

PENTAETHYLENEHEXAMINE

PEN

CAUTIONARY RESPONSE INFORMATION

Common Synonyms Levepox hardener T3 3,6,9,12-Tetraazatetradecane- 1,14-diamine		Liquid	Yellowish	Ammonia-like odor
<p style="color: red;">Wear chemical protective gloves, goggles and approved respirator. Notify local health and pollution control agencies. Protect water intakes.</p>				
Fire	Combustible. Containers could rupture when overheated. Wear full protective clothing with self-contained breathing apparatus. Extinguish fire with alcohol foam, sand, dry chemical, or CO ₂ . Use water spray to cool exposed containers.			
Exposure	CALL FOR MEDICAL AID. VAPOR Move victim to fresh air. If breathing is difficult, give oxygen. LIQUID Remove contaminated clothing and shoes. Wash affected areas with soap and water. IF IN EYES: hold eyelids open and flush with plenty of water. IF SWALLOWED and victim is CONSCIOUS, administer large quantities of water.			
Water Pollution	Effect of low concentrations on aquatic life is unknown. May be dangerous if it enters water intakes. Notify local health and wildlife officials. Notify operators of nearby water intakes.			

1. CORRECTIVE RESPONSE ACTIONS

Stop discharge
Dilute and disperse
Do not burn

2. CHEMICAL DESIGNATIONS

2.1 **CG Compatibility Group:** Not listed.
 2.2 **Formula:** H₂(CH₂CH₂NH)₅CH₂CH₂NH₂
 2.3 **IMO/UN Designation:** Currently not available
 2.4 **DOT ID No.:** 2735
 2.5 **CAS Registry No.:** 4067-16-7
 2.6 **NAERG Guide No.:** 153
 2.7 **Standard Industrial Trade Classification:** 51452

3. HEALTH HAZARDS

- 3.1 **Personal Protective Equipment:** Wear chemical protective gloves. Wear full face shield or chemical safety goggles. Use approved respirator to protect against vapors.
- 3.2 **Symptoms Following Exposure:** Contact with eyes can cause slight to moderate irritation and possible burns. May cause transient fogging of the eyes as a result of corneal edema, which is reversible. May cause moderate skin irritation or allergic skin reaction with symptoms of redness, itching, swelling, or rash. Vapors may irritate the eyes, nose, throat, and respiratory tract. May cause coughing, headache, nausea and vomiting. If swallowed, may cause nausea, vomiting and abdominal pain. May cause burns of the mouth, throat, esophagus, and stomach.
- 3.3 **Treatment of Exposure:** Get medical attention. **INHALATION:** Remove to fresh air. If breathing is difficult, give oxygen. **EYES:** Flush with water for at least 15 min., lifting lids occasionally. **SKIN:** Remove contaminated clothing and shoes. Wash with soap and water. **INGESTION:** Have the victim drink large quantity of water.
- 3.4 **TLV-TWA:** Not listed.
 3.5 **TLV-STEL:** Not listed.
 3.6 **TLV-Ceiling:** Not listed.
 3.7 **Toxicity by Ingestion:** Grade 2; oral rat LD₅₀ = 4.13 g/kg
 3.8 **Toxicity by Inhalation:** Currently not available.
 3.9 **Chronic Toxicity:** Currently not available
 3.10 **Vapor (Gas) Irritant Characteristics:** Vapors cause moderate irritation such that personnel will find high concentrations unpleasant. The effect is temporary.
 3.11 **Liquid or Solid Characteristics:** Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of skin.
 3.12 **Odor Threshold:** Currently not available
 3.13 **IDLH Value:** Not listed.
 3.14 **OSHA PEL-TWA:** Not listed.
 3.15 **OSHA PEL-STEL:** Not listed.
 3.16 **OSHA PEL-Ceiling:** Not listed.
 3.17 **EPA AEGL:** Not listed

4. FIRE HAZARDS

- 4.1 **Flash Point:** 347-405°F C.C.
- 4.2 **Flammable Limits in Air:** Currently not available
- 4.3 **Fire Extinguishing Agents:** Alcohol foam, sand, dry chemical, or CO₂.
- 4.4 **Fire Extinguishing Agents Not to Be Used:** Do not use water.
- 4.5 **Special Hazards of Combustion Products:** Irritating vapors and toxic gases, such as amine vapors, nitrogen oxides, and carbon monoxide, may be formed when involved in fire.
- 4.6 **Behavior in Fire:** Containers may rupture when overheated.
- 4.7 **Auto Ignition Temperature:** 680°F.
- 4.8 **Electrical Hazards:** Not listed.
- 4.9 **Burning Rate:** Currently not available
- 4.10 **Adiabatic Flame Temperature:** Currently not available
- 4.11 **Stoichiometric Air to Fuel Ratio:** 95.2 (calc.)
- 4.12 **Flame Temperature:** Currently not available
- 4.13 **Combustion Molar Ratio (Reactant to Product):** 30.0 (calc.)
- 4.14 **Minimum Oxygen Concentration for Combustion (MOCC):** Not listed

5. CHEMICAL REACTIVITY

- 5.1 **Reactivity with Water:** No reaction.
- 5.2 **Reactivity with Common Materials:** Incompatible with oxidizing materials, isocyanates, and acids.
- 5.3 **Stability During Transport:** Stable.
- 5.4 **Neutralizing Agents for Acids and Caustics:** Not pertinent.
- 5.5 **Polymerization:** Will not polymerize.
- 5.6 **Inhibitor of Polymerization:** Not pertinent.

6. WATER POLLUTION

- 6.1 **Aquatic Toxicity:** Currently not available
- 6.2 **Waterfowl Toxicity:** Currently not available
- 6.3 **Biological Oxygen Demand (BOD):** Currently not available
- 6.4 **Food Chain Concentration Potential:** Currently not available
- 6.5 **GESAMP Hazard Profile:**
 Bioaccumulation: 0
 Damage to living resources: (1)
 Human Oral hazard: 1
 Human Contact hazard: II
 Reduction of amenities: XX

7. SHIPPING INFORMATION

- 7.1 **Grades of Purity:** Technical grades.
 7.2 **Storage Temperature:** Ambient.
 7.3 **Inert Atmosphere:** No requirement.
 7.4 **Venting:** Not listed.
 7.5 **IMO Pollution Category:** D
 7.6 **Ship Type:** Data not available
 7.7 **Barge Hull Type:** Currently not available

8. HAZARD CLASSIFICATIONS

- 8.1 **49 CFR Category:** Corrosive material
 8.2 **49 CFR Class:** 8
 8.3 **49 CFR Package Group:** Currently not available.
 8.4 **Marine Pollutant:** No
 8.5 **NFPA Hazard Classification:** Not listed
 8.6 **EPA Reportable Quantity:** Not listed.
 8.7 **EPA Pollution Category:** Not listed.
 8.8 **RCRA Waste Number:** Not listed
 8.9 **EPA FWPCA List:** Not listed

9. PHYSICAL & CHEMICAL PROPERTIES

- 9.1 **Physical State at 15° C and 1 atm:** Liquid
 9.2 **Molecular Weight:** 232.38
 9.3 **Boiling Point at 1 atm:** 662 - 734°F = 350 - 390°C = 623 - 663°K
 9.4 **Freezing Point:** Currently not available
 9.5 **Critical Temperature:** Currently not available
 9.6 **Critical Pressure:** Currently not available
 9.7 **Specific Gravity:** 1.0 @ 20°C.
 9.8 **Liquid Surface Tension:** Currently not available
 9.9 **Liquid Water Interfacial Tension:** Currently not available
 9.10 **Vapor (Gas) Specific Gravity:** Currently not available
 9.11 **Ratio of Specific Heats of Vapor (Gas):** Currently not available
 9.12 **Latent Heat of Vaporization:** Currently not available
 9.13 **Heat of Combustion:** Currently not available
 9.14 **Heat of Decomposition:** Currently not available
 9.15 **Heat of Solution:** Currently not available
 9.16 **Heat of Polymerization:** Not pertinent.
 9.17 **Heat of Fusion:** Currently not available
 9.18 **Limiting Value:** Currently not available
 9.19 **Reid Vapor Pressure:** Currently not available

NOTES

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9.20 SATURATED LIQUID DENSITY		9.21 LIQUID HEAT CAPACITY		9.22 LIQUID THERMAL CONDUCTIVITY		9.23 LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit inch per hour-square foot-F	Temperature (degrees F)	Centipoise
68	8.350		C U R R E N T L Y N O T A V A I L A B L E		C U R R E N T L Y N O T A V A I L A B L E		C U R R E N T L Y N O T A V A I L A B L E

9.24 SOLUBILITY IN WATER		9.25 SATURATED VAPOR PRESSURE		9.26 SATURATED VAPOR DENSITY		9.27 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	M I S C I B L E		C U R R E N T L Y N O T A V A I L A B L E		C U R R E N T L Y N O T A V A I L A B L E		C U R R E N T L Y N O T A V A I L A B L E