS No.: 100B-USA-CPP
RECOMMENDED USE:	Warning agent	

Distributor: Soil Chemicals Corporation D/B/A Cardinal Professional Products 8770 Highway 25 Hollister, CA 95023 Business Number: (530) 666-1020	**FOR CHEMICAL EMERGENCY** **(Spill, Leak, Fire, Exposure, or Accident),** **Call CHEMTREC:** (800) 424-9300 (24 hours, USA or Canada) (703) 527-3887 (if outside USA or Canada)

2. HAZARDS IDENTIFICATION

GHS Classification	• Acute Toxicity, Category 1 (inhalation) • Acute Toxicity, Category 2 (oral) • Acute Toxicity, Category 2 (dermal) • Skin Corrosion/Irritation (1C) (liquid contact) • Eye Damage/Irritation – Category 1 (liquid contact) • Eye Irritation, Category 2A (vapor contact) • Specific Target Organ Toxicity, Single Exposure, Category 1 (respiratory) • Specific Target Organ Toxicity, Repeat Exposure, Category 1 (respiratory) • Aquatic Toxicity Acute, Category 1

Signal Word	**DANGER**
GHS Hazard Statements	• Fatal if inhaled, swallowed, or in contact with skin. H330+H300+H310 • Causes severe skin burns and eye damage (liquid contact). H314 • Causes serious eye irritation (vapor contact). H319 • Causes damage to the respiratory tract and to lungs from single exposure or through prolonged or repeated exposure by inhalation. H370+H372 • Very toxic to aquatic life. H400

GHS PRECAUTIONARY STATEMENTS

Prevention

- Do not breathe gas or vapors. P260
- Do not get in eyes, on skin, or on clothing. P262
- Wear respiratory, eye, hand, and skin protection in accordance with this SDS. P284+P280
- Use only outdoors or in a well-ventilated area. P271
- Do not eat, drink, or smoke when using this product. P270
- Wash hands thoroughly after handling. P264
- Keep away from heat/sparks/open flames/hot surfaces – No Smoking. P210
- Store away from combustible materials. P220
- Avoid release to the environment. P273

Response

- IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a physician or poison control center. P304
- IF IN 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. For vapor contact, if eye irritation persists, get medical advice or attention. P305
- IF ON SKIN: Take off contaminated clothing immediately. Wash with plenty of water and soap. Immediately call a physician or poison control center. P302+P361+P352+P310
- IF SWALLOWED, immediately call a physician or poison control center. Rinse mouth. Do NOT induce vomiting. P310+P330+P331
- Get medical advice if you feel unwell or if eye irritation persists. P314+P337
- Wash contaminated clothing before reuse. P363:
- In case of fire, evacuate area. Fight fire remotely due to the risk of cylinder rupture. Use water, dry chemical, or any other conventional media. P370+P380+P375+P378:

Storage

- Protect from sunlight, store in well-ventilated place away from other materials, store locked up, keep container or cylinder valve tightly closed. P410+P403+P405+P233
- Store at temperatures not exceeding 55 °C (131 °F). P411

Disposal

- Collect spillage. P391
- Dispose of contents and container in accordance with government regulations. (See Section 13). P501

Hazards Not Otherwise Classified	• Lachrymator - Vapor extremely irritating to the eyes and respiratory tract. • Closed cylinders may rupture or burst if heated by fire.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Identity	Synonyms	CAS #	Concentration
Chloropicrin	Trichloronitromethane	76-06-2	99.0%*
Impurities			Balance**

* % Active ingredient nominal. For reporting imports and exports pursuant to Chemical Weapons Convention, use 100% Chloropicrin.

** The impurities do not contribute to the classification of this product.

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. Use a pocket mask equipped with a one-way valve or other proper respiratory medical device. Do not use mouth-to-mouth method if victim inhaled chloropicrin. 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 vapor 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. 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	IF SWALLOWED: Immediately call a Poison Control Center or physician. Have victim rinse mouth thoroughly with water. 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 vapor 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 including Hazardous Combustion Products	• Non-combustible. Substance itself does not burn but may decompose upon heating to produce corrosive, toxic, and/or irritating gases or vapors. • Vapors are not explosive. • Vapors 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	• Carbon monoxide, chlorine, hydrogen chloride, phosgene, nitrosyl chloride, and nitrogen oxides.
Special Protective Equipment	• Wear self-contained breathing apparatus and full turnout gear for fire situations.
Precautions for Fire Fighters	• 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. • 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.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures	• 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 vapors 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 0.1 ppm. • After clean-up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
Environmental Precautions	• 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	• 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	• 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 vapors. • 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 0.1 ppm.
Methods for Cleaning Up Large Liquid Spills > 55 gallons	• 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 vapors.
Other Information	• For disposal, see Section 13.

7. HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING

This product is a highly hazardous material and must be handled with care only by those individuals experienced with its proper use.

- 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 thereby increase the potential for internal corrosion.
- 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 vapors through activated carbon effectively removes Chloropicrin.
- Do not allow to spill.
- Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.
- 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. Vapors 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, sparks, or open flame.
- Do not use water to clean equipment. Flush with nitrogen, compressed air, or solvent.
- Do not use containers or application equipment made of magnesium, aluminum, or their alloys, or alkali metals as under certain conditions, chloropicrin may be severely corrosive to such metals.
- 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).
- 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	
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, Recommended Exposure Limits	TWA	0.1 ppm	0.7 mg/m^3
US NIOSH, Documentation for Immediately Dangerous to Life or Health	IDLH	2 ppm	

ENGINEERING CONTROLS

General Hygiene:	• 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.
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

Minimum Protection	When performing tasks with NO potential for liquid contact, handlers and applicators must wear: • Long-sleeved shirt and long pants, and • Shoes and socks
Eyes, Face, Skin	When performing tasks with potential for liquid contact, handlers and applicators must wear: • Long-sleeved shirt and long pants, and • Chemical-resistant gloves - Butyl, Nitrile, or Neoprene are acceptable for incidental contact (<10 minutes)

	• Chemical-resistant apron
	  - Saranex, neoprene, or chlorinated polyethylene provide short-term contact or splash protection against liquid product
	• Protective eyewear as follows:
	  - Safety glasses with front, brow, and temple protection, or
	  - Face shield, or
	  - Full-facepiece respirator
	  - NOTE: Eye goggles are NOT to be worn
	• Chemical-resistant footwear with socks
	
	Longer-term protection is provided by PPE constructed of Viton, Teflon, and EVAL barrier laminates (for example, responder suits manufactured by Life-guard or Silvershield gloves manufactured by North).
	
	Where chemical-resistant materials are required, leather, canvas, or cotton materials offer no protection from this product and must not be worn as the sole article of protection when contact with this product is possible.

Respiratory NOTE: Only NIOSH certified respirators may be used for Respiratory Protection	If working in an environment where the eyes are stinging and watery due to exposure to this product, or when taking air samples, or when an air-purifying respirator is required, handlers must wear at a minimum either: • A NIOSH certified full facepiece air-purifying respirator equipped with an organic vapor (OV, NIOSH approval prefix TC-23C) cartridge and a particulate pre-filter (Type N, R, P, or HE, NIOSH approval number prefix TC-84A), or • A gas mask with a canister approved for organic vapor (NIOSH approval number prefix TC-14G). For emergency response, wear a self-contained breathing apparatus (SCBA) as follows: • A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes. IMPORTANT: An SCBA is not permitted for routine handler tasks. If responding to an emergency when corrective action is needed to reduce air concentrations to acceptable levels, wear an SCBA. Escape-only SCBA respirators must not be used by handlers for responding to emergencies.
Measurement	Air concentration can be measured with a direct reading detection device, such as a Dräger, Sensidyne or Kitigawa pump, using its Chloropicrin detector tube.

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 vapor cartridge and chemical resistant gloves. Upgrade respiratory protection in accordance with the "Respiratory" section above.
Chemical Protective Clothing	• 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 vapor levels exist, wear a vapor-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, colorless liquid in normal storage. Pale yellow if aged or exposed to air.
Odor	Strong, sharp, irritating (pungent). Chloropicrin is readily identifiable by smell.
Odor Threshold	700 ppb in 2-5 seconds
pH	Not applicable
Melting Point	-69.2 °C (-92.56 °F)
Freezing Point	-69.2 °C (-92.56 °F)
Boiling Point	112 °C (233.6 °F) (757 mm Hg, 100.925kPa)
Boiling Range	Not available
Flash Point (°C)	No flash point determined below 100 °C (212 °F)
Flammability (solid, gas)	Not flammable
Flammability Limits in air, Upper % by volume	Not applicable
Flammability Limits in air, Lower % by volume	Not applicable
Autoignition Temperature	No ignition occurred when tested up to 402 °C (755 °F)
Evaporation Rate	Fast 0.00017 lbs/sec/ft^2 at 15.5 °C (60 °F) and 13.7 km/h (8.5 mph) wind 0.00008 lbs/sec/ft^2 at 15.5 °C (60 °F) and 5.3 km/h (3.3 mph) wind
Vapor Pressure	18.3 mm Hg @ 20 °C (68 °F) Volatile 2.2610 kPa @ 20 °C 5.77 mmHg @ 0 °C, 79 mmHg @ 50 °C
Vapor Density	5.7 (air = 1)
Relative Density (g/cm^3) (Specific Gravity)	1.6558 @ 20 °C (68 °F) H_2O = 1 1.69225 @ 0 °C
Density @ 20 °C	13.88 lbs. / gal.
Solubility	Slightly in water. 0.16 grams/100 ml (0.016%) in water, 1.6 g/L Soluble in acetonitrile, hydrocarbon solvents
Partition Coefficient (n-octanol/water)	2.38 log K_{ow}
Decomposition Temperature	127 °C (261 °F) At its boiling point, chloropicrin slowly decomposes
Viscosity	0.73 centistokes @ 20 °C
% Volatile	100
Molecular Formula	CCl_3NO_2
Molecular Weight	164.37
Critical Pressure	640 psia
Critical Temperature	145 °C (293 °F)
Saturated Vapor Density	0.0068 gm/cc @ 20 °C/Air=1
Liquid Surface Tension	32.3 dynes/cm = 0.0323 N/m at 20 °C (not considered to be surface active) 71.0 mN m^{-1}
Ratio of Specific Heats of Vapor (Gas)	1.0991
Latent Heat of Vaporization	103 Btu/lb = 57.3 cal/g = 2.4 X 105 J/kg
Heat of Fusion	48.16 cal/g
Henry's Law Constant	43.84 Pa.m^3.mol^{-1} Moderately volatile (2.15 E-03 atm-M3 mole (estimated)

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	• 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).
Chemical Stability	• Product is stable under normal temperatures and pressures.
Possibility of Hazardous Reactions	• If heated under confinement, may develop accelerated decomposition.
Conditions to Avoid	• 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	• 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	• Phosgene, hydrogen chloride, carbon monoxide, chlorine, nitrosyl chloride, and nitrogen oxides at high temperatures.
Explodability	• Did not exhibit heat or shock sensitivity when tested per EEC Method A14.

11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure:	• Eyes (mainly due to vapors in air) • Respiratory Tract (by inhalation of vapors) • Skin (mainly by contact with liquid) • Ingestion
Signs & Symptoms of Exposure	Vapor 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 edema, and death due to pulmonary edema Liquid Contact: • Skin blistering • Skin, eye, and portal tissue burns

SHORT TERM (ACUTE, IMMEDIATE) OR DELAYED EFFECTS:

Inhalation	• At 73-150 ppb, chloropicrin behaves as a mild sensory irritant. Above 150 ppb, cough, headache, nausea, and vomiting may occur. These symptoms are temporary and reversible following termination of exposure. • At levels above 300 ppb, respiratory symptoms may increase in severity and include difficulty in breathing. • At levels above 580 ppb for 8 hours or 2000 ppb for 10 minutes, life-threatening effects including pulmonary edema (fluid in lungs) can occur. • Severe pulmonary responses can be delayed following onset of exposure.

Eyes	• Exposure to vapor 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.
Skin	• Direct contact with liquid chloropicrin can cause irritation, blistering, or burns. • Burns can produce permanent damage to the skin. • Prolonged or widespread skin contact may result in absorption of amounts which could cause death.
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.
Specific Organ Toxicity	• Respiratory system, lungs

CHRONIC EFFECTS:

Chronic Effects	Long-term overexposure to inhalation of chloropicrin could result in inflammatory damage to the respiratory tract.
Specific Target Organ Toxicity	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 vapor for 90 days at concentrations at or above 0.1ppm (0.67mg/m^3). 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.
Respiratory or Skin Sensitization	Data not available
Carcinogenicity	Not Listed: IARC - International Agency for Research on Cancer Not Listed: NTP - National Toxicology Program Not Listed: OSHA - US Occupational Safety and Health Administration ACGIH A4 – Not classifiable as a human carcinogen 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.
Mutagenicity	*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.
Reproductive Toxicity	Inhalation exposure to chloropicrin of male and female rats in a 2-generation reproductive function study produced an NOAEL of 1.0ppm for systemic toxicity and greater than 1.5ppm for developmental toxicity and reproductive parameters. These data indicate that reproduction fitness is not adversely affected by chloropicrin inhalation even at systemically toxic levels.
Developmental Toxicity	Developmental toxicity studies in rats and rabbits conducted by the inhalation route of exposure showed that the NOAEL for maternal toxicity in rats was 0.4ppm and 1.2ppm for fetal toxicity. In rabbits NOAEL for maternal toxicity was 0.4ppm and 1.2ppm for fetal toxicity indicating that the developing fetus is not a target tissue for chloropicrin toxicity.

Neurotoxicity	Data not available
Aspiration Hazard	Data not available
Interactive Effects	Data not available
Confirmation of exposure	There is no biological indicator for exposure to Chloropicrin.

HUMAN AND ANIMAL TOXICOLOGY STUDIES:

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. 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 edema can occur.
18.9 ppm (126.6 mg/m^3)	Acute Inhalation LC_{50} Rat: 4 Hour (for both sexes with 95% confidence limits of 16.5 to 21.6 ppm (110.6 - 144.7 mg/m^3)
2.34 ppm (15.7 mg/m^3)	Acute Inhalation RD_{50} mice: with 95% confidence limits of 1.84 to 2.58 ppm (12.2 – 17.3 mg/m^3)
37.5 mg/kg	Acute Oral LD_{50} Rat

12. ECOLOGICAL INFORMATION

Ecotoxicity	Toxic to aquatic life
Aquatic Toxicity	• Daphnia: EC_{50} = 120 µg/L, 48 Hr, acute • Mysid: EC_{50} = 40 µg/L, 96 Hr • Sheepshead Minnow: EC_{50} = 100 µg/L; 96 Hr • Trout: EC_{50} = 11 µg/L; 96 Hr • Bluegill/Sunfish: EC_{50} = 50 µg/L; 96 Hr • Eastern Oyster: EC_{50}=6.4µg/L, 96 Hr • Aquatic plant growth (Lemna): NOEC=11µg/L, 7 day
Terrestrial Toxicity	• Honeybee dermal LD_{50} > 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)	• Atmospheric half-life estimated to be 1 day. 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 = 4.5-10 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).
Bioaccumulative Potential	Due to low log Po/w (<5.0) chloropicrin is not expected to bioaccumulate
Mobility in Soil	Data not available
Other Adverse Effects (i.e. ozone)	Data not available
Partition Coefficient (n-octanol/water)	2.38 log K_{ow}

13. DISPOSAL CONSIDERATIONS

Cylinder Management	• 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.
Railcar Management	• An extra seal is provided in the railcar dome to be used when returning the railcar. • Contact the distributor for specific return instructions, if necessary.
Safe Handling	• 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.
Railcar Management	• An extra seal is provided in the railcar dome and is to be used when returning the railcar. • Contact the distributor for specific return instructions, if necessary.
Safe Handling	• 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.
Disposal of Product	• Do not contaminate water, food, or feed by storage or disposal. Improper disposal of excess spray mixture or rinsate is a violation of Federal Law.
Container Disposal	• Containers are the property of the registrant or distributor and must be returned promptly after use for refilling or for disposal. • To clean the container before final disposal, remove any remaining liquid, using dry air pressure if necessary. Allow container to aerate for at least 5 days. After aeration, wash container using hot water; then offer container to qualified reconditioner or dispose of as directed by State or local regulations.

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	Yes
Hazard 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	154 (NAERG – North American Emergency Response Guide)
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

U.S FEDERAL

OSHA This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

DEA Drug Enforcement Administration – 21 CFR 1308.11-15 – Not controlled.

CWC Chemical Weapons Convention – Chloropicrin is listed as a Schedule 3 substance subject to declaration and reporting.

(CERCLA - Superfund): (SARA Title III)

Section 302.4 (RQ)	Chloropicrin is not listed with an RQ (Reportable Quantity)
Section 302, EHS (TPQ)	Chloropicrin does not have a TPQ (Threshold Planning Quantity)
Section 311/312 (Tier II)	Yes
SARA Hazard Codes	Chloropicrin, CAS# 76-06-2 Immediate Hazard - Yes
Section 313	This product contains the following EPCRA section 313 chemicals subject to the reporting requirements of EPCRA section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372): **CAS Registry Number** **Chemical Name** **% by Weight** 76-06-2 Chloropicrin 99.0%+

RCRA - Resource Conservation and Recovery Act - Hazardous Wastes

Listed U or P	Chloropicrin is not specifically listed; however, prior to disposal of waste Chloropicrin or Chloropicrin-contaminated materials, the generator will need to evaluate if its waste characteristics are hazardous or non-hazardous.

TSCA - Toxic Substances Control Act

TSCA Inventory List, Section 8(b):	Chloropicrin, CAS# 76-06-2 is listed
Health & Safety Reporting List, Section 8(d)	Not listed
Chemical Test Rules, Section 4	Not listed under these rules
Export Notification, Section 12b	Not listed under this section
TSCA Significant New Use Rule, Section 5(a)	Not listed under this rule

Clean Air Act

Hazardous Air Pollutants	Not listed
Class 1 or 2 Ozone depletors	Not listed

Clean Water Act / Oil Pollution Act of 1990

Section 311	Not listed
Hazardous Substances	Not listed
Priority Pollutants	Not listed
Toxic Pollutants	Not listed

STATE

Chloropicrin can be found on the following state right-to-know lists: California, New Jersey (Reportable threshold 500 lbs), Florida, Pennsylvania, Minnesota, Massachusetts
California Proposition 65 – Not listed.

16. OTHER INFORMATION

Issue date 29-April-2015

Version # 01

Hazard Rating Systems

	NFPA 704*	ACA-HMIS**
Category	Chloropicrin	Chloropicrin
Health	4	4
Flammability	0	0
Instability	3	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*

** ACA - HMIS – American Coatings Association - Hazardous Material Information System

ABBREVIATIONS:

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement concerning the Internal Carriage of Dangerous Goods by Road
CAS	Chemical Abstracts Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHEMTREC	Chemical Transportation Emergency Center
DOT	Department of Transportation (USA)
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.
EPCRA	Emergency Planning and Community Right-to-Know
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
NOAEL	No Observable Adverse Effect Level
NOEC	No Observed Effect Concentration
NTP	Normal Temperature and Pressure: 20 ºC and 760 mmHg or 68 ºF and 1 atm
OSHA	Occupational Health and Safety Administration
ppb	part per billion
ppm	part per million
PPE	Personal Protective Equipment
RD_{50}	Respiratory Distress in 50% of test animals
SARA	US EPA Superfund Amendments and Reauthorization Act
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 ºC and 760 mmHg or 32 ºF 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

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.