1. Product and Company Identification

Material name: ETHYLENEDIAMINE

Version #: 01

Revision date: 05-19-2011

CAS #: 107-15-3

Product Codes: J.T.Baker: 9299

Macron: 1844

Synonym(s): 1,2-Ethanediamine; 1,2-diaminoethane

Manufacturer: Avantor Performance Materials, Inc.

Address: 222 Red School Lane

Phillipsburg, NJ 08865

US

Customer Service: 800-582-2537

24 Hour Emergency: 908-859-2151

Chemtrec: 800-424-9300

2. Hazards Identification

Emergency overview: DANGER

Flammable liquid and vapor. May be ignited by heat, sparks or flames.

Corrosive. Causes severe skin and eye burns. Causes digestive tract burns. Harmful if absorbed through skin or swallowed. May cause allergic respiratory and skin reactions. Mist or vapor extremely irritating to eyes and respiratory tract. 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: Corrosive. Causes severe eye burns. Vapor or spray may cause eye damage, impaired sight or blindness.

Skin: Harmful if absorbed through skin. Corrosive. Causes severe skin burns. May cause sensitization by skin contact.

Inhalation: Corrosive. May cause damage to mucous membranes in nose, throat, lungs and bronchial system.

Ingestion: Harmful if swallowed. Corrosive. Ingestion may produce burns to the lips, oral cavity, upper airway, esophagus and possibly the digestive tract.


Chronic effects: Corrosive. Prolonged contact causes serious tissue damage. Can cause delayed lung injury. May cause damage to the liver and kidneys.

Potential environmental effects: Harmful to aquatic organisms.

3. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS #</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHYLENEDIAMINE</td>
<td>107-15-3</td>
<td>98 - 100</td>
</tr>
</tbody>
</table>
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. Call a physician or poison control center immediately. In case of irritation from airborne exposure, move to fresh air. Get medical attention immediately.
- **Skin contact**: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician or poison control center immediately. 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. Call a physician or poison control center 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
- Keep victim under observation. Treat symptomatically.

General advice
- In the case of accident or if you feel unwell, seek medical advice immediately (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**: HIGHLY FLAMMABLE! Vapors may cause a flash fire or ignite explosively. Vapors may travel considerable distance to a source of ignition and flash back. Heat may cause the containers to explode.

- **Extinguishing media**
  - Unsuitable extinguishing media: Do not use water jet as an extinguisher, as this will spread the fire.

- **Protection of firefighters**
  - Specific hazards arising from the chemical: Can be ignited easily and burns vigorously. Vapor from the solvent may accumulate in container headspace resulting in flammability hazard.
  - Protective equipment and precautions for firefighters: Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Move containers from fire area if you can do so without risk. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out. Some of these materials, if spilled, may evaporate leaving a flammable residue. Cool containers exposed to flames with water until well after the fire is out.

- **Special protective equipment for fire-fighters**: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

- **Specific methods**: In the event of fire and/or explosion do not breathe fumes. Use water spray to cool unopened containers.

- **Hazardous combustion products**: Carbon monoxide and carbon dioxide. Nitrogen Oxides (NOx).

6. Accidental Release Measures

- **Personal precautions**: Wear appropriate protective equipment and clothing during clean-up. Keep unnecessary personnel away. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering them. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Local authorities should be advised if significant spillages cannot be contained.

- **Environmental precautions**: Prevent further leakage or spillage if safe to do so. Do not contaminate water. Avoid discharge into drains, water courses or onto the ground.

- **Methods for containment**: ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Dike the spilled material, where this is possible.
Methods for cleaning up

Use only non-sparking tools. All equipment used when handling the product must be grounded.

Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Dike far ahead of spill for later disposal.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Collect in a non-combustible container for prompt disposal.

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

DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. Wear appropriate personal protective equipment. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Wash thoroughly after handling. Do not eat, drink or smoke when using the product. See Section 8 of the MSDS for Personal Protective Equipment.

Storage

Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children. Do not store in metal containers. Ground container and transfer equipment to eliminate static electric sparks. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids. Keep tightly closed in a dry, cool and well-ventilated place.

8. Exposure Controls / Personal Protection

Occupational exposure limits

<table>
<thead>
<tr>
<th>Material</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHYLENEDIAMINE (107-15-3)</td>
<td>TWA</td>
<td>10.0000 ppm</td>
</tr>
<tr>
<td>ETHYLENEDIAMINE (107-15-3)</td>
<td>PEL</td>
<td>10.0000 ppm</td>
</tr>
<tr>
<td>ETHYLENEDIAMINE (107-15-3)</td>
<td></td>
<td>25.0000 mg/m3</td>
</tr>
</tbody>
</table>

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. Explosion proof exhaust ventilation should be used.

Personal protective equipment

Eye / face protection

Chemical goggles and face shield are recommended.

Skin protection

Wear appropriate chemical resistant clothing. Wear appropriate chemical resistant gloves.

Respiratory protection

If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Chemical respirator with specific cartridge and full facepiece providing protection against the compound of concern.

General hygiene 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.

9. Physical & Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Clear</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Amine-like</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
</tbody>
</table>
Physical state: Liquid.
Form: Liquid.
pH: 11.9 (25% Solution)
Melting point: 48.2 °F (8.5 °C)
Freezing point: 48.2 °F (8.5 °C)
Boiling point: 240.8 - 242.6 °F (116 - 117 °C)
Flash point: 110 °F (43.3 °C) Closed Cup
Flammability limits in air, upper, % by volume: 12 %
Flammability limits in air, lower, % by volume: 2.5 %
Vapor pressure: 1.61317 kPa at 25°C
Vapor density: 2.07
Specific gravity: 0.898
Relative density: Not available.
Solubility (water): Miscible
Partition coefficient (n-octanol/water): -2.04 at pH 13
Auto-ignition temperature: 725 °F (385 °C)
Molecular weight: 60.1 g/mol
Molecular formula: C2-H8-N2

10. Chemical Stability & Reactivity Information

Chemical stability: Stable under normal temperature conditions.
Conditions to avoid: Heat, flames and sparks.
Hazardous decomposition products: Carbon monoxide. Carbon Dioxide. Nitrogen oxides (NOx).
Possibility of hazardous reactions: Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

<table>
<thead>
<tr>
<th>Product</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETHYLENEDIAMINE (107-15-3)</td>
<td>Acute Dermal LD50 Rabbit: 730 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Acute Oral LD50 Rat: 500 mg/kg</td>
</tr>
</tbody>
</table>

Sensitization: May cause sensitization by inhalation and skin contact.

US ACGIH Threshold Limit Values: Skin designation

| ETHYLENEDIAMINE (CAS 107-15-3) | Can be absorbed through the skin. |

Acute effects: Harmful if absorbed through skin or swallowed.
Local effects: Causes severe burns. Mist or vapor extremely irritating to eyes and respiratory tract.
Chronic effects: Corrosive. Prolonged contact causes serious tissue damage. Prolonged exposure may cause chronic effects. Can cause delayed lung injury. May cause damage to the liver and kidneys.
Carcinogenicity: This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens


Skin corrosion/irritation: Causes skin burns.
Epidemiology: No epidemiological data is available for this product.
Mutagenicity
No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Reproductive effects
Contains no ingredient listed as toxic to reproduction

Teratogenicity
No data available to indicate product or any components present at greater than 0.1% may cause birth defects.

Symptoms and target organs

Further information
Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data
Product Test Results
ETHYLENEDIAMINE (107-15-3) LC50 Fathead minnow (Pimephales promelas): 98.6 mg/l 96.00 hours
LC50 Water flea (Daphnia magna): 20.4 mg/l 48.00 hours

Ecotoxicity
Harmful to aquatic life.

Environmental effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability
Expected to be readily biodegradable.

Partition coefficient (n-octanol/water)
-2.04 at pH 13

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 F
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 UN1604
Proper shipping name Ethylenediamine
Hazard class 8
Subsidiary hazard class 3
Packing group II
Additional information:
Special provisions IB2, T7, TP2
Basic shipping requirements:
Labels required 8, 3
Additional information:
Packaging exceptions 154
Packaging non bulk 202
Packaging bulk 243
Reportable quantity 5000
ERG number 132

IATA
Basic shipping requirements:
UN number 1604
Proper shipping name Ethylenediamine
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 302 - Extremely Hazardous Spill: Reportable quantity
ETHYLENEDIAMINE (CAS 107-15-3) 5000 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity
ETHYLENEDIAMINE (CAS 107-15-3) 10000 LBS

CERCLA (Superfund) reportable quantity
ETHYLENEDIAMINE: 5000.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)
Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

Section 311 hazardous chemical
Yes

Clean Water Act (CWA)
Hazardous substance

Inventory status

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Domestic Substances List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada</td>
<td>Non-Domestic Substances List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>China</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European Inventory of Existing Commercial Chemical Substances (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Europe</td>
<td>European List of Notified Chemical Substances (ELINCS)</td>
<td>No</td>
</tr>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Country(s) or region  | Inventory name                                                                 | On inventory (yes/no)*
---------------------|-------------------------------------------------------------------------------|------------------
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
This product does not contain a chemical known to the State of California to cause cancer, birth defects or other reproductive harm.

US - New Jersey Community RTK (EHS Survey): Reportable threshold
ETHYLENEDIAMINE (CAS 107-15-3) 500 LBS

US - Pennsylvania RTK - Hazardous Substances: Listed substance
ETHYLENEDIAMINE (CAS 107-15-3) Listed.

Saf-T-Data
Health: 2 - Moderate (Poison)
Flammability: 2 - Moderate
Reactivity: 1 - Slight
Contact: 4 - Extreme (Corrosive)
Lab Protective Equip: DB - GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: R - Red (Flammable)

16. Labeling Info

Label Hazard Warning
DANGER
FLAMMABLE LIQUID AND VAPOR. May be ignited by heat, sparks or flames. Corrosive. Causes severe skin and eye burns. Causes digestive tract burns. Harmful if absorbed through skin or swallowed. May cause allergic respiratory and skin reactions. Mist or vapor extremely irritating to eyes and respiratory tract. Prolonged exposure may cause chronic effects.

Label Precautions
Keep away from heat, sparks and flame. Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling. Keep container tightly closed in a cool, well-ventilated place.

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: 3
Flammability: 2
Instability: 0
Disclaimer

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