



MATERIAL SAFETY DATA SHEET

24 Hour Emergency Phone 316/524-5751

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

Trichloroethylene, Metal Degreasing Grade

Part Numbers:

MRS401

MRS405

MRS455

CHEMICAL NAME

Trichloroethylene

SYNONYMS

Ethylene Trichloride

MANUFACTURER

Plastic Process Equipment, 8303 Corporate Park Drive, Macedonia, OH 44056

SECTION 2 COMPOSITION INFORMATION ON HAZARDOUS INGREDIENTS

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>% RANGE</u>	<u>OSHA PEL</u>
* Trichloroethylene	79-01-6	100	100 ppm

* Denotes chemical subject to reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

A dense, nonflammable, colorless, clear liquid with a mildly sweet odor.

WARNING! Harmful if inhaled. Can cause skin and eye irritation.

POTENTIAL HEALTH EFFECTS

INHALATION

Inhalation is the major potential route of exposure. Exposure to high concentrations of vapor or mist can cause central nervous system depression with symptoms of headache, dizziness, stupor, loss of consciousness or death depending on concentration and duration of exposure. Exposure to high concentrations can cause irregular heartbeat, cardiac arrest and death. Overexposure has been shown to cause adverse effects on the liver, kidney, nervous system and other internal organs.

SKIN

Prolonged or repeated contact of liquid can cause irritation, defatting of skin, and dermatitis. Absorption of liquid through intact skin is possible, causing systemic poisoning, but this is an unlikely route of significant toxic exposure.

EYE

Liquid in eyes produces pain and irritation with mild temporary damage possible. Vapor can irritate eyes.

INGESTION

Single dose toxicity is low to moderate. If vomiting occurs, trichloroethylene can be aspirated into the lungs, which can cause chemical pneumonia and systemic effects. Ingestion can cause adverse health effects as described in the Inhalation section above.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**

Alcoholism, acute and chronic kidney or liver disease, rhythm disorders of the heart, and neuritis and other disorders of the nervous system. Exposure can result in cardiac sensitization and increase the risk of cardiac arrest.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY

Consumption of alcoholic beverages may increase potential for development of toxic effects resulting from exposure to this product.

CHRONIC EFFECTS

Chronic overexposure to trichloroethylene has caused toxic effects in the liver, lymphatic (one species), kidney, and cardiovascular system, and has caused cancer in certain laboratory animal tests. Humans exposed to trichloroethylene can become intolerant to ethyl alcohol, with small quantities causing inebriation and skin blotches. IARC has classified trichloroethylene in Group 2A as a substance considered probably carcinogenic to humans. See Section 11 for additional toxicological information.

SECTION 4 FIRST AID MEASURES**INHALATION**

Remove to fresh air. If breathing has stopped, administer artificial respiration. Contact physician or emergency medical facility immediately.

SKIN

Remove contaminated clothing and shoes. Wash exposed area thoroughly with soap and water for at least 15 minutes. Wash contaminated clothing before reuse.

EYES

Immediately flush eyes with large amounts of water for at least 15 minutes while frequently lifting the upper and lower eyelids. If irritation persists, call a physician.

INGESTION

Do not induce vomiting. Contact physician or emergency medical facility immediately. Never give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN

Chlorinated hydrocarbons may sensitize the heart to epinephrine and other circulating catecholamines so that arrhythmias may occur. Careful consideration of this potential adverse effect should precede administration of epinephrine or other cardiac stimulants and the selection of bronchodilators.

See Section 11 for Toxicological Information

SECTION 5 FIRE FIGHTING MEASURES**FLAMMABLE PROPERTIES**

FLASH POINT
None (TCC)

AUTOIGNITION TEMPERATURE
788°F (420°C)

FLAMMABLE LIMITS IN AIR (PERCENT BY VOLUME)
8.0% - 10.5% in air @ 25°C

HAZARDOUS COMBUSTION PRODUCTS
Hydrogen chloride, phosgene, chlorine.

EXTINGUISHING MEDIA
Foam, dry chemical, carbon dioxide (CO₂)

**FIRE FIGHTING INSTRUCTIONS**

Concentrated vapors can be ignited by high intensity energy source. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Use water spray to keep fire-exposed containers cool. Extinguish fire using agent suitable for surrounding fire.

Firefighters should wear full protective clothing and self-contained, positive-pressure breathing apparatus.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Evacuate the area, ventilate, and avoid breathing vapors. Dike area to contain spill. If spill occurs indoors, turn off heating and/or air conditioning systems, to prevent vapors from contaminating entire building. Clean up area (wear protective equipment - refer to Section 8) by mopping or with absorbent material and transfer to closed containers for disposal. Avoid contamination of ground and surface waters. Do not flush to sewer. All spills or leaks of this material must be handled and disposed of in accordance with local, state and Federal regulations.

Notify National Response Center (800/424-8802) of uncontained releases to the environment in excess of the Reportable Quantity (RQ). See Section 15 for regulatory information.

For all transportation accidents, call CHEMTREC at 800/424-9300.

SECTION 7 HANDLING AND STORAGE**HANDLING**

Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes which become contaminated with perchloroethylene should be removed immediately and thoroughly laundered before wearing again.

Follow protective controls set forth in Section 8 when handling this product. Do not use in poorly ventilated or confined spaces. Vapors are heavier than air and will collect in low areas. Do not enter confined spaces such as tanks or pits without following proper entry procedures as required by 29 CFR 1910.146.

STORAGE**STORAGE CONDITIONS**

Store in labeled, sealed containers in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Do not store in open, unlabeled or mislabeled containers. Do not remove or deface label. Prevent water or moist air from entering storage tanks or containers.

Do not reuse drum without recycling or reconditioning in accordance with any applicable federal, state or local laws. Do not use cutting or welding torches, open flames, or electric arcs on empty or full containers.

SHELF LIFE LIMITATIONS

Trichloroethylene has an indefinite shelf life when stored under recommended conditions.

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT

Aluminum equipment should not be used for storage and/or transfer. Contact with aluminum parts in a pressurizable fluid system may cause violent reactions. Consult equipment supplier for further information.

Liquid oxygen or other strong oxidants may form explosive mixtures with trichloroethylene. Consult supplier before using in liquid oxygen service.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION**ENGINEERING CONTROLS****VENTILATION**

Do not use in closed or confined space. Open doors and/or windows. Use ventilation to maintain exposure levels below 50 ppm (TWA).



To determine exposure level(s), monitoring should be performed regularly. Safety shower and eyewash station should be available.

PERSONAL PROTECTIVE EQUIPMENT

EYE AND FACE PROTECTION

Wear safety glasses. Contact lenses should not be worn. Chemical goggles and/or face shields should be worn where splashing is a possibility.

SKIN PROTECTION

Wear solvent-resistant gloves such as Viton, polyvinyl alcohol, or equivalent. Solvent-resistant boots, apron, headgear and/or faceshield should be worn where splashing is a possibility.

RESPIRATORY PROTECTION

Where vapor concentration exceeds or is likely to exceed 50 ppm, a NIOSH/MSHA approved organic vapor type half-mask respirator is acceptable. A NIOSH/MSHA approved self-contained breathing apparatus or air line respirator, with full face piece, is required for vapor concentrations above 1,000 ppm and for spills and/or emergencies. Follow any applicable respirator use standards or regulations.

GENERAL

Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations.

EXPOSURE GUIDELINES

PPE recommends that its customers minimize employee exposure. PPE therefore suggests that its customers consider adopting the lower of the current OSHA PEL or the ACGIH TLVs for the purpose of evaluating employee exposures. The TLVs recommended by the ACGIH have been updated on a continuing basis.

ACGIH: 50 ppm TWA (8 hr), 100 ppm STEL
OSHA: 100 ppm TWA (8 hr), 200 ppm Ceiling

ACGIH Biological Exposure Indices:
Blood: 4 mg/L,
Urine: 100 mg/g creatinine

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH

1000 ppm

ODOR THRESHOLD

Odor threshold approximately 60 ppm; causes olfactory fatigue.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

CHEMICAL FORMULA

C_2HCl_3

MOLECULAR WEIGHT

131.38

APPEARANCE AND ODOR

Colorless, clear liquid; mildly sweet odor

SPECIFIC GRAVITY

1.45 @ 25/25°C

VAPOR PRESSURE

58 mm Hg @ 20°C

VOLATILES, PERCENT BY VOLUME

100

BOILING POINT

188°F (86.7°C)

VAPOR DENSITY

4.5

EVAPORATION RATE

(ether = 1): 0.3

SOLUBILITY IN WATER

0.1 gm/100 gm @ 25°C



SECTION 10 STABILITY AND REACTIVITY

CHEMICAL STABILITY

Stable

CONDITIONS TO AVOID

Avoid contact with open flame, electric arcs, or other hot surfaces which can cause thermal decomposition.

INCOMPATIBILITY WITH OTHER MATERIALS

Strong alkalis, oxidizers, barium, lithium, magnesium, and titanium. Refer to Section 7 for additional information on aluminum and liquid oxygen.

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen chloride, phosgene, chlorine.

HAZARDOUS POLYMERIZATION

Will not occur

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

INHALATION

200 ppm causes mild eye irritation. 400 ppm causes slight eye irritation and minimal light-headedness after 3 hours. 1,000 - 1,200 ppm after 6 minutes causes eye and nasal irritation, light-headedness and dizziness. 2,000 ppm cannot generally be tolerated, is irritating to the eyes and respiratory tract and causes drowsiness, dizziness and nausea within 5 minutes. Ventricular arrhythmias and very rapid respiration have been observed in individuals exposed to 15,000 ppm. High concentrations or prolonged overexposure can cause unconsciousness and death.

ANIMAL TOXICOLOGY

Inhalation LC₅₀: 12,000 ppm - 4 hours (rat)
Dermal LD₅₀: > 20 g/kg (rabbit)
Oral LD₅₀: 5650 mg/kg (rats)

CHRONIC TOXICITY

Chronic overexposure to trichloroethylene has caused toxic effects in the liver, lymphatic system (one species), kidney, and cardiovascular system of experimental animals. Humans exposed to trichloroethylene can become intolerant to ethyl alcohol, with small quantities causing inebriation and skin blotches.

Reports have been published associating increased incidences of scleroderma (systemic sclerosis) with exposures to trichloroethylene.

The finding of chronic toxic effects in laboratory animals may indicate toxicity to humans. Overexposure should be avoided, failure to do so could result in illness, injury or even death depending on the level and duration of exposure.

CARCINOGENICITY

Trichloroethylene has been evaluated for possible cancer causing effects in laboratory animals.

Inhalation studies of Wistar rats, NMRI mice and Syrian hamsters exposed to concentrations up to 500 ppm found no statistical increase in cancer except in the female mice where significant increases in lymphomas were observed. Inhalation studies of ICR mice and Swiss mice exposed to concentrations up to 450 ppm and 600 ppm respectively found statistically significant increases in lung tumors (female ICR mice) and lung and liver tumors (male Swiss mice). Inhalation studies in B₆C₃F₁ mice found an increased incidence in lung tumors in female mice.



Ingestion studies in $B_6C_3F_1$ mice exposed to concentrations up to 2,239 mg/kg/day males and 1,739 mg/kg/day females found statistically significant increase in liver tumors. Ingestion studies of Osborne-Mendel rats exposed to concentrations up to 1,097 mg/kg/day found no statistically significant increase in cancer. Ingestion studies in Fisher 344 rats at dosages of up to 1000 mg/kg found an increase in kidney tumors in male rats.

Five epidemiological studies using a variety of testing approaches found no increased incidence of cancer in groups exposed to trichloroethylene. Two recent additional epidemiology cohort studies have been published reporting increases in cancer associated with trichloroethylene exposure. Henschler et al (1995) reported an excess of renal cancer in German cardboard workers exposed to trichloroethylene. Antilla et al, (1995) reported an excess of liver, cervical and lymphopoietic cancers in workers from various industries where workers were believed to have been exposed to trichloroethylene.

The International Agency for Research on Cancer (IARC) has concluded that with respect to trichloroethylene, there is sufficient evidence of carcinogenicity to experimental animals and limited evidence of carcinogenicity to humans, resulting in a classification in Group 2A as a substance probably carcinogenic to humans. Trichloroethylene is not listed on the OSHA or NTP carcinogen lists. The ACGIH has classified trichloroethylene in category A5 as an agent not suspected as a human carcinogen.

MUTAGENICITY

Bacterial and cellular mutation assays have been largely negative. Mixed findings have been reported among studies using other endpoints. Most studies measuring DNA damage (strand breaks, unscheduled DNA synthesis, *in vitro* and *in vivo* micronucleus and chromosomal aberrations) have been negative, but some positive findings have been reported.

REPRODUCTIVE TOXICITY

Laboratory animal studies on mice, rats and rabbits have been conducted to evaluate the potential reproductive and developmental effects of trichloroethylene exposures. Trichloroethylene did delay the normal development of rats but this delay did not affect later life. Trichloroethylene exposure has not been shown to cause teratogenic effects (birth defects) in experimental animals.

SECTION 12 ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE

Water: Trichloroethylene will not hydrolyze in water under normal environmental conditions. Slow biodegradation may occur in groundwater where acclimated populations of microorganisms exist. Marine monitoring data suggests only moderate bioconcentration, with bioconcentration factors of 2-25. Trichloroethylene in water is subject to rapid evaporation, with estimated half-lives ranging from several minutes to hours depending on turbulence. Henry's Law Constant is 1×10^{-2} atm m^3/mol .

Octanol/Water Partition Coefficient ($\log K_{ow}$) is 2.29

Soil: Trichloroethylene can leach rapidly through sandy soil to reach groundwater. Soil adsorption potential is low. Adsorption Coefficient ($\log K_{oc}$) is 2.0

Air: Trichloroethylene in the atmosphere is subject to photooxidation, with an estimated half-life of 7 days.

ECOTOXICITY

Acute LC_{50} (96 Hours, flow-through) for Fathead Minnow:	40.7 mg/L
Acute LC_{50} (96 Hours, static) for Fathead Minnow:	66.8 mg/L
Acute LC_{50} (96 Hours, static) for Bluegill:	44.7 mg/L
Acute LC_{50} (96 Hours) for Grass Shrimp	2 mg/L
Acute LC_{50} (96 Hours) for Sheepshead Minnow:	20 mg/L

SECTION 13 DISPOSAL CONSIDERATIONS

All disposals of this material must be done in accordance with local, state and Federal regulations. Waste characterization and disposal compliance are the responsibility of the waste generator.

**SPILL RESIDUES**

Recovered liquids may be sent to an EPA permitted reclaimer or incineration facility. Contaminated material must be disposed of in a permitted waste management facility. Consult federal, state, or local disposal authorities for approved procedures.

SECTION 14 TRANSPORT INFORMATION**DOT IDENTIFICATION NO.**

UN 1710

DOT SHIPPING DESCRIPTION (49 CFR 172.101)

Trichloroethylene, 6.1, UN 1710, PG III, RQ

PLACARD REQUIRED

KEEP AWAY FROM FOOD, 1710, Class 6

LABEL REQUIRED

KEEP AWAY FROM FOOD, Class 6

Label as required by OSHA Hazard Communication Standard, and any applicable state and local regulations.

IMO REQUIREMENTS

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SECTION 15 REGULATORY INFORMATION**U S FEDERAL REGULATIONS****REPORTABLE QUANTITY (RQ)**

Reportable Quantity is 100 lbs.

TOXIC SUBSTANCES CONTROL ACT

Listed on TSCA Inventory

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III

Components identified with an asterisk (*) in Section 2 are subject to the reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372.

SARA HAZARD CATEGORIES (40 CFR 370.2)

HEALTH: Immediate Health, Delayed Health

INTERNATIONAL REGULATIONS**CANADA****WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION**

WHMIS Classifications applicable to this product:

D-1B (Toxic Material) based on assignment to TDG Class 6.1, PG III

D-2A (Very Toxic Material) based on classification as 2A carcinogen by IARC

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

All components of this product are on the Domestic Substances List (DSL).

HAZARDOUS PRODUCTS ACT

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR).

EUROPE

EINECS No.: 201-167-4

**STATE REGULATIONS****CALIFORNIA PROPOSITION 65**

The State of California has listed trichloroethylene under Proposition 65 as a chemical known to the state to cause cancer.

SECTION 16 OTHER INFORMATION**NFPA RATINGS**

Health 2, Flammability 1, Reactivity 0

Medical Emergencies:

Call toll-free 24 hours a day
for emergency toxicological
information 888/211-9412

Other Emergency information:

Call 316/524-5751 (24 Hours)

For any other information contact:

Plastic Process Equipment, Inc.
Technical Service Department
8303 Corporate Park Drive
Macedonia, OH 44056
800/362-0706
8 AM - 5 PM, Eastern Time
Monday through Friday

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