1. PRODUCT AND COMPANY IDENTIFICATION

Address/Phone No.:
INEOS Chlor Americas Inc.
2036 Foulk Road, Suite 204
Wilmington
Delaware, 19810
Tel No (866) 296-0146

Emergency Phone No.:
call CHEMTREC 1-800-424-9300
For medical emergencies call 1-800-317-9643

Synonyms:
Trichloroethylene, Ethylene Trichloride, Trichloroethene, Trichlor.

Use of Substance / Preparation:
Industrial solvent, degreasing agent and chemical feedstock.
For details on specific grades please refer to technical literature.

2. COMPOSITION/INFORMATION ON INGREDIENTS

PRODUCT DESCRIPTION:
Trichloroethylene stabilised.

2.1 HAZARDOUS INGREDIENT(S)

<table>
<thead>
<tr>
<th>Hazardous ingredient(s)</th>
<th>CAS No.</th>
<th>%(w/w)</th>
<th>ACGIH TLV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichloroethylene</td>
<td>000079-01-6</td>
<td>&gt;99</td>
<td>*50ppm (8hr TWA )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*100ppm (15 min STEL)</td>
</tr>
</tbody>
</table>

* Please review full comments regarding recent ACGIH activities in Section 15

3. HAZARDS IDENTIFICATION

3.1 Emergency Overview

Clear colourless liquid with an ethereal, sweet odour.
Explosive mixtures of trichloroethylene and air can be formed, but they are difficult to ignite and require high intensity sources of heat such as welding arcs, sparks and flames or high temperatures and pressures.
Thermal decomposition will evolve toxic and corrosive vapours of hydrogen chloride and phosgene.
Harmful by inhalation. High exposures by inhalation will cause anaesthetic effects.
This may result in a loss of consciousness and could prove fatal if exposure has been severe. Dangerous for the Environment. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

3.2 Potential Health Effects

Eye
The vapor and liquid are irritant.

Skin
Slight/mild irritant. Can be absorbed through skin.

Ingestion
The swallowing of small amounts is unlikely to cause any adverse effects.

Inhalation
High concentrations of vapour, in excess of the occupational exposure limit, will lead to adverse effects on the central nervous system, causing nausea, headaches, dizziness and lightheadedness (concentrations in excess of 300ppm). Higher concentrations, around 5000ppm and above, will cause anaesthetic effects, leading to unconsciousness and in extreme cases, coma and death. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal.
Chronic Effects
Repeated exposure to high levels produces adverse effects on the liver and, to a lesser extent on the kidney. A condition known as 'Degreaser’s Flush', a pronounced redness of the skin, may occur on the face, hands, arms, feet and trunk of some individuals following repeated exposure to trichloroethylene and the consumption of alcohol. This effect can intensify over a 30 minute period but usually disappears completely after 1 hour. These symptoms may occur up to 6 weeks after the last exposure to trichloroethylene and can reoccur if exposure continues.

Carcinogenicity / Regulatory Status
Trichloroethylene has been shown to cause various tumours in animal studies. Mechanistic studies have shown that some of these observations are not relevant for humans. Epidemiological studies suggest that there may be a weak association between exposure to high levels of trichloroethylene and an increased incidence of kidney cancer, although the evidence for a causal relationship is not conclusive. See Regulatory Information (Section 15).

4. FIRST-AID MEASURES

Inhalation
Remove patient from exposure, keep warm and at rest. DO NOT walk the patient about. Administer oxygen if necessary. Apply artificial respiration if breathing has ceased or shows signs of failing. During resuscitation, care must be taken to avoid contamination by the substance from the patient. Obtain immediate medical attention.

Skin Contact
Remove contaminated clothing. Wash skin with soap and water. If symptoms develop, obtain medical attention.

Eye Contact
Immediately irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 10 minutes. Obtain medical attention.

Ingestion
Do not induce vomiting. Provided the patient is conscious, wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Obtain immediate medical attention.

Note to Physicians
Adrenaline and similar sympathomimetic drugs should be avoided following exposure as cardiac arrhythmia may result with possible subsequent cardiac arrest. Symptomatic treatment and supportive therapy as indicated.
Gastric lavage may be effective when performed within 4 hours of ingestion. Following ingestion adsorbents such as activated charcoal may be of value.

5. FIRE-FIGHTING MEASURES

Explosive mixtures of trichloroethylene and air can be formed, but are difficult to ignite and require high intensity sources of heat, such as welding arcs, sparks and flames or high temperatures and pressures; addition of small amounts of flammable substances to trichloroethylene (such as flammable liquids or gases) and/or an increase in the oxygen content of the local atmosphere, may strongly enhance these effects.
Welding or cutting should not be carried out on any vessel likely to contain solvent because of the risk of explosion.
Thermal decomposition will evolve toxic and corrosive vapours of hydrogen chloride and phosgene.
Containers may burst if overheated due to thermal expansion of the contents.

Flammable Properties
- Flash point (BS EN 22719:1994) : None
- Explosive limits (Company test method) : trichloroethylene
  at 50 Deg C LEL 8% v/v, UEL 28% v/v
  at 100 Deg C LEL 6.5% v/v, UEL 44% v/v

Auto Ignition Temperature (Deg C) 410

Extinguishing Media
Normal extinguishing media. Water spray should be used to cool containers.

Fire Fighting Protective Equipment
A self contained breathing apparatus and full protective clothing must be worn in fire conditions.
6. ACCIDENTAL RELEASE MEASURES

Provided it is safe to do so, isolate the source of the leak. Ensure suitable personal protection (including respiratory protection) during removal of spillages.

Small spillages: Adsorb spillages onto sand, earth or any suitable adsorbent material. Transfer to a container for disposal or recovery.

Large spillages: Contain spillages with sand, earth or any suitable adsorbent material. Do not allow to enter drains, sewers or waterways.

Spillages or uncontrolled discharges into waterways must be alerted to the Environment Agency or other appropriate regulatory body.

7. HANDLING AND STORAGE

7.1 Handling

Do not breathe vapor. Use only in well ventilated areas. Avoid contact with skin and eyes. Avoid contact with naked flames and hot surfaces as toxic and corrosive decomposition products (hydrogen chloride) can be formed. The vapour is heavier than air and may reach dangerously high concentrations in pits, tanks, and other confined spaces. In such cases provide adequate ventilation or wear suitable respiratory protective equipment with positive air supply. When using do not smoke. When welding metals degreased with trichloroethylene, special care is needed to ensure all solvent has evaporated from the components. Separate cleaning and welding areas.

Ensure vapours from degreasing operations do not enter welding areas - welding arcs can cause trichloroethylene vapour to break down producing toxic vapours.

7.2 Storage

Keep container dry. Keep in a cool, well ventilated place. Keep away from direct sunlight. Keep away from heat and sources of ignition. All bulk storage vessels should be made of steel and require a suitable vent or pressure relief valve and secondary containment to prevent uncontrolled losses from accidental release. Do not use aluminium or its alloys in the construction of storage vessels, pipework and ancillary equipment, including internal components e.g. pump impellers. Storage tanks should be bunded to accommodate 110% of the tank volume. Due to the risk of explosion DO NOT weld, cut or burn drums or other vessels which contain or have contained this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Wear suitable protective clothing and gloves. Nitrile rubber is better than PVC. Gloves should be changed regularly to avoid permeation problems. Gloves should be changed if excessive exposure has occurred. Wear eye/face protection. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit. Wear suitable respiratory protective equipment if exposure to levels above the occupational exposure limit is likely. Positive air supplied RPE is recommended.

Exposure Guidelines

<table>
<thead>
<tr>
<th>Exposure Guidelines product(s)</th>
<th>OSHA PEL</th>
<th>ACGIH</th>
<th>Company 8 hr LTEL</th>
<th>Company 15 min STEL</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichloroethylene</td>
<td>100 ppm (8hr TWA)</td>
<td>*50ppm (8hr TWA)</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>200 ppm (Ceiling)</td>
<td>*100ppm (15 min STEL)</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

* Please review full comments regarding recent ACGIH activities in Section 15
9. PHYSICAL AND CHEMICAL PROPERTIES

These properties are the most relevant and no other properties are available. For specific physical properties of individual grades, please refer to technical literature and/or product specifications. Physio-chemical data refers to trichloroethylene.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Color</td>
<td>clear</td>
</tr>
<tr>
<td>Odor</td>
<td>sweet</td>
</tr>
<tr>
<td>Boiling Point (Deg C)</td>
<td>87</td>
</tr>
<tr>
<td>Auto Ignition Temperature (Deg C)</td>
<td>410</td>
</tr>
<tr>
<td>Vapour Pressure (mm Hg)</td>
<td>59 at 20 Deg C</td>
</tr>
<tr>
<td>Solubility (Water)</td>
<td>slightly soluble</td>
</tr>
<tr>
<td>Solubility (Other)</td>
<td>miscible with most organic solvents</td>
</tr>
<tr>
<td>Freezing Point (Deg C)</td>
<td>-87</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.464 at 20 Deg C</td>
</tr>
<tr>
<td>Vapour Density (Air= 1)</td>
<td>4.54 at 74 Deg C</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Hazardous Reactions
Contact with red hot surfaces, sparks or naked flames may generate toxic fumes of phosgene and hydrogen chloride. May react violently with metals such as sodium, potassium and barium, particularly if they are finely divided. Prolonged contact with aluminium or light alloys may cause a reaction resulting in the generation of hydrogen chloride gas and heat.

Decomposition Product(s)
hydrogen chloride, Phosgene.
Reacts with strong alkalis to give explosive and highly toxic chloroacetylenes.

11. TOXICOLOGICAL INFORMATION

This health hazard assessment is based on a consideration of the composition of this product.

Inhalation
High concentrations of vapour, in excess of the occupational exposure limit, will lead to adverse effects on the central nervous system, causing nausea, headaches, dizziness and lightheadedness (concentrations in excess of 300ppm). Higher concentrations, around 5000ppm and above, will cause anaesthetic effects, leading to unconsciousness and in extreme cases, coma and death. Very high exposures may cause an abnormal heart rhythm and prove suddenly fatal.

Skin Contact
Slight/mild irritant. Will remove the natural greases resulting in dryness, cracking and dermatitis. Can be absorbed through skin.

Eye Contact
The vapor and liquid are irritant. Permanent damage is unlikely.

Ingestion
The swallowing of small amounts is unlikely to cause any adverse effects. Larger doses may produce effects similar to inhalation.

Long Term Exposure
Repeated exposure to high levels produces adverse effects on the liver and, to a lesser extent on the kidney. A condition known as 'Degreaser's Flush', a pronounced redness of the skin, may occur on the face, hands, arms, feet and trunk of some individuals following repeated exposure to trichloroethylene and the consumption of alcohol. This effect can intensify over a 30 minute period but usually disappears completely after 1 hour. These symptoms may occur up to 6 weeks after the last exposure to trichloroethylene and can reoccur if exposure continues.

Trichloroethylene has been shown to cause various tumours in animal studies. Mechanistic studies have shown that some of these observations are not relevant for humans. Epidemiological studies suggest that there may be a weak association between exposure to high levels of trichloroethylene and an increased incidence of kidney cancer, although the evidence for a causal relationship is not conclusive. Exposures should be kept as low as practicable and at least below the ACGIH TLV.
**12. ECOLOGICAL INFORMATION**

**Environmental Fate and Distribution**
Medium tonnage material produced in partially contained systems. Liquid with high volatility. The product is sparingly soluble in water. The product has low potential for bioaccumulation. The product has high mobility in soil. The product has high mobility in sediment.

**Persistence and Degradation**
Not readily biodegradable. There is no evidence of rapid metabolism in soil. There is evidence of slow degradation in soil. There is evidence of photodegradation in air. This product has potential for leaching.

**Ecotoxicity**
Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Effect on Effluent Treatment**
The product is partially removed in biological treatment processes.

**13. DISPOSAL CONSIDERATIONS**

Disposal should be in accordance with local, state or national legislation. Transfer solvent residues to a labelled, sealed container for disposal or recovery. Waste disposal must be by an accredited contractor. Large volumes may be suitable for redistillation by solvent recovery contractors. Solvent residues must not be allowed to enter drains, sewers or watercourses or to contaminate the ground.

Due to the risk of explosion DO NOT weld, cut or burn drums or other vessels which contain or have contained this product.

**14. TRANSPORT INFORMATION**

| **UN No.** | III |
| **UN Pack. Group** | |

**AIR**

| ICAO/IATA | 6.1 |
| Packing group Air | III |

**SEA**

| IMDG | 6.1 |
| U.N. Packing group Sea | III |
| Proper Shipping Name | TRICHLOROETHYLENE |

**ROAD/RAIL**

| ADR/RID Class | 6.1 |
| ADR Sin | 1710 |

**TDG / DOT**

| Hazards Class | 6.1 |
| Identification No | 1710 |
| Packing Group | III |
| Hazardous Substances (RQ) | 100 lbs. / 45.4 kg |
| Placard | POISON, 1710, Class 6.1 |
15. REGULATORY INFORMATION

US FEDERAL REGULATIONS

OSHA Classification
This product is classified as a "Hazardous Chemical" by definition of Hazard Communication Standard (29 CFR 1910.1200).

Carcinogen Status
Trichloroethylene is listed by NTP as 'reasonably anticipated to be a human carcinogen' and by IARC as a Group 2A carcinogen.

The ACGIH TLV Committee have published a Notice of Intended Change (NIC) to the TLV and in the carcinogenicity classification for trichloroethylene (currently Group 5: not suspected as a human carcinogen). The NIC proposes a TLV of 10 ppm (8-hour TWA) and 25 ppm (15 minute STEL) and a carcinogenicity classification in Group A2 (suspected human carcinogen).

TSCA Inventory Status
All components of this product are listed on the TSCA inventory.

CERCLA
This material is listed in Table 302.4 of 40 CFR Part 302 as a hazardous substance with a reportable quantity of 100 lbs. Releases to air, land or water which exceed the RQ must be reported to the National Response Centre, 800-424-8802.

SARA
Sections 313 and 40 CFR 372: This product is subject to reporting requirements.

Hazard Categories
Sections 311/312 (40 CFR 370.2): An immediate health hazard; A delayed health hazard.

CALIFORNIA PROPOSITION 65: This product contains a chemical(s) known to the State of California to cause cancer.

US Federal Right-To-Know: contains butylene oxide, butanone, methyl pyrrole.

Canadian Regulations
This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.

Controlled Products Regulations (WHMIS) Classification:
Class D1B: Toxic material causing immediate and serious toxic effects.
Class D2A: Very toxic material causing other toxic effects.
Class D2B: Toxic material causing other toxic effects.

CEPA / Canadian Domestic Substances List (DSL):
The substances in this product are on the Canadian Domestic Substances List (CEPA DSL).

EU
EINECS: 201-167-4

Inventory Status
United States, Australia, Canada, China, EU, Japan, Korea, Philippines

16. OTHER INFORMATION

NFPA ratings: Health 2, Flammability 1, Reactivity 0

This data sheet is based on a consideration of the properties of the constituents.

Explosive limit data from Company measurements using 5 litre ASTM flask with 6 Amp hot wire or fusing wire ignition source.
PRODUCT NAME:  TRIKLONE™ 134 / A / LE

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The following sections contain revisions or new statements: 2, 3, 11, 15

GLOSSARY
ACGIH - American Conference of Govermental Industrial Hygienists
CAS - Chemical Abstracts Service Registry Number
CFR - Code of Federal Regulations
COM - The company aims to control exposure in its workplace to this limit
DOT - Department of Transportation
EINECS - European Inventory of Existing Commercial Chemical Substances
OSHA - Occupational Safety & Health Administration
SARA - Superfund Amendments and Reauthorization Act of the U.S. EPA
TDG - Transportation of Dangerous Goods Act/Regulations
TLV - Threshold Limit Value
TSCA - Toxic Substances Control Act
TWA - Time-Weighted Average