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School Materials Safety Manual:

No. 323 Trichloroacetic Acid Issued 10/92

◆ SECTION 1 INTRODUCTION

Material Trichloroacetic Acid, ca 100%

Synonyms Aceto-Caustic, Amchem Grass Killer, TCA, trichloroethanoic acid

Chemical Formula CCl_3COOH

CAS Number 76-03-9

DOT Classification Corrosive, UN1839, UN2564 (solution), Listed as a Hazardous Material for Transportation (49 CFR 172.101)

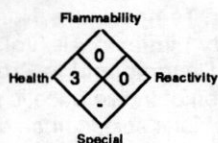
EPA Classification Listed as a RCRA Hazardous Waste (40 CFR 261.22, Characteristic of Corrosivity), and a CERCLA Hazardous Substance (40 CFR 302.4), and not listed as a SARA Extremely Hazardous Substance (40 CFR 355), or a SARA Toxic Chemical (40 CFR 372.65)

OSHA Classification Listed as an Air Contaminant (29 CFR 1910.1000, Table Z-1-A)

NFPA Hazard Rating Not found

Genium Hazard Rating

4 = Extreme
3 = High
2 = Moderate
1 = Slight
0 = Minimum



HMIS

H 3
F 0
R 0

Description White granules or pellets; colorless crystals or solution with a sharp pungent (vinegar-like) odor. Manufactured by chlorination of acetic acid. Used in medicine and pharmacy; in herbicides; as a biological lab reagent for detecting albumin and fixing tissue; and in organic synthesis. Trichloroacetic acid may also be found as a by-product in chlorinated water containing natural organic material.

Overview Trichloroacetic acid is **corrosive** to the skin, eyes, and mucous membranes. It is capable of causing chemical burns and injury. **Do not use this material in schools if alternatives can be found to meet the necessary educational objectives.** If its inclusion in a project is deemed necessary, keep amounts being used to a minimum and use with great caution. This material should not be handled by students. Protect against vapor or dust inhalation and skin and eye contact.

Manufacturer Always request an up-to-date MSDS from your chemical supplier. That sheet should include the manufacturer and their emergency phone numbers. This *Manual's* Resources/Manufacturers Index lists some larger manufacturers and available emergency phone numbers.

◆ SECTION 2 USE AND STORAGE DATA

Preliminary Planning Considerations *Plan and provide for safe disposal of all school-generated chemical waste.* Check applicable regulations prior to use. Whenever possible, substitute less hazardous materials. Investigate the feasibility of microscale chemistry experiments to reduce the quantity required and disposal concerns. Purchase smallest size container for planned use as trichloroacetic acid has a poor shelf life. Review Sections 3, 4, and 5 to prepare for an accident or emergency. Dispense and use trichloroacetic acid in a fume hood to avoid exceeding the TLV (Sec. 4). Contact lens use when handling chemical materials is

controversial. In some cases, soft lenses can actually protect eyes from chemicals. In other cases, chemical entrapment is presumed a possible hazard. Particles adhering to contact lens surfaces can cause corneal damage. Wear safety glasses or goggles and appropriate protective clothing (e.g., gloves, lab coats) to work with trichloroacetic acid. Employees and students should know the location of eyewash and shower facilities near chemical use areas. Check and document that eyewash stations and safety showers are working properly.

Usage Precautions and Procedure Before using, *read this material's container label* and follow all precautions. Do not smoke in usage or storage areas. Practice good housekeeping to avoid unintentionally mixing incompatibles. Do not allow chemical residue or dust buildup in lab or work areas. Keep trichloroacetic acid away from notebooks, textbooks, and personal belongings to avoid transporting chemical residues from the lab/work area. After working with chemical materials, and before eating, drinking, or smoking, always wash hands and face. Remove and launder contaminated clothing before reusing.

Additional Data Trichloroacetic acid has a poor shelf life because it is very deliquescent (moisture-absorbing). Keep storage containers tightly closed. It does not polymerize. Its incompatibilities include copper, dimethyl sulfoxide, bases, strong reducing agents, and alkali metals such as sodium, potassium, and calcium. Avoid prolonged contact with water or contact with acids or alkalis because trichloroacetic acid may break down to toxic and corrosive chloroform, hydrochloric acid and carbon monoxide gases.

Preferred Storage Location and Methods Store in tightly closed and properly labeled containers in a cool, well-ventilated area out of direct sunlight and away from incompatibles. To separate incompatible chemicals, store by chemical family, not by alphabetical name. Protect all chemical containers from physical damage. Prohibit smoking in chemical storage areas.

◆ SECTION 3 SPILL/DISPOSAL PROCEDURES

If Spilled Ventilate spill area and evacuate students. Promptly and thoroughly clean up spilled material. Cleanup personnel should protect against inhalation and skin or eye contact. For liquid (solution) spills, cover with an inert solid absorbent (vermiculite, dry sand, etc.) and scoop into appropriate containers (with secure lid) for disposal in accordance with existing regulations. As needed, dike spill area with inert absorbent material to contain spill. Neutralize trichloroacetic acid solutions with sodium carbonate (Na_2CO_3) or sodium hydroxide (NaOH) solution, checking the pH with pH paper. For dry spills, carefully collect spilled material and scoop into secure disposal or reclamation containers. Avoid creating airborne dust conditions. Vacuum (with appropriate filter) or wet mop to minimize dust dispersion.

Disposal of Small Quantities *Handle emptied containers carefully since residues may remain.* Always check regulations before disposal. Investigate recycling or reclamation rather than landfill disposal. If these methods are not

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practical, feasible, or in accord with existing regulations, contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

Disposal of Larger Amounts Contact your supplier or a licensed disposal company.

Follow all applicable local, state, and Federal regulations for all waste disposal.

◆ SECTION 4 HEALTH HAZARDS

Trichloroacetic acid is a very strong skin and tissue irritant and is toxic by inhalation and ingestion. Contact with skin or eyes can result in chemical burns and injury. Burns on the eye may result in blindness. Chronic inhalation of dust or vapor can cause throat and lung irritation with persistent cough and gastrointestinal tract disturbances. Ingestion may cause severe gastrointestinal (GI) disease.

1991 OSHA PEL 8-hr TWA: 1 ppm, 7 mg/m³

1992-93 ACGIH TLV 8-hr TWA: 1ppm, 6.7 mg/m³

1990 NIOSH REL 10-hr TWA: 1 ppm, 7 mg/m³

1985-6 Toxicity Data Rabbit, skin: 200 µg produced mild irritation. Rabbit, eye: 3500 µg/5 sec produced severe irritation. Rat, oral: 3300 mg/kg administered to a female from the 6-15 day of pregnancy produced effects on the embryo or fetus.

Carcinogenicity Not listed by the IARC, NTP, or OSHA

Acute Effects Skin contact causes redness, blistering and chemical burns and severe pain. Eye contact causes immediate pain, irritation, conjunctivitis, and necrosis (localized tissue death) of the cornea of the eyes. In severe cases, eye contact may also lead to blindness. Dust or vapor inhalation causes coughing, choking, nose and throat irritation, dizziness, and general weakness followed (after 6-8 hr latent period) by pulmonary edema (fluid in lung), chest tightness, and air hunger. Although ingestion is unlikely, effects include burning pain in mouth, pharynx, and abdomen followed by spontaneous vomiting, bloody diarrhea, and GI tract ulceration.

Chronic Effects Chronic inhalation of dust or vapor can cause tooth erosion followed by jaw necrosis, and bronchial irritation with chronic cough and frequent attacks of bronchial pneumonia. Gastrointestinal disturbances including vomiting, diarrhea, and lassitude are also noted.

◆ SECTION 5 FIRST AID PROCEDURES

Eye Contact Promptly flush eyes with plenty of running water for at least 15 min, including under eyelids. Get prompt medical attention, preferably an ophthalmologist.

Skin Contact After flushing with large amounts of water, wash exposed areas with soap and water. Irrigate severely affected areas with a solution of sodium bicarbonate (baking soda) and water. For reddened or blistered skin, get prompt medical attention.

Inhalation Remove victim from exposure to fresh air and support breathing with 100% humidified oxygen if necessary.

Ingestion Contact a poison control center*. Never give anything by mouth to an unconscious or convulsing person. Unless otherwise advised by the poison control center, irrigate the patient's mouth with copious amounts of water and then have the conscious and alert patient drink one or

two glasses of water. Follow by ingestion of demulcents (milk or cornstarch and water). **Do not induce vomiting!** Get prompt medical attention.

Get proper in-school, paramedic, or community medical attention and support.

* See listings on pages 2-8 of *Resources/Manufacturers Index*.

◆ SECTION 6 FIRE PROCEDURES AND DATA

Fire Hazards For major fires, firefighters should wear appropriate protective clothing and respirators. Because fire may produce toxic thermal decomposition products, a self-contained breathing apparatus (SCBA) is recommended. Structural firefighter's protective clothing is **not** effective for trichloroacetic acid. If feasible and without undue risk, move containers from fire-exposed area. Otherwise, use water spray to cool fire-exposed containers and reduce vapors.

Flash Point and Method Nonflammable

Autoignition Temperature None reported

Flammability Limits in Air (vol. %) None reported

Hazardous Decomposition Products Thermal oxidative decomposition of trichloroacetic acid can produce chloroform, hydrochloric acid, carbon dioxide, and carbon monoxide.

Extinguishing Media For small fires, use dry chemical, carbon dioxide, water spray or regular foam. For large fires, use water spray, fog or regular foam.

◆ SECTION 7 PHYSICAL DATA

Boiling Point Range 385-387 °F (196-197 °C)

Melting Point Range 135-136 °F (57-58 °C)

Vapor Pressure 1 mm Hg at 124 °F (51 °C)

Solubility in Water Soluble in 0.1 part water

Other Solubilities Alcohol, ether

pH of 0.1 Molar Aqueous Solution 1.2

Molecular Weight 163.40

Specific Gravity (H₂O = 1 at 4 °C) 1.62 at 77 °F (25 °C)

References 89, 100, 101, 124, 126, 132, 136, 140, 149, 153, 163, 164, 167, 174, 180, 530; Genium's *Material Safety Data Sheets Collection*, No. 524 (4/89)

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