MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Trichloroethylene
PRODUCT ID: 0085
SYNONYMS: Trichloroethene; Trichlorethylene; Trichlor; C_2HCl_3
ISSUE DATE: 11/26/2002
EDITION NO.: 17

PPG Industries, Inc.
One PPG Place, Pittsburgh, PA 15272, USA
24-hour Emergency Telephone Number: 1-304-843-1300
For Product Information (8am-5pm Eastern time):
1-800-243-6774 (C/A)

PREPARER: Product Safety, Chemicals

2. COMPOSITION/INFORMATION ON INGREDIENTS

Material/CAS Number	Percent
Trichloroethylene (Stabilized) 79-01-6	>99

Note: Tested Mixture

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

WARNING! May cause irritation to eyes and skin. Vapor harmful. Harmful if swallowed. Possible cancer hazard based on tests with laboratory animals -- overexposure may create cancer risk. Do not ship lightly stabilized grades in aluminum trailers.

Precautions: Avoid contact with eyes. Avoid prolonged or repeated contact with the skin. Use only with adequate ventilation. Do not breathe vapors. High vapor concentrations can cause dizziness, unconsciousness, central nervous system depression or death. Long-term overexposure may cause liver/kidney injury. Do not use in poorly ventilated or confined spaces without proper respiratory protection. Ventilation must be sufficient to limit employee exposure to this product below permissible exposure limits. Eye irritation, dizziness and/or drunkenness are signs of overexposure. Do not swallow. Wash thoroughly every day after work. Do not eat, drink or smoke in work area.

4. FIRST AID MEASURES

INHALATION: Move person to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult. If breathing is difficult, give oxygen. Call a physician.

EYE/SKIN CONTACT: In case of contact, immediately flush eyes and skin with plenty of water (soap and water for skin) for at least 15 minutes, while removing contaminated clothing and shoes. Get medical attention if irritation persists. Thoroughly clean contaminated clothing and shoes before reuse or discard.

INGESTION: If swallowed, give at least 3-4 glasses of water, but do not induce vomiting. Do not give anything by mouth to an unconscious or convulsing person. Get medical attention.

NOTES TO PHYSICIAN:
Only administer adrenaline after careful consideration following overexposure. Increased sensitivity of the heart to adrenaline may be caused by overexposure to this product.

5. FIRE FIGHTING MEASURES

FLASH POINT: None (by DOT test method).

FLAMMABLE LIMITS IN AIR - LOWER (%): 7.8%

FLAMMABLE LIMITS IN AIR - UPPER (%): 52%

EXTINGUISHING MEDIA: Carbon dioxide. Dry chemical. Water.

SPECIAL FIREFIGHTING PROCEDURES: Emits toxic fumes under fire conditions. When this product is involved in fires, it can decompose to toxic, corrosive hydrogen chloride and possible traces of phosgene. Fire-fighters must wear NIOSH approved pressure demand, self-contained breathing apparatus and full protective clothing when fighting chemical fires. Vapor concentration in a confined or poorly ventilated area can be ignited upon contact with a high energy spark, flame, or high intensity source of heat. This can occur at concentrations ranging between the lower and upper limits (by volume) listed above.

6. ACCIDENTAL RELEASE MEASURES

ACTION TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
Immediately evacuate the area. Provide maximum ventilation. Unprotected personnel should move upwind of spill. Only personnel equipped with proper respiratory and eye/skin protection should be permitted in the area. Dike area to contain spill. Take precautions as necessary to prevent contamination of ground and surface waters. Recover spilled material on adsorbents, such as sawdust or vermiculite, and sweep into closed containers for disposal. After all visible traces, including ignitable vapors, have been removed, thoroughly wet vacuum the area. Do not flush to sewer. If area of spill is porous, remove as much earth and gravel, etc. as necessary and place in closed containers for disposal.

7. HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN DURING HANDLING AND STORAGE:
Vapors are heavier than air and will collect in low areas. Keep container closed when not in use. Store only in closed, properly labeled containers. This material or its vapors when in contact with flames, hot glowing surfaces or electric arcs can decompose to form hydrogen chloride gas and possible traces of phosgene. Avoid contamination of water supplies. Handling, storage and use procedures must be carefully monitored to avoid spills or leaks. Any spill or leak has the potential to cause underground water contamination which may, if sufficiently severe, render a drinking water source unfit for human consumption. Contamination that does occur cannot be easily corrected. A chlorinated solvent used as a flashpoint suppressant must be added in sufficient quantity or the resultant mixture may have a flashpoint lower than the flammable component. Do not use cutting or welding torches on drums that contained this product unless properly purged and cleaned. Do not ship lightly stabilized grades in aluminum trailers. The only exception is Type 145 vapor degreasing grade. Liquid oxygen or other strong oxidants may form explosive mixtures with this product.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Limits:
8-hour Time Weighted Average (TWA); 15-minute Short-Term Exposure Limit (STEL)

OSHA: 50 ppm TWA. 200 ppm STEL.

ACGIH: 50 ppm TWA. 100 ppm STEL.

RESPIRATORY PROTECTION: Airborne concentrations should be maintained below the exposure limits. When respiratory protection is required for certain operations (<10x exposure limit), use an air purifying respirator. The effectiveness of an air purifying respirator is limited. Use only for a single short-term exposure. Use self-contained breathing apparatus (SCBA) or full facepiece airline respirator with auxiliary SCBA operated in the pressure demand mode for emergencies and for all work performed in storage vessels, poorly ventilated rooms, and other confined areas. Overexposure to vapors may be prevented by ensuring proper ventilation controls, vapor exhaust or fresh air entry. A NIOSH-approved air purifying respirator with the appropriate chemical cartridges or a positive-pressure air-supplied respirator may also reduce exposure. Read the respirator manufacturer's instructions and literature carefully to determine the type of airborne contaminants against which the respirator is effective, its limitations, and how it is to be properly fitted and used.

VENTILATION: Use local exhaust or general room/dilution ventilation sufficient to maintain employee exposure below permissible exposure limits.

EYE AND FACE PROTECTION: Splashproof goggles.

PROTECTIVE GLOVES: Viton®. Silver Shield®. Polyvinyl alcohol (degrades in water).

OTHER PROTECTIVE EQUIPMENT: Boots, aprons, or chemical suits should be used when necessary to prevent skin contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT: 86-88 C
VAPOR DENSITY (Air=1): 4.54
SPECIFIC GRAVITY (Water=1): 1.465 @ 20/20 C
pH: 6.7 to 7.5
FREEZING/MELTING POINT: -86.4 C
SOLUBILITY (wt.% in water): 0.11
BULK DENSITY: 12.2 lbs/gal @ 20 C
VOLUME % VOLATILE: 100
VAPOR PRESSURE: 57.8 mm Hg @ 20 C
EVAPORATION RATE: 0.28 (ethyl ether=1)
HEAT OF SOLUTION: NA
PHYSICAL STATE: Liquid
ODOR: Ether-like
COLOR: Clear/Colorless

10. STABILITY AND REACTIVITY

STABILITY: Stable.

HAZARDOUS POLYMERIZATION: Will not occur.

INCOMPATIBILITY (CONDITIONS/MATERIALS TO AVOID):
Open flames, hot glowing surfaces or electric arcs. Avoid contamination with caustic soda, caustic potash or oxidizing materials. Shock sensitive compounds may be formed.

HAZARDOUS THERMAL DECOMPOSITION/COMBUSTION PRODUCTS:
Hydrogen chloride gas. Possible traces of phosgene.

11. TOXICOLOGICAL INFORMATION

ACUTE INHALATION LC50: (mouse) 8450 ppm (4 hours). Slight to very low toxicity.
ACUTE DERMAL LD50: (rabbit) >2000 mg/kg Slight to very low toxicity.
SKIN IRRITATION: Mildly irritating.
EYE IRRITATION: Moderately irritating.
ACUTE ORAL LD50: (rat) 5650 mg/kg. Slight to very low toxicity.

CHRONIC EFFECTS/CARCINOGENICITY: Trichloroethylene is listed by NTP as a suspect carcinogen, and by IARC as a Group 2A carcinogen.

MEDICAL CONDITIONS AGGRAVATED: Prolonged exposure above the OSHA permissible exposure limit may complicate existing liver and kidney diseases.

EFFECTS OF OVEREXPOSURE:

ACUTE:

Inhalation: This product is primarily a central nervous system depressant. Inhalation can cause irritation of the respiratory tract, dizziness, nausea, headache, loss of coordination and equilibrium, unconsciousness and even death in confined or poorly ventilated areas. Fatalities following severe acute exposure to various chlorinated solvents have been attributed to ventricular fibrillation.

Eye/Skin: Liquid splashed in the eye can result in discomfort, pain and irritation. Prolonged or repeated contact with liquid on the skin can cause irritation and dermatitis. The problem may be accentuated by liquid becoming trapped against the skin by contaminated clothing and shoes. Skin absorption is not expected to be of toxicological significance under normal industrial use.

Ingestion: Swallowing of this material may result in irritation of the mouth and GI tract along with other effects as listed above for inhalation. Vomiting and subsequent aspiration into the lungs may lead to chemical pneumonia and pulmonary edema which is a potentially fatal condition.

CHRONIC: Prolonged exposure above the OSHA permissible exposure limits may result in liver and kidney damage. Prudent handling practices should be followed to minimize human exposure.

CARCINOGENICITY: In a National Cancer Institute bioassay, little if any effect was observed in rats but hepatocellular carcinomas were quite common in both sexes of mice fed high doses. A subsequent study investigating the possible differences in metabolism found that mice metabolized trichloroethylene to a much greater extent than other species. Additionally, data from this study showed that tumor formation occurred via a nongenetic mechanism. The Science Advisory Board of the EPA has suggested caution in concluding from animal studies that trichloroethylene presents a risk of human cancer because of the negative epidemiology studies and also because of metabolism studies showing differences between the human and mouse response.

MUTAGENESIS: When activated with microsomal enzymes, trichloroethylene has been shown to be weakly positive in certain microbial mutagen test systems.

EPIDEMIOLOGY: In a retrospective cohort study of 14,457 people followed for at least 26 years, the investigators concluded that employees occupationally exposed to trichloroethylene did not show any significant association between several measures of exposure to trichloroethylene and any excess of cancer.

REPRODUCTIVE/DEVELOPMENTAL: Trichloroethylene was not embryotoxic or teratogenic in rats or mice inhaling the compound. In a teratology-reproduction study conducted by NTP, rats and mice fed microencapsulated trichloroethylene at doses as high as 300 mg/kg/day (rats) and 750 mg/kg/day (mice) showed little effect.

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION:
Slightly toxic to aquatic life.

Sheepshead Minnows - 96-hour LC50 - 52 mg/l
Mysid Shrimp - 96-hour LC50 - 14 mg/l

Marine Alga - 96-hour EC50 - 95 mg/l

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:
Contaminated sand, sawdust, vermiculite, soil 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. Waste material must be disposed of in accordance with federal, state, provincial, and local environmental control regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

14. TRANSPORT INFORMATION

Proper Shipping Name: Trichloroethylene
Hazard Class: 6.1 (Toxic)
UN Number: UN1710
Packing Group: III
USA-RQ, Hazardous Substance and Quantity: 100 lbs./45.4 kg.
Marine Pollutant: None

15. REGULATORY INFORMATION

USA TSCA: All components of this product are listed on the TSCA Inventory.
EUROPE EINECS: All components in this product are listed on EINECS.
CANADA DOMESTIC SUBSTANCES LIST (DSL): This product and/or all of its components are listed on the Canadian DSL.
AUSTRALIA AICS: All components of this product are listed on AICS.
KOREA ECL: All components in this product are listed on the Korean Existing Chemicals Inventory (KECI).
JAPAN MITI (ENCS): All components in this product are listed on the Japanese Existing and New Chemical Substances (ENCS) chemical inventory.
PHILIPPINES PICCS: All of the components in this product are listed on the Philippines Inventory of Chemicals and Chemical Substances (PICCS).

SARA TITLE III:
SARA (311, 312) Hazard Class:
Acute Health Hazard. Chronic Health Hazard.
SARA (313) Chemicals:
Listed.
SARA Extremely Hazardous Substance:
Not listed.

CERCLA Hazardous Substance:
Listed in Table 302.4 of 40 CFR Part 302 as a hazardous substance with a reportable quantity of 100 pounds. Releases to air, land or water which exceed the RQ must be reported to the National Response Center, 800-424-8802.

RCRA:
Waste trichloroethylene and contaminated soils/materials from spill cleanup are U228 hazardous

waste as per 40 CFR 261.33 and must be disposed of accordingly under RCRA.

CALIFORNIA PROPOSITION 65: This product is a chemical known to the State of California to cause cancer.

NJ RIGHT-TO-KNOW LIST: Also contains butylene oxide (CAS No. 106-88-7).

CANADA REGULATIONS (WHMIS): Class D1B - Toxic Materials. Sensitization to product: None known. Odor threshold: Approx. 80 ppm. Product use: degreasing solvent.

16. OTHER INFORMATION

The following has been revised since the last issue of this MSDS:
Date. Edition. Section 3 has been updated. Section 8 has been updated. Section 13 has been updated. Section 14 has been updated. Section 15 has been updated.

Previous revision date: 09/27/2001
Previous edition number: 16

NA = Not Available