Material Safety Data Sheet
1,4-Diazabicyclo[2.2.2]octane, 97%

ACC# 42775

Section 1 - Chemical Product and Company Identification

MSDS Name: 1,4-Diazabicyclo[2.2.2]octane, 97%
Catalog Numbers: AC112470000, AC112471000, AC112475000, NC9194209
Synonyms: DABCO; TEDA; Triethylenediamine.
Company Identification:
Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410
For information, call: 201-796-7100
Emergency Number: 201-796-7100
For CHEMTREC assistance, call: 800-424-9300
For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
280-57-9	1,4-Diazabicyclo[2.2.2]octane	97	205-999-9

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: white crystalline powder. Flash Point: 62 deg C.
Danger! Flammable solid. Causes severe eye irritation and possible eye injury. Causes skin and respiratory tract irritation. May be harmful if swallowed, inhaled, or absorbed through the skin. Hygroscopic (absorbs moisture from the air). Sublimes (goes directly from solid to vapor form) readily at room temperature.
Target Organs: Central nervous system, respiratory system, eyes, skin.

Potential Health Effects
Eye: Contact with eyes may cause severe irritation, and possible eye burns. Vapors cause eye irritation. A single exposure to TEDA vapor can cause slight swelling of the front part of the eye (cornea). This may result in a "halo" vision effect beginning up to several hours after exposure. Symptoms include hazy, foggy and sometimes blurry vision, and seeing blue halos around lights. Recovery usually occurs within a day. It is not certain what levels of TEDA vapor cause this effect. corneal injury occurred when 0.5 ml of a solution of 5% TEDA in water was applied to rabbit eyes. A 15% solution caused moderate injury, and a 25% solution burned the eyes.
Skin: Causes skin irritation. May be harmful if absorbed through the skin. Definite skin reddening and some death of skin tissue were seen 24 hours after a solution of 25% TEDA in water was applied to rabbit skin. When a solution of 10% TEDA in water was applied to the skin of 5 mice for 2 weeks, 2 of the mice died from bleeding in the prostate gland. Two other mice also had bleeding of the prostate gland but did not die. There was no sign of skin damage .
Ingestion: May cause severe gastrointestinal tract irritation with nausea, vomiting and possible burns. The toxicological properties of this substance have not been fully investigated. May be harmful if swallowed.
Inhalation: Inhalation of vapor may cause respiratory tract irritation. Inhalation of dust may cause respiratory tract irritation. Acute inhalation toxicity was evaluated in guinea pigs exposed to triethylenediamine at a measured concentration of 8.9 ppm for a period of 1 hour. Clinical observations included slight dyspnea and somewhat elevated airway resistance. (Olin Corp.)
Chronic: No information found.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).
Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.
Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion. Flammable solid.
Extinguishing Media: Use water spray, dry chemical, or carbon dioxide.
Flash Point: 62 deg C (143.60 deg F)

Autoignition Temperature: Not available.
Explosion Limits, Lower: Not available.
Upper: Not available.
NFPA Rating: (estimated) Health: 3; Flammability: 2; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal container. Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Remove all sources of ignition. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid breathing dust. Do not get in eyes. Avoid contact with skin and clothing.
Storage: Keep away from sources of ignition. Store in a tightly closed container. Refrigerator/flammables. Isolate from oxidizing materials and acids.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local explosion-proof ventilation to keep airborne levels to acceptable levels.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1,4-Diazabicyclo[2.2.2]octane	none listed	none listed	none listed

OSHA Vacated PELs: 1,4-Diazabicyclo[2.2.2]octane: No OSHA Vacated PELs are listed for this chemical.
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Crystalline powder
Appearance: white
Odor: ammonia-like
pH: 10.8 (10g/l aq soln)
Vapor Pressure: 0.742 mm Hg @ 25 deg C
Vapor Density: 3.86 (air=1)
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 174 deg C @ 760 mm Hg
Freezing/Melting Point:155 - 160 deg C
Decomposition Temperature:> 130 deg C
Solubility: 46 g/100ml (26°C)
Specific Gravity/Density:1.1400 g/cm3
Molecular Formula:C6H12N2
Molecular Weight:112.17

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, dust generation, moisture, excess heat.
Incompatibilities with Other Materials: Strong oxidizing agents, strong acids.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 280-57-9: HM0354200

LD50/LC50:
CAS# 280-57-9:
Draize test, rabbit, eye: 25 mg Moderate;
Oral, rabbit: LD50 = 1100 mg/kg;
Oral, rat: LD50 = 1700 mg/kg;
.

Carcinogenicity:
CAS# 280-57-9: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.
Teratogenicity: No data available.
Reproductive Effects: No data available.
Mutagenicity: No data available.
Neurotoxicity: TEDA may cause neurological effects as indicated by transient experimental effects on blood pressure in dogs.
Other Studies:

Section 12 - Ecological Information

No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	FLAMMABLE SOLIDS, ORGANIC, N.O.S.	Flammable Solid, Organic, N.O.S. (1,4 DIAZABICYCLO(2.2.2)
Hazard Class:	4.1	4.1
UN Number:	UN1325	UN1325
Packing Group:	III	III
Additional Info:		OCTANE)

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 280-57-9 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 280-57-9: immediate, fire.
Section 313 No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 280-57-9 can be found on the following state right to know lists: New Jersey.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN F

Risk Phrases:

R 11 Highly flammable.
R 22 Harmful if swallowed.
R 37/38 Irritating to respiratory system and skin.
R 41 Risk of serious damage to eyes.
R 52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 3 Keep in a cool place.
S 37/39 Wear suitable gloves and eye/face protection.

WGK (Water Danger/Protection)

CAS# 280-57-9: 2

Canada - DSL/NDSL

CAS# 280-57-9 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B4, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 280-57-9 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 8/18/1998
Revision #6 Date: 2/23/2004