MATERIAL SAFETY DATA SHEET

No. U-0970E-06
Identity (As Used on Label and List)

- **Date Prepared:** January 6, 1993
- **Date Revised:** July 19, 2007

TRICHLOROETHYLENE

1. PRODUCT AND COMPANY INFORMATION

Product Name: TRICHLOROETHYLENE
General Use: solvent
MSDS Number: U-0970E

Manufacturer's Name
ASAHI GLASS Co., Ltd.

Emergency Telephone Number
+81-3-3218-5700

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12-1 Yurakucho 1-Chome
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Chemicals Company
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+81-3-3218-5700
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2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	%
Trichloroethylene	79-01-6	>99

OSHA Hazardous Components (29 CFR 1910.1200)
Trichloroethylene is hazardous in OSHA.

3. HAZARDS IDENTIFICATION

Emergency Overview
Vapors have strong anesthesia action.

Heavy exposure can damage the liver and kidneys.
Trichloroethylene is irritating to eyes and repeated contact may cause skin irritation.
May cause acute central nervous system depression (CNS) effect and chronic CNS effect.
Toxic gases (hydrogen chloride) will form upon combustion.

Potential Health Effects

- **Inhalation:**
  Vapors are irritating to the eyes, nose, throat and respiratory tract. May cause central nervous system (CNS) depression, liver, kidney, and cardiac arrhythmia.
- **Skin:**
  Prolonged and repeated contact may cause mild skin irritation. May cause defatting, drying and cracking of the skin. Prolonged and repeated contact may lead to dermatitis. May be absorbed through intact skin causing central nervous system (CNS) depression, liver, kidney, and cardiac arrhythmia.
- **Eye:**
  May cause irritation, redness and pain. Vapors from this product are irritating to the eyes.
- **Ingestion:**
  May cause irritation and burning of the mouth, throat and respiratory tract and abdominal pain. Can cause central nervous system (CNS) depression, liver, kidney, and cardiac arrhythmia.

4. FIRST AID MEASURES

- **Inhalation**:
  Remove the victim from the contamination immediately to fresh air and keep the victim warm and quiet. Obtain medical attention immediately.
  If breathing is weak, irregular or has stopped, loosen his collar and belt and administer artificial respiration.
- **Skin Contact:**
  Remove all contaminated clothing, shoes and socks from the affected areas as quickly as possible, cutting them off if necessary.
  Wash the affected area with plenty of water using a mild soap or a detergent for skin.
  If irritation persists, obtain medical attention immediately.
- **Eye Contact:**
  Immediately flush eyes with running water at least 15 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention immediately.
- **Ingestion:**
  DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomits
  Keep an unconscious person the patient in the lateral position in the transportation.
  Obtain medical attention immediately.

5. FIRE-FIGHTING MEASURES

- **Suitable extinguishing media**: Use media appropriate for surrounding fire and/or materials.
  Dry chemical powder, form or carbon dioxide. No self-combustibility.
- **Unsuitable extinguish media/methods:** none
- **Hazardous combustion product or gases:** Hydrogen chloride, phosgene.
- **Special protective equipment for fire fighters:** Fire fighters should use pressure-demand self contained breathing apparatus due to possible exposure to hydrogen chloride and phosgene gases.
- **Additional Information:** Shut off fuel to fire if possible to do so without hazard.
  Vapors concentrated in a confined or poorly-ventilated area can be ignited upon contact with a spark, flame or high-intensity source of heat. This can occur at concentrations in air of approximately 8-10.5%.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:
Ensure adequate ventilation.
Unprotected personnel should move upwind of spill. Evacuate non essential personnel.
Only personnel equipped with proper respiratory and skin/eye protection should be permitted in area.
Environmental precautions:
Shut off source of ignition and ventilate spill area.
Do not wash away into shower or waterway.
Take precautions as necessary to prevent contamination of ground and surface waters.
Methods for cleaning up/taking up:
Sweep up to avoid slipping hazard and dispose of in accordance with applicable regulations.
Recover or absorb spilled material on sawdust or vermiculite and sweep into closed containers for disposal.

Additional information:
Information for safe handling looks up chapter 7.
Information for disposal looks up chapter 13.

7. HANDLING AND STORAGE

Handling
In doors, use with sufficient ventilation to keep employee exposure below recommended limits.
Avoid leak, overflow and dispersal. Prevent form vapor.
In case of chance exposure to this substance wear suitable protective glove, eye protection and respiratory equipment. Keep upwind of work area.
Do not allow product to contact open flame or electrical heating elements because dangerous decomposition products may form.
Keep container tightly closed when in not use.
Waste fluid takes up and place in closed containers for disposal.
Use floor material which is able to prevent soil infiltration. To avoid cracks of floor.
Mechanical ventilation should be used in low places because vapor is 4.5 times as heavy as air.

Storage
Store in cool, dry, well –ventilated location. Keep away from sunlight.
Keep container tightly closed.
Prevent spills from entering sewers, watercourses or low areas.
Use floor material which is able to prevent soil infiltration.
Build roof or cover by vinyl sheet in the case of storage container in an outdoor location.

8. EXPOSURE CONTROL / PERSONAL PROTECTION

Exposure Limit values

Chemical name	**OSHA (1993)**	**ACGIH (2006)**	**NIOSH**
Trichloroethylene	PEL-TWA: 100ppm; (Acceptable Ceiling Concentration); 200ppm; (5mins in any 2h); 300ppm	TLV-TWA: 50ppm, A5; STEL, 100ppm	TWA 50 ppm (270 mg/m^3) ST 200 ppm (1080 mg/m^3)

Exposure controls
occupational exposure controls
Engineering Controls:
Local exhaust ventilation required.
Personal protection:

- **Respiratory Protection:** A NIOSH/MSHA approved air-supplied respirator for concentrations of trichloro-ethylene above 500 ppm.
- **Eye Protection:** Use chemical safety goggles when there is potential for eye contact.
- **Skin protection:** Impervious gloves
- **Other protection:** If need, protective clothing and rubber boot should be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

- **Appearance and Odour:** Clear, colorless liquid with mild, ethereal odour.
- **Boiling Point:** 87.2deg.C
- **Flash Point (Method Used):** No flash obtained when tested in usual manner
- **Flammable Limits:** 10.5vol% (in the air at 100deg.C) UEL; 41.0 vol%(in the air at 100deg.C)
- **Specific Gravity (H2O = 1):** 1.465
- **Vapour Pressure:** 7.7kPa (20deg.C)
- **Melting Point:** -86.2 deg.C
- **Vapour Density (Air = 1):** 4.53
- **Evaporation Rate (Ethyl ether = 1):** 0.28
- **Solubility in Water**: 0.11 g/100ml water (20deg.C)

10. STABILITY AND REACTIVITY

Conditions to avoid: Open flames, hot glowing surfaces, or electric arcs.

Stability: Stable

Materials to avoid (Incompatibilities): May react violently with alkali and alkaline earth metals such as sodium, potassium and barium. Avoid mixing with caustic soda, caustic potash, or oxidizing materials.

Hazardous decomposition products: Hydrogen chloride, phosgene.
Risk of flash and explosion in the case of contact high energy igniters or oxygen in concentrated amount atmosphere. May form toxicity gases by decomposition.
The substance decomposes on contact with strong alkali producing dichloroacetylene, which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

11. TOXICOLOGICAL INFORMATION

Health Hazardous (Acute and Chronic):
Animal Data:
- LD50 (oral, rat) = 3670 mg/kg
- LD50 (oral, mouse) = 2402 mg/kg

- LC50 (inhalation, mouse) = 8450 ppm for 4 hours

Mutagenicity Data:
-Ames Assay : negative
- Chromosome Aberration: negative

Carcinogenicity

- NTP: N/E
- IARC Monographs: 2A
- ACGIH: A5
- EU:3
- OSHA Regulated: N/E

This substance causes cancer in mice, and there is no evidence that it is a carcinogen in rats. Humans exposed to this substance have not been studied well enough to give much information.
The epidemiological human studies report that it is not clear whether this substance causes cancer. (But you should treat this substance as a likely cause of human cancer.)

Other information

The most famous symptom of acute intoxication is narcotic action. Many fatal accidents were reported. Repeated exposure can damage the liver and kidneys.
Irritating to skin because this substance can dissolve your skin's natural protective oils.
Frequent or prolonged skin contact can cause irritation and dermatitis (skin rash), with dryness, redness, flaking, and cracking of the skin.
Though this substance can be absorbed into the body slowly through healthy skin.

12. ECOLOGICAL INFORMATION

Biodegradability: BOD 2.4%
Bioaccumulation: Bio concentration factor: <17/6weeks
Fish Toxicity:
guppy LC50(7days) 55ppm,
fathead minnow LC50 (48h) 53.3mg/l (running water)
fathead minnow LC50 (96h) 40.7mg/l (running water)
fathead minnow LC50 (48h) 66.8mg/l (still water)
killifish LC50 (48h) 59mgl

Other information
The life time in the air : 0.018year (estimation)
Global warming potential (CFC11= 1) : <0.001 (estimation)

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method
Contaminated sawdust, vermiculite or porous surface must be disposed of in a permitted hazardous waste management facility. Recovered liquids may be reprocessed or incinerated or must be treated in a permitted hazardous waste management facility. Care must be taken when using or disposing of chemical materials and/or their containers to prevent environmental contamination.

Comply with all federal, state and local regulations.
Do not dump this product into sewers, on the ground or into any body of water.

14. TRANSPORT INFORMATION

US DEPARTMENT OF TRANSPORTATION (DOT)
Hazardous Materials: Yes
Proper Shipping Name: TRICHLOROETHYLENE
Hazardous Class or Division: 6.1
Identification Number: UN1710
Packing Group: III
Label(s) Required: 6.1

Sea transport
IMDG
Class: 6.1
Packing Group: III
UN Number: 1710
Proper Shipping Name: TRICHLOROETHYLENE
Marine Pollutant: NO

Air transport
ICAO/IATA
Class: 6.1
Packing Group: III
UN Number: 1710
Proper Shipping Name: TRICHLOROETHYLENE

15. REGULATORY INFORMATION

OSHA STATUS: This product is a hazardous substance under 29 CFR 1910.1200.
TSCA STATUS: This product is listed on the TSCA Inventory.
SARA TITLE III
SECTION 302(40 CFR 355):
None of the Chemicals in this product have a TPQ.

Name	CERCLA/SERA-hazardous substances and their Reportable Quantities
Trichloroethylene	=100lb (45.4kg) final RQ

SECTION 311/312(40 CFR 370): Chronic Health Hazard, Acute Health Hazard
SECTION 313(40 CFR 372): Trichloroethylene
Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. OTHER INFORMATION

- **N/E:** Not Established
- **N/A:** Not Applicable
- **N/D:** No Data
- **ACGIH:** American Conference of Governmental Industrial Hygienists

NFPA CODES

Flammability	Hazard	Instability
1	2	1

Revision Summary: Section1-16(2005. 1), Section2(2007. 7)

The product is not designed for special applications such as pharmaceutical, medical use.

The information given in this safety data sheet is for safety purposes only. It is given in good faith and based on the best knowledge and experience of the company at the date of issuing.
The company is not responsible for any loss or damage caused by the use of the product in applications for which it was not intended or for conditions of use contrary to the recommendations in this safety data sheet.