MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**TRICHLOROETHYLENE**
Version #	01
Revision date	10-13-2011
CAS #	79-01-6
Product Codes	**J.T.Baker: 5376, 9454, 9458, 9464, 9473** **Macron: 8600**
Synonym(s)	Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride
Manufacturer	Avantor Performance Materials, Inc.
Address	3477 Corporate Parkway Suite #200 Center Valley, PA 18034 US
Customer Service	855-282-6867
24 Hour Emergency	908-859-2151
Chemtrec	800-424-9300

2. Hazards Identification

Emergency overview

DANGER

Suspect cancer hazard - may cause cancer. Harmful if inhaled or swallowed. Irritating to eyes, respiratory system and skin. May cause sensitization by skin contact. May cause drowsiness or dizziness. Suspected of causing genetic defects. May cause reproductive effects. Prolonged exposure may cause chronic effects.

OSHA regulatory status

This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).

Potential health effects

Routes of exposure	Ingestion. Inhalation. Skin contact. Eye contact.
Eyes	Irritating to eyes. Splashes may cause serious eye damage.
Skin	Irritating to skin. May cause sensitization by skin contact.
Inhalation	Harmful if inhaled. Irritating to respiratory system. Vapors may cause drowsiness and dizziness.
Ingestion	Harmful: may cause lung damage if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Target organs

Eyes. Skin. Respiratory system. Central nervous system. Liver. Kidneys. Reproductive organs.

Chronic effects

Suspect cancer hazard - may cause cancer. May cause adverse reproductive effects - such as birth defects, miscarriages, or infertility based on animal data. May cause genetic defects. Can cause liver damage. Can cause kidney damage. May cause central nervous system effects.

Potential environmental effects

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

3. Composition / Information on Ingredients

Components	CAS #	Percent
TRICHLOROETHYLENE	79-01-6	99 - 100

4. First Aid Measures

First aid procedures

Eye contact

Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin contact	Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes.
Inhalation	Move to fresh air. If breathing stops, provide artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion	Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, the head should be kept low so that stomach vomit doesn't enter the lungs.
Notes to physician	Treat symptomatically. Symptoms may be delayed.
General advice	If you feel unwell, seek medical advice (show the label where possible). Show this safety data sheet to the doctor in attendance. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire Fighting Measures

Flammable properties	May burn, but does not ignite readily. Containers may explode when heated.
Extinguishing media	
Suitable extinguishing media	Carbon dioxide (CO2). Dry chemical powder. Foam. Water fog.
Unsuitable extinguishing media	Do not use a solid water stream as it may scatter and spread fire.
Protection of firefighters	
Specific hazards arising from the chemical	Fire may produce irritating, corrosive and/or toxic gases.
Protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Wear self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode when fighting fires.
Specific methods	In the event of fire and/or explosion do not breathe fumes. Use water spray to cool unopened containers. Cool containers exposed to flames with water until well after the fire is out.
Hazardous combustion products	Carbon monoxide and carbon dioxide. Hydrogen Chloride (HCl).

6. Accidental Release Measures

Personal precautions	Keep unnecessary personnel away. Wear appropriate protective equipment and clothing during clean-up. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering them. Local authorities should be advised if significant spillages cannot be contained.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground.
Methods for containment	Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.
Methods for cleaning up	Large Spills: Dike far ahead of spill for later disposal. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills in original containers for re-use. Clean up in accordance with all applicable regulations. Collect in a non-combustible container for prompt disposal.

7. Handling and Storage

Handling	Wear appropriate personal protective equipment. Avoid contact with eyes, skin, and clothing. Do not breathe mist or vapor. Do not taste or swallow. Do not eat, drink or smoke when using the product. Use only with adequate ventilation. Wash thoroughly after handling. See Section 8 of the MSDS for Personal Protective Equipment.
Storage	Keep tightly closed in a dry, cool and well-ventilated place.

8. Exposure Controls / Personal Protection

ACGIH

Material	Type	Value
TRICHLOROETHYLENE (79-01-6)	BEL	0.5000 mg/l
		15.0000 mg/l
	STEL	25.0000 ppm
	TWA	10.0000 ppm

Occupational exposure limits

U.S. - OSHA

Material	Type	Value
TRICHLOROETHYLENE (79-01-6)	Ceiling	200.0000 ppm
	TWA	100.0000 ppm

Engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Personal protective equipment

Eye / face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection Wear appropriate chemical resistant clothing. Wear appropriate chemical resistant gloves.

Respiratory protection Use a positive-pressure air-supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection.

General hygeine considerations Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

General Wear chemical protective equipment that is specifically recommended by the manufacturer. Launder contaminated clothing before reuse.

9. Physical & Chemical Properties

Appearance Liquid.

Color Colorless.

Odor Ether-like.

Odor threshold Not available.

Physical state Liquid.

Form Liquid.

pH Not available.

Melting point -121 °F (-84.7 °C)

Freezing point -121 °F (-84.7 °C)

Boiling point 188.6 °F (87.2 °C)

Flash point Not available.

Evaporation rate Not available.

Flammability limits in air, upper, % by volume 10.5 % (77°F)

Flammability limits in air, lower, % by volume 8 % (77°F)

Vapor pressure 9.199 kPa at 25°C

Vapor density 4.53

Specific gravity 1.47

Relative density	Not available.
Solubility (water)	1 g/l
Partition coefficient (n-octanol/water)	2.61
Auto-ignition temperature	788 °F (420 °C)
VOC	100 %
Percent volatile	100 %
Molecular weight	131.39 g/mol
Molecular formula	C2-H-Cl3

10. Chemical Stability & Reactivity Information

Chemical stability	Stable under normal temperature conditions.
Conditions to avoid	Heat, flames and sparks. Light. Moisture.
Incompatible materials	Strong oxidizing agents. Caustics. Alkalies. Chemically active metals.
Hazardous decomposition products	Carbon oxides. Hydrogen chloride. Phosgene.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product	Test Results
TRICHLOROETHYLENE (79-01-6)	Acute Dermal LD50 Rabbit: 20 ml/kg
	Acute Inhalation LC50 Rat: 12000 mg/l 4.00 Hours
	Acute Oral LD50 Rat: 4920 mg/kg

Sensitization	May cause sensitization by skin contact.
Acute effects	Harmful if inhaled or swallowed.
Local effects	Irritating to eyes, respiratory system and skin. May cause sensitization by skin contact. Vapors may cause drowsiness and dizziness.
Chronic effects	May cause central nervous system effects. Can cause liver damage. Can cause kidney damage.
Carcinogenicity	Suspected of causing cancer.

ACGIH Carcinogens

TRICHLOROETHYLENE (CAS 79-01-6)	A2 Suspected human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

TRICHLOROETHYLENE (CAS 79-01-6)	2A Probably carcinogenic to humans.

US NTP Report on Carcinogens: Anticipated carcinogen

TRICHLOROETHYLENE (CAS 79-01-6)	Anticipated carcinogen.

Skin corrosion/irritation	Causes skin irritation.
Epidemiology	No epidemiological data is available for this product.
Mutagenicity	Suspected of causing genetic defects.
Neurological effects	Central and/or peripheral nervous system damage.
Reproductive effects	Possible risk of impaired fertility. Possible risk of harm to the unborn child.
Teratogenicity	Components in this product have been shown to cause birth defects and reproductive disorders in laboratory animals.
Symptoms and target organs	Irritant effects. Drowsiness and dizziness. Sensitization. Cough. Decrease in motor functions. Behavioral changes. Birth defects. Renal injury.
Further information	Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data

Product	Test Results
TRICHLOROETHYLENE (79-01-6)	EC50 Water flea (Daphnia magna): 76 mg/l 24.00 hours LC50 Flagfish (Jordanella floridae): 3.1 mg/l 96.00 hours

Ecotoxicity Toxic to aquatic life with long lasting effects.

Persistence and degradability Not readily degradable.

Partition coefficient (n-octanol/water) 2.61

13. Disposal Considerations

Waste codes

US RCRA Hazardous Waste U List: Reference

TRICHLOROETHYLENE (CAS 79-01-6) U228

Disposal instructions Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. All wastes must be handled in accordance with local, state and federal regulations.

Contaminated packaging Since emptied containers retain product residue, follow label warnings even after container is emptied. Offer rinsed packaging material to local recycling facilities.

14. Transport Information

DOT

Basic shipping requirements:

UN number UN1710
Proper shipping name Trichloroethylene
Hazard class 6.1
Packing group III
Additional information:
Special provisions IB3, N36, T4, TP1
Basic shipping requirements:
Labels required 6.1
Additional information:
Packaging exceptions 153
Packaging non bulk 203
Packaging bulk 241
Reportable quantity 100
ERG number 160

IATA

Basic shipping requirements:

UN number 1710
Proper shipping name Trichloroethylene
Hazard class 6.1
Packing group III
Additional information:
ERG code 6A

IMDG

Basic shipping requirements:

UN number 1710
Proper shipping name TRICHLOROETHYLENE
Hazard class 6.1

Packing group III

DOT

IATA

IMDG

15. Regulatory Information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

TRICHLOROETHYLENE (CAS 79-01-6) 0.1 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

TRICHLOROETHYLENE (CAS 79-01-6) Listed.

CERCLA (Superfund) reportable quantity

TRICHLOROETHYLENE: 100.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

Section 311 hazardous chemical Yes

Clean Air Act (CAA) HAPS list

Clean Water Act (CWA) Hazardous substance
Priority pollutant
Toxic pollutant

Safe Drinking Water Act (SDWA) 0 mg/l
0.005 mg/l

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

TRICHLOROETHYLENE (CAS 79-01-6) Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

TRICHLOROETHYLENE (CAS 79-01-6) Listed: April 1, 1988 Carcinogenic.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

TRICHLOROETHYLENE (CAS 79-01-6) 500 LBS

US - Pennsylvania RTK - Hazardous Substances: Listed substance

TRICHLOROETHYLENE (CAS 79-01-6) Listed.

Saf-T-Data

Health: 2 - Moderate (Poison)
Flammability: 1 - Slight
Reactivity: 1 - Slight
Contact: 3 - Severe (Life)
Lab Protective Equip: D - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES
Storage Color Code: B - Blue (Health)

16. Labeling Info

Label Hazard Warning DANGER

Harmful if inhaled or swallowed. Irritating to eyes, respiratory system and skin. May cause sensitization by skin contact. Vapors may cause drowsiness and dizziness. Suspect cancer hazard - may cause cancer. Suspected of causing genetic defects. May cause reproductive effects. Prolonged exposure may cause chronic effects.

Label Precautions Avoid contact with eyes, skin, and clothing. Do not breathe mist or vapor. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed.

Label First Aid Immediately flush eyes with plenty of water for at least 15 minutes. Immediately flush skin with plenty of water. If gas/fume/vapor/dust/mist from the material is inhaled, remove the affected person immediately to fresh air. Get medical attention immediately. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance.

17. Other Information

NFPA ratings

Health: 2
Flammability: 1
Instability: 0

Disclaimer

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