Material Safety Data Sheet

1. Substance and Company Identification

Identification of the Product: **N-28 Reducer Solution**
Used in electroless silver plating

CAS No.: N/A

Company Identification:
Peacock Laboratories, Inc., 1901 S. 54th Street, Phila., PA 19143

24 Hour Emergency Number: CHEMTREC (800)424-9300

2. Composition

<table>
<thead>
<tr>
<th>Substance</th>
<th>Percentage</th>
<th>CAS No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrazine Hydrate</td>
<td>5%-10%</td>
<td>302-01-2</td>
</tr>
<tr>
<td>Dihydrazine Sulfate</td>
<td>2%-5%</td>
<td>13464-80-7</td>
</tr>
<tr>
<td>Ammonium Hydroxide</td>
<td>0.5%-3%</td>
<td>1336-21-6</td>
</tr>
<tr>
<td>Water</td>
<td>92.5%-82%</td>
<td>7732-18-5</td>
</tr>
</tbody>
</table>

3. Hazards Identification

**Hazard Rating:** Health 3, Flammability 3, Reactivity 2
(Scale: 4 - Extreme, 3 - High, 2 - Moderate, 1 - Slight, 0 - Insignificant)

**TSCA Status:** Hydrazine Hydrate is on TSCA inventory.

4. First Aid Measures

**Ingestion:** Drink large amounts of water immediately. Induce vomiting by sticking finger down throat. Call physician. **Inhalation:** Remove to fresh air. Seek medical aid. **Skin:** Wash skin with plenty of soap water. Remove contaminated clothing. Wash clothing before re-use. Call physician. **Eye contact:** Immediately flush with water for 15 minutes. Call Physician.

5. Fire Fighting Procedures

Flash Point: 95-100 C  
Method Used: Closed Cup  
Flammable Limits in Air% by Volume: N/A  
Auto-Ignition Temperatures: N/A  
Extinguisher Media: Water, Dry chemical, or carbon dioxide.
Special Fire Fighting Procedures: Dilute with water. For fire supported by oxidants, use carbon dioxide or dry chemical.

Unusual Fire and Explosive Hazards: Vapors mixed with air may detonate near or above the flash point. Hydrazine vapor can be ignited by electric sparks or open flame. Use NIOSH/MSHA approved self-contained breathing apparatus where this material is involved in a fire, or near a heat source.

6. Accidental Release Measures

Collect wash water for approved disposal. Keep from entering water or ground water. Clean spills in a manner that does not disperse liquid into the air. Isolate area of spill by diking. Transfer contents to a non-leaking container or storage vessel. Neutralize spilled hydrazine by diluting with water to a 5% or less solution. Add an equal volume of 5% calcium hypochlorite aqueous solution. Test for neutralization. After neutralization, transfer material to appropriate DOT container for proper disposal. Keep from entering water or ground water. Flush area with water and drain into a catch basin.

Waste Disposal Methods: Consult federal, state, and local regulations

7. Handling & Storage

Store in dark, dry place. Keep closed in supplied container. Store away from incompatible materials (oxidizing agents). Store out of sunlight and away from heat source.

8. Exposure Controls/Personal Protection

Hydrazine Hydrate
- OSHA PEL: 0.4 mg/m³ 2 hours
- ACGIH TLV: .1 ppm (0.1 mg/m³)

Dihydrazine Sulfate
- OSHA PEL: 0.1 mg/m³ Skin - Value for hydrazine
- ACGIH TLV: 0.013 mg/m³ Skin - Value for hydrazine

Ammonium Hydroxide
- OSHA PEL: 50ppm
- ACGIH TLV: 25ppm

Respiratory Protection: Approved NOISH /MSHA respirator.
Ventilation: Local exhaust, to meet TLV requirements.
Protective Gloves: Rubber or Neoprene.
Eye Protection: Chemical safety splash goggles to prevent eye contact. Contact lenses should not be worn.
Other Protective Clothing or Equipment: Rubber apron or protective coveralls.
Work/Hygienic Practices: Wash after handling-have shower and eye bath available. Do not get on clothing.

9. Physical & Chemical Properties

Boiling Point: Between 100-120 C
Specific Gravity (water=1): 1.021 @25 C
Vapor Pressure (mm Hg): N/A
Vapor Density (Air=1): N/A
**Solubility in Water**: Complete  
**Reactivity in Water**: None  
**Appearance and Odor**: Clear Liquid-Ammonia odor.  
**Melting Point**: N/A

### 10. Stability & Reactivity

**Stability**: Stable  
**Incompatibility (Materials to Avoid)**: Oxidizing agents, bases, organic matter, oxidizing agents with Ar, Zn, Pb, Stainless steel with more than 0.5% Mo, rust and other metal oxides. Also hydrogen peroxide, nitric acid, strong acids and porous materials.  
**Hazardous Decomposition Products**: Nitrogen gas and Hydrogen gas.  
**Hazardous Polymerization**: Will not occur.

### 11. Toxicological Information

**RTECS Number**: MV8050000  
**Routes of Exposure**: Eye contact, Ingestion, Inhalation, and Skin contact.  
**Toxicity Data**: Oral-Rat LD50: 129 mg/kg, Oral-Mus LD50: 83 mg/kg, Ipr-Mus LD50: 156 mg/kg  
**Chronic Toxic Effects**: Carcinogen. May alter genetic material  
**Acute Toxic Effects**: May be fatal if inhaled, swallowed, or absorbed through skin. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes and skin. Inhalation may be fatal as a result of spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, and shortness of breath, headache, nausea and vomiting. May cause allergic reaction. Can cause CNS depression. May cause convulsions.  

**Human Effects of Overexposure**: Danger! Poison! May be fatal if inhaled, swallowed or absorbed through the skin. Causes burns. Readily absorbed through skin. Possible carcinogen. Material is irritating to mucous membranes and upper respiratory tract. Exposure can cause damage to the liver, kidneys, and lungs. Sensitizer.  

**Signs and symptoms of Exposure**: Dizziness, nausea, and mucous membrane irritation, chemical burns, central nervous system stimulation. All hydrazine have similar toxic local effects due to their irritant properties. The vapor is highly irritating to the eyes, upper respiratory tract and skin, and causes delayed eye irritation. Severe exposure may cause temporary blindness. The liquid is corrosive, producing penetrating burns and severe dermatitis. Permanent corneal lesions may occur if the liquid is splashed in the eyes. A sensitization dermatitis  

**Medical Conditions Generally Aggravated by Exposure**: N/A  

**Carcinogenicity**: Hydrazine is listed by NTP (sufficient evidence of carcinogenicity from studies in experimental animals), IARC (possibly carcinogenic to humans: limited evidence in humans in the absence of sufficient evidence in experimental animals,) and regulated as a carcinogen by NIOSH (carcinogen defined with no further categorization).

### 12. Ecological Information

**Environmental Fate**: No information found.
Environmental Toxicity: No information found.

Products of Biodegradation: Possibly hazardous short/long term degradation products are to be expected.

Toxicity of the Products of Biodegradation: The products of degradation are more toxic.

Special Remarks on the Products of Biodegradation: Not available.

13. Disposal Considerations

Soak up solution, place in plastic bag or bottle. Clean spills in a manner that does not disperse liquid into the air. Isolate area of spill by diking. Transfer contents to a non-leaking container or storage vessel. Neutralize spilled hydrazine by diluting with water to a 5% or less solution. Add an equal volume of 5% calcium hypochlorite aqueous solution. Test for neutralization. After neutralization, transfer material to appropriate DOT container for proper disposal. Keep from entering water or ground water. Flush area with water and drain into a catch basin.

14. Transport Information

Proper Shipping Name: Hydrazine Aqueous Solution with 37% or less hydrazine by weight
UN Number: 3293
Class: 6.1
P.G.: III
DOT Label: Poison

15. Other Information

Potential Exposure: Because of its strong reducing capabilities, hydrazine is used as an intermediate in chemical synthesis and in photography and metallurgy. It is also used in the preparation of anticorrosives, textile agents, pesticides, and as a scavenging agent for oxygen in boiler water. Hydrazine is widely used in pharmaceutical synthesis (A-41). It is also used as a rocket fuel. NIOSH has estimated annual worker exposure as follows: Hydrazine 9000, Hydrazine di-hydrazine 89000; Hydrazine Sulfate 2500; Hydrazine Hydro-bromine 1500; and Hydrazine Hydrate 1700.

Permissible Exposure Limits in Air: The federal standard is 1.0 ppm (1.3 mg/m³). NIOSH has recommended a standard in terms of free base as a ceiling for any 2 hour period of 0.03 ppm (0.4 mg/m³). ACGIH has recommended a TWA of 0.1 ppm (0.1 mg/m³) with the notation that hydrazine is a substance with suspect carcinogenic potential for man. The notation "skin" also indicated the possibility of cutaneous absorption. No STEL value is given. The IDLH level is 80 ppm.

OSHA Status: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Chemical Inventory: This compound is on the EPA Toxic Substance Control Act (TSCA) inventory List
California Proposition 65: This product contains levels of listed substances, which the state of California has found to cause cancer, birth defects or other reproductive effects.
SARA 313 Title III:
Section 302 Extremely Hazardous Substances: None
Section 311/312 Hazardous Categories: None
Section 313 Toxic Chemicals: This product may be subjected to SARA section 313 reporting requirements.

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