SAFETY DATA SHEET
Technical Chloropicrin

1. IDENTIFICATION

PRODUCT IDENTIFIER: Technical Chloropicrin
OTHER MEANS OF IDENTIFICATION: Chloropicrin, Trichloronitromethane
RECOMMENDED USE: Pesticide (Fumigant)

MANUFACTURER:
Trinity Manufacturing, Inc.
PO Box 1519
11 E.V. Hogan Drive
Hamlet, NC  28345

Customer Service:  800-632-6228
E-mail:  sds@trinitymfg.com

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)

NOTE TO PESTICIDE HANDLERS: If the pesticide product user labeling contains specific task instructions or requirements that conflict with the requirements of this Safety Data Sheet (SDS), follow the instructions or requirements on the labeling. If there is a conflict between user specific instructions or requirements in the Worker Protection Standard and this SDS, follow the instructions or requirements of the Worker Protection Standard. See Section 15 of this SDS for further information.

2. HAZARDS IDENTIFICATION

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

GHS Classification
• Acute Toxicity – Inhalation, Category 1
• Acute Toxicity – Oral, Category 2
• Skin Corrosion/Irritation, Category 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)
• Hazardous to the Aquatic Environment, Short Term (Acute) Hazard, Category 1
• Hazardous to the Aquatic Environment, Long Term (Chronic) Hazard, Category 1

Signal Word
DANGER

GHS Hazard Statements
• Fatal if inhaled or swallowed.  H330+H300
• Causes severe skin burns and eye damage.  [liquid contact]  H314
• Causes serious eye irritation.  [vapor contact]  H319
• Causes damage to the respiratory system from single exposure or through prolonged or repeated exposure by inhalation.  H370+H372
• Very toxic to aquatic life with long lasting effects.  H400 +H410

GHS PRECAUTIONARY STATEMENTS

Prevention
• Do not breathe gas or vapors.  P260
• Use only outdoors or in a well-ventilated area.  P271
• Wear protective gloves, eye and respiratory protection.  [See section 8 of SDS].  P280+P284
• Wash hands and face thoroughly after handling.  P264
• Do not eat, drink, or smoke when using this product.  P270
• Avoid release to the environment  [except for authorized use]  P273
Response  [First Aid, See Section 4 for additional information]

- **IF INHALED:** Remove person to fresh air and keep comfortable for breathing. Immediately call a physician or poison control center.  P304+P340+P310
- **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor, [for liquid contact]  [For vapor contact], if eye irritation persists, get medical advice.  P305+P351+P338+P310+P337+P313
- **IF ON SKIN (or hair):** Take off immediately all contaminated clothing. Rinse skin with water or shower. Immediately call a POISON CENTER or doctor.  P303+P361+P353+P310
- **IF SWALLOWED:** Immediately call a POISON CENTER or doctor. [Dab material from mouth with dry cloth first, if possible] Rinse mouth. Do NOT induce vomiting.  P310+P301+P330+P331
- Get medical advice if you feel unwell.  P314
- Wash contaminated clothing before reuse.  P363

Storage  [See Section 7 for additional information]

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

Disposal  [See Section 13 for additional information]

- Collect spillage.  P391
- Dispose of contents and container in accordance with government regulations.  P501

Hazards Not Otherwise Classified

Closed cylinders may rupture or burst if heated by fire.
- Keep away from heat/open flames.  P210
- Store away from combustible materials.  P220
- In case of fire: Evacuate area. Fight fire remotely due to the risk of cylinder rupture.  P370+P380+P375 (modified)

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Identity</th>
<th>Synonyms</th>
<th>CAS #</th>
<th>Concentration by weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloropicrin</td>
<td>Trichloronitromethane</td>
<td>76-06-2</td>
<td>100.0 *</td>
</tr>
</tbody>
</table>

* Product label will reflect nominal active ingredient percentages.

### 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 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. 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 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**
- 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, 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
- 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 0.15 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. 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.

- 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.
- 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.
- 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 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 upright, 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)

<table>
<thead>
<tr>
<th>SOURCE OF EXPOSURE LIMIT</th>
<th>TYPE</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>US OSHA, Table Z-1 Limits for Air Contaminants, 29 CFR 1910.1000</td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>US ACGIH, Threshold Limit Values (TLVs)</td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>US NIOSH, Recommended Exposure Limits</td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>US NIOSH, Documentation for Immediately Dangerous to Life or Health</td>
<td>IDLH</td>
<td>2 ppm</td>
</tr>
<tr>
<td>Canada, Alberta OELs (Occupational Health &amp; Safety Code, Schedule 1, Table 2)</td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Canada, British Columbia OELs (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)</td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Canada, Ontario OELs. (Ministry of Labor – Control of Exposure to Biological or Chemical Agents)</td>
<td>STEV</td>
<td>0.3 ppm</td>
</tr>
<tr>
<td></td>
<td>TWAEV</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Canada, Quebec OELS. (Ministry of Labor- Regulation Respecting the Quality of the Work Environment)</td>
<td>TWAEV</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Mexico, Occupational Exposure Limit Values</td>
<td>STEL</td>
<td>0.3 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA</td>
<td>0.1 ppm</td>
</tr>
</tbody>
</table>

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. 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
To protect against splash and irritating mists during use or manual handling:
- Full-face shield worn over safety glasses with side shields, or
- Full-facepiece respirator
- NOTE: Eye goggles are not to be worn when handling this product.

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).

Clothing:
Wear appropriate splash-resistant clothing to prevent skin exposure. For longer term protection options for gloves and protective clothing, refer to the EPA Label Review Manual, EPA Chemical Resistance Category Selection Chart, Category H.
Respiratory Protection

**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, wear a full facepiece respirator with an organic vapor cartridge.

For air concentrations greater than 2 ppm (IDLH):
- A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes.
- A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

For emergency or planned entry into unknown concentrations:
- A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes.
- A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

For escape*
- Air-purifying respirator equipped with full facepiece and an organic vapor cartridge.
- Any air-purifying hood style CBRN escape-certified respirator.
- Air-purifying respirator with canisters (TC-14G) 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.

*Respirators certified “escape only” can only be used for escape purposes and CANNOT be used for responding to emergencies.

**When applying as a pesticide, follow end-use pesticide label instructions for respiratory protection.**

---

### 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).

### 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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Clear, colorless liquid in normal storage. Pale yellow if aged or exposed to air.</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>Strong, sharp, irritating (pungent). Chloropicrin is readily identifiable by smell.</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>700 ppb in 2-5 seconds</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Melting Point</strong></td>
<td>-69.2 °C (-92.56 °F)</td>
</tr>
<tr>
<td><strong>Freezing Point</strong></td>
<td>-69.2 °C (-92.56 °F)</td>
</tr>
<tr>
<td><strong>Boiling Point</strong></td>
<td>112 °C (233.6 °F) (757 mm Hg, 100.925kPa)</td>
</tr>
<tr>
<td><strong>Boiling Range</strong></td>
<td>Not available</td>
</tr>
<tr>
<td><strong>Flash Point (°C)</strong></td>
<td>No flash point determined below 100 °C (212 °F)</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>Not flammable</td>
</tr>
<tr>
<td><strong>Flammability Limits in air,</strong></td>
<td>Not relevant</td>
</tr>
<tr>
<td><strong>Upper % by volume</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Flammability Limits in air,</strong></td>
<td>Not relevant</td>
</tr>
<tr>
<td><strong>Lower % by volume</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Autoignition Temperature</strong></td>
<td>No ignition occurred when tested up to 402 °C (755 °F)</td>
</tr>
</tbody>
</table>
### Evaporation Rate
- Fast: 0.00017 lbs/sec/ft² at 15.5 °C (60 °F) and 13.7 km/h (8.5 mph) wind
- 0.00008 lbs/sec/ft² 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 mm Hg @ 0 °C, 79 mm Hg @ 50 °C

### Vapor Density
- 5.7 (air = 1)

### Relative Density (g/cm³) (Specific Gravity)
- 1.6558 @ 20 °C (68 °F) H₂O = 1
- 1.69225 @ 0 °C

### Density @ 20 °C
- 13.7 lbs. / gal. (water = 8.33 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<sub>ow</sub>

### Decomposition Temperature
- 127 °C (261 °F)
- At its boiling point, chloropicrin slowly decomposes

### Viscosity
- 0.73 centistokes @ 20° C

### % Volatile
- 100

### Molecular Formula
- CCl₃NO₂

### 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.m³/mol⁻¹
- Moderately volatile (2.15 E-03 atm-M³ mole (estimated))

### Conversion
- To convert inhalation results for Chloropicrin:
  - mg/m³ to ppm x 0.14875 (NTP) x 0.13628 (STP)
  - ppm to mg/m³ 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 (primarily due to vapors in air)  
|                                   | • Respiratory Tract (by inhalation of vapors)  
|                                   | • Skin (primarily 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 blistersing  
|                                   | • 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. Inhalation of chloropicrin vapors can be fatal.  
|                                   | • 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.  
| 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 Target Organ Toxicity      | • Respiratory system, lungs  
|                                     | • Single exposure to high concentration can cause pulmonary edema and damage to bronchial epithelium.  

### 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/m³).  
|                                     | 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/m³) Acute Toxicity Inhalation LC\textsubscript{50} Rat: 4 Hour
37.5 mg/kg Acute Toxicity Oral LD\textsubscript{50} Rat
Reliable data not available Acute Toxicity Dermal LD\textsubscript{50} Rabbit

12. ECOLOGICAL INFORMATION

Ecotoxicity Toxic to aquatic life

Aquatic Toxicity

- EC\textsubscript{50} = 0.15 mg/L, 48 hr, Daphnia magna (crustacean), acute, static
- LC\textsubscript{50} = 0.0048 mg/L, 96 hr, Oncorhynchus mykiss (rainbow trout), semi-static
- NOEC = 0.0025 mg/L, 90 day growth, Oncorhynchus mykiss (rainbow trout): ELS flow through
- NOEC = 0.00427 mg/L, 21 day, Daphnia magna (crustacean): static, reproduction
- E\textsubscript{r}C\textsubscript{50} = 0.00016 mg/L, 72 hr, Selenastrum Capricornutum (algae), static, Growth rate
- E\textsubscript{s}C\textsubscript{50} = 0.00011 mg/L, 72 hr, Selenastrum Capricornutum (algae), static, Biomass
- E\textsubscript{r}C\textsubscript{50} = 0.0379 mg/L, 7 day, Lemna minor (higher plant), semi-static (Fronds EC\textsubscript{50})

Terrestrial Toxicity

- Honeybee dermal LD\textsubscript{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 degrade is carbon dioxide.
- Evaporation half-life in water (light) = 4.8-9.4 minutes; (dark) = 4.1-15.7 minutes

Bioaccumulative Potential

Due to low log Kow (<5.0) chloropicrin is not expected to bioaccumulate.

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 degrade is carbon dioxide.
- Evaporation half-life in water (light) = 4.8-9.4 minutes; (dark) = 4.1-15.7 minutes

Bioaccumulative Potential

Due to low log Kow (<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.

Disposal of Product

- Do not contaminate water, food, or feed by storage or disposal. Pesticide wastes are toxic.
- Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law.
- If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, the Hazardous Waste representative at the nearest EPA Regional Office, or the product manufacturer or distributor for guidance.

Container Disposal

- 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

<table>
<thead>
<tr>
<th>UN Number</th>
<th>Proper Shipping Name</th>
<th>Transport Hazard Class(es)</th>
<th>Packing Group</th>
<th>Toxic-Inhalation Hazard</th>
<th>Hazard Zone</th>
<th>Environmental Hazards</th>
<th>Marine Pollutant</th>
<th>Hazardous Substance</th>
<th>Transport in Bulk per MARPOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1580</td>
<td>Chloropicrin</td>
<td>6.1</td>
<td>I</td>
<td>Yes</td>
<td>B</td>
<td>Aquatic</td>
<td>Yes</td>
<td>No Reportable Quantity (RQ) listed for Chloropicrin</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

ImDG, TDG, United Nations: Class 6.1, Toxic Substances

Emergency Guide

- Class 6.1, Poison Inhalation Hazard
- IMDG; TDC, ADR, United Nations: Class 6.1, Toxic Substances

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.

IATA / ICAO (Air Transport)

Forbidden for any amount
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.

FIFRA

This chemical is a pesticide product registered by the U.S. Environmental Protection Agency and is subject to certain labeling requirements under US federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets, and for workplace labels of non-pesticide chemicals. Following is the hazard information as required on the pesticide label.

**POISON, DANGER**

May be fatal if inhaled or swallowed. Corrosive. Poisonous liquid and vapor. Liquid causes skin burns and irreversible eye damage. Do not get in eyes, on skin or on clothing. Do not breathe vapor or gas. Chloropicrin is readily identifiable by smell. Exposure to very low concentrations of vapor will cause irritation of eyes, nose, and throat. Continued exposure after irritation or higher concentrations may cause painful irritation to the eyes or temporary blindness. This product is toxic to mammals, birds, fish, and aquatic invertebrates. This product may be corrosive to metals under certain conditions.

CERCLA - Superfund (SARA Title III)

<table>
<thead>
<tr>
<th>Section 302.4 (RQ)</th>
<th>Chloropicrin is not listed with an RQ (Reportable Quantity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 302, EHS (TPQ)</td>
<td>Chloropicrin does not have a TPQ (Threshold Planning Quantity)</td>
</tr>
<tr>
<td>Section 311/312 (Tier II)</td>
<td>Yes</td>
</tr>
<tr>
<td>SARA Hazard Categories (for Tier II reporting)</td>
<td>See Physical and Health hazards listed in Section 2 of this SDS.</td>
</tr>
<tr>
<td>Section 313</td>
<td>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):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS Registry Number</th>
<th>Chemical Name</th>
<th>% by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>76-06-2</td>
<td>Chloropicrin</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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.

CANADA

Domestic Substances List: Yes
Non-Domestic Substance List: No
Ingredient Disclosure List: Chloropicrin is listed (455 is chemical ingredient number)

MEXICO

This safety data sheet was prepared in accordance with the Official Mexican Standard (NOM-018-STPS-2000)

16. OTHER INFORMATION

VERSION 12 DATE: January 09, 2018

REVISION HISTORY:

01-16-13
Reformat SDS to OSHA GHS standard
Section 14 ERG reference from 2008 to 2012 edition

01-31-13
Section 7 Removed nitrogen pressure reference
Section 14 Modified special precautions subheading

02-07-13
Section 15 Removed de minimis reference in Section 313 subheading

03-15-13
Section 14 Replaced Poison – Inhalation Hazard with Toxic – Inhalation Hazard

04-17-13
Section 9 Corrected decomposition temperature
Section 14 Modified Label and Placards information for clarity

07-11-13
Section 10 Revised Possibility of Hazardous Reactions

10-18-13
Section 10 Added Explodability section and information

05-20-14
Section 3 Modified concentration
Section 15 Modified Section 313 % by weight

11-15-14
Section 2 Relocated Hazards Not Otherwise Specified and added information

09-30-15
Section 2 Revised all subsections; updated Canadian information to GHS
Section 4 Revised subsections for Inhalation, Skin, Ingestion
Section 15 Removed Canadian information not formatted to GHS

01-09-18
Section 1 Revised Recommended Use information
Section 3, 15 Revised composition of ingredients to reflect concentration by weight %
Section 15 Revised SARA Hazard Categories

Hazard Rating Systems

<table>
<thead>
<tr>
<th>Category</th>
<th>NFPA 704*</th>
<th>ACA-HMIS**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloropicrin</td>
<td>Chloropicrin</td>
<td></td>
</tr>
<tr>
<td>Health</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Flammability</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Reactivity</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazard Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - Severe</td>
</tr>
<tr>
<td>3 - Serious</td>
</tr>
<tr>
<td>2 - Moderate</td>
</tr>
<tr>
<td>1 - Slight</td>
</tr>
<tr>
<td>0 - Minimal</td>
</tr>
</tbody>
</table>

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

ABBREVIATIONS:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>ADR</td>
<td>European Agreement concerning the Internal Carriage of Dangerous Goods by Road</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstracts Service</td>
</tr>
<tr>
<td>CBRN</td>
<td>Chemical, Biological, Radiological, and Nuclear</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td><strong>CFR</strong></td>
<td>Code of Federal Regulations</td>
</tr>
<tr>
<td><strong>CHEMTREC</strong></td>
<td>Chemical Transportation Emergency Center</td>
</tr>
<tr>
<td><strong>DOT</strong></td>
<td>Department of Transportation (USA)</td>
</tr>
<tr>
<td><strong>EC_{50}</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>EPCRA</strong></td>
<td>Emergency Planning and Community Right-to-Know</td>
</tr>
<tr>
<td><strong>GHS</strong></td>
<td>Globally Harmonized System</td>
</tr>
<tr>
<td><strong>IDLH</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>IMDG</strong></td>
<td>International Maritime Dangerous Goods</td>
</tr>
<tr>
<td><strong>LC_{50}</strong></td>
<td>Lethal Concentration - median dose at which 50% of test animals die from inhalation</td>
</tr>
<tr>
<td><strong>LD_{50}</strong></td>
<td>Lethal Dose - median dose at which 50% test animals die from oral or dermal exposure</td>
</tr>
<tr>
<td><strong>NOAEL</strong></td>
<td>No Observable Adverse Effect Level</td>
</tr>
<tr>
<td><strong>NOEC</strong></td>
<td>No Observed Effect Concentration</td>
</tr>
<tr>
<td><strong>NTP</strong></td>
<td>Normal Temperature and Pressure: 20 °C and 760 mmHg or 68 °F and 1 atm</td>
</tr>
<tr>
<td><strong>OEL</strong></td>
<td>Occupational Exposure Limit</td>
</tr>
<tr>
<td><strong>OSHA</strong></td>
<td>Occupational Health and Safety Administration</td>
</tr>
<tr>
<td><strong>ppb</strong></td>
<td>part per billion</td>
</tr>
<tr>
<td><strong>ppm</strong></td>
<td>part per million</td>
</tr>
<tr>
<td><strong>PPE</strong></td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td><strong>RD_{50}</strong></td>
<td>Respiratory Distress in 50% of test animals</td>
</tr>
<tr>
<td><strong>SARA</strong></td>
<td>Superfund Amendments and Reauthorization Act</td>
</tr>
<tr>
<td><strong>STEL</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>STEV</strong></td>
<td>Short Term Exposure Value: the maximum airborne concentration of a chemical to which a worker may be exposed in any 15 minute period, provided the TWAEV is not exceeded.</td>
</tr>
<tr>
<td><strong>STP</strong></td>
<td>Standard Temperature and Pressure: 0 °C and 760 mmHg or 32 °F and 1 atm</td>
</tr>
<tr>
<td><strong>TDG</strong></td>
<td>Transport of Dangerous Goods (Canada)</td>
</tr>
<tr>
<td><strong>TWA</strong></td>
<td>Time Weighted Average airborne concentration for a worker in an 8 hour day</td>
</tr>
<tr>
<td><strong>TWAEV</strong></td>
<td>Time-Weighted Average Exposure Value: Average airborne concentration of a chemical to which a worker may be exposed in a work day.</td>
</tr>
<tr>
<td><strong>US DOT</strong></td>
<td>United States Department of Transportation</td>
</tr>
<tr>
<td><strong>WHMIS</strong></td>
<td>Workplace Hazardous Materials Identification System (Canada)</td>
</tr>
</tbody>
</table>

**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.