1. Chemical Product and Company Identification

Trade Name: NYACOL® APE1540 Antimony Pentoxide Dispersion
Chemical Name: Polyester Resin, Antimony Oxides
Synonyms: APE1540
Product Code: APE1540
Use: Flame Retardant Additive
Manufacturer: Nyacol Nano Technologies, Inc.
Megunko Road, P.O. Box 349, Ashland, MA 01721 U.S.A.
Emergency Telephone: 508-881-2220

2. Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS RN</th>
<th>Exposure Limits</th>
<th>% By Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isophthalic Acid Polyester Resin with Diethylene Glycol, Adipic Acid, Maleic Anhydride, and 1,2 Propanediol</td>
<td>61224-63-3</td>
<td>Not available.</td>
<td>20 – 30</td>
</tr>
<tr>
<td>Unsaturated Polyester Resin</td>
<td>Trade secret of resin vendor</td>
<td>Not available.</td>
<td>10 – 15</td>
</tr>
<tr>
<td>Antimony Pentoxide partially ion–exchanged with sodium ions</td>
<td>1314-60-9</td>
<td>0.5 mg/M³ (Antimony)</td>
<td>44</td>
</tr>
<tr>
<td>Antimony Oxide</td>
<td>1327-33-9</td>
<td>0.5 mg/M³ (Antimony)</td>
<td>2</td>
</tr>
<tr>
<td>Hexanoic Acid, 2-ethyl–Potassium Salt</td>
<td>3164-85-0</td>
<td>Not available.</td>
<td>5 – 10</td>
</tr>
<tr>
<td>Ethanol, 2,2′-oxybis– Amines, C₁₂–C₁₄-tert–alkyl, ethyoxylated</td>
<td>73138-27-9</td>
<td>Not available.</td>
<td>1 – 5</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>EINECS #</th>
<th>RTECS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isophthalic Acid Polyester Resin with Diethylene Glycol, Adipic Acid, Maleic Anhydride, and 1,2 Propanediol</td>
<td>Not listed.</td>
<td>Not listed.</td>
</tr>
<tr>
<td>Unsaturated Polyester Resin</td>
<td>Not listed.</td>
<td>Not listed.</td>
</tr>
<tr>
<td>Antimony Pentoxide</td>
<td>215–237–7</td>
<td>CC6300000</td>
</tr>
<tr>
<td>Antimony Oxide</td>
<td>215–474–6</td>
<td>Not listed.</td>
</tr>
<tr>
<td>Hexanoic Acid, 2–Ethyl–Potassium Salt</td>
<td>221–625–7</td>
<td>Not listed.</td>
</tr>
<tr>
<td>Ethanol, 2,2′–oxybis– Amines, C₁₂–C₁₄-tert–alkyl, ethyoxylated</td>
<td>203–872–2</td>
<td>ID5950000</td>
</tr>
</tbody>
</table>

3. Hazard Identification

Emergency Overview
GREY–TAN VISCOS LIQUID – SWEET ODOR
KEEP SPILLS OUT OF SURFACE WATERS
3. **Hazard Identification, continued**

**Potential Health Effects / Health Hazard Identification**

**Acute Exposure:**
- **Eye:** Irritant
- **Skin:** Irritant

**Ingestion:** Gastrointestinal effects such as vomiting and diarrhea have been reported in both humans and animals after ingesting antimony compounds. Kidney damage from ethanol, 2,2’oxybis–(diethylene glycol).

**Inhalation:** Pneumoconiosis and upper airway inflammation.

**Chronic Exposure:** Chronic exposure to antimony compounds has caused damage to the heart with altered ECG, high blood pressure, ulcers and disturbances in menstruation. Kidney and liver damage can occur from resin and additives.

**Other Hazards**
- **Known Synergists:** None known
- **Explosion Hazard:** None known
- **Fire Hazard:** This material will burn in a fire.
- **Corrosion Hazard:** None known

4. **First Aid Measures**

**Eye Contact:** Immediately flush eyes with large amounts of water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Do not attempt to neutralize the material, and do not apply ointments or oils to the eyes at this time. Get medical attention immediately.

**Skin Contact:** Immediately remove contaminated clothing and shoes. Wash skin with soap and plenty of water for at least 15 minutes. Do not attempt to neutralize with chemical agents. Get medical attention. Wash contaminated clothing before reuse. Thoroughly clean or destroy contaminated shoes.

**Ingestion:** Immediately give several glasses of water. DO NOT induce vomiting. If vomiting occurs, keep head below hips to reduce the risk of aspiration. Give fluids again. Have a physician determine if condition of the patient will permit induction of vomiting or evacuation of stomach. Never give anything by mouth to a person who is unconscious or convulsing. If victim is unconscious, monitor pulse, breathing and airway. If breathing stops, begin artificial respiration immediately. If the heart has stopped, give cardiopulmonary resuscitation (CPR). Get medical attention immediately.

**Inhalation:** Inhalation is unlikely; if it does occur, remove to fresh air. If breathing becomes difficult, seek medical attention. If breathing has stopped, give artificial respiration. Maintain airway and give oxygen if available. Get medical attention immediately. Treat symptomatically.

**First Aid Facilities:** Eye wash facilities.

**Advice to Physicians:** Reports of occupational exposure to inorganic antimony compounds include skin rash, gastrointestinal disturbances and ECG alterations. Therapeutic administration of antimonial drugs has reported side effects of ECG changes in the T wave and possible heart failure. Liver damage has also been reported. Studies with pentavalent antimonial drugs show between 19 and 43% of the antimony being excreted after 24 hours. See U.S. Department of Health, Education and Welfare document *Occupational Exposure to Antimony* for details.

5. **Fire Fighting Measures**

As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate non-essential personnel from the fire area. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. If possible, move containers from the fire area. If not leaking, keep fire-exposed containers cool with a water fog or spray to prevent rupture due to excessive heat. High-pressure water may spread product from broken containers increasing contamination or fire hazard. Contaminated buildings, areas and equipment must not be used until they are properly decontaminated. Dike fire water for later disposal. Do not allow contaminated water to enter waterways.

*continued →*
5. **Fire Fighting Measures, continued**

   Extinguishing Media: Water (not direct high pressure), dry powder, foam, carbon dioxide.
   Protective Equipment: Wear standard full firefighter turn out gear (full bunker gear) and respiratory protection (SCBA).
   Special Exposure Hazard: None known.

6. **Accidental Release Measures**

   Leaks and Spills: Contain spill or leak with sand, clay or absorbents. Recover liquid for recycle or disposal. Do not allow spills into sewers or surface waters. Place absorbents, waste products and contaminated soil into containers for disposal.
   Personal Protection: Eye protection and impervious gloves. An approved air-purifying respirator should be worn if dust or mist is present.

7. **Handling and Storage**

   Handling: Avoid generating mist during use.
   Storage: Store in a cool dry area.

8. **Exposure Controls / Personal Protection**

   Engineering Control: Use exhaust ventilation to keep airborne concentrations below exposure limits.
   Respiratory Protection: When respiratory protection required, or concentrations unknown, use approved air-purifying respirator with organic vapor cartridge.
   Skin Protection: Clean body-covering clothing, impervious gloves e.g. neoprene.
   Eye Protection: Wear approved safety goggles or face shield.

9. **Physical and Chemical Properties**

   NYACOL® APE1540 is an organic liquid–based material.
   Appearance: Grey / tan viscous liquid.
   Odor: Sweet.
   Physical State: Liquid.
   pH: Not applicable.
   Boiling Point: > 232°C.
   Freezing Point: Not available.
   Flash Point: > 101°C open cup.
   Vapor Pressure: Not applicable.
   Oxidizing Properties: Not an oxidizer.
   Solubility in Water: Not soluble.
   Density: 1600 kg/m³
   Specific Gravity: 1.6
   Volatile by Weight: Not volatile.
   Viscosity: Not available.
   Explosion Limits: Not available.
   Partition Coefficient: Not available; negligible solubility in water; appreciable solubility in oil.
   Evaporation Rate: Slow.

10. **Stability and Reactivity**

    Chemical Stability: Stable under normal ambient and anticipated storage conditions.
    Conditions To Avoid: Prolonged storage at elevated temperatures.
    Incompatibility With Other Materials: Strong acids and/or oxidizers. Use of APE1540 under acidic reducing conditions may form the poisonous gas stibine.
    Hazardous Decomposition Products: Oxides of carbon and nitrogen.
    Hazardous Polymerization: Will not occur.
11. **Toxicological Information**

<table>
<thead>
<tr>
<th>Material</th>
<th>LD$_{50}$, Rat, Oral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony Pentoxide</td>
<td>&gt;4123 mg/kg</td>
</tr>
<tr>
<td>Antimony Oxide</td>
<td>Not available.</td>
</tr>
<tr>
<td>Hexanoic acid, 2-ethyl-potassium salt</td>
<td>Not available.</td>
</tr>
<tr>
<td>Ethanol, 2,2'-oxybis-</td>
<td>&gt;12565 mg/kg</td>
</tr>
<tr>
<td>Amines, C$<em>{12}$-C$</em>{14}$-tert-alkyl, ethoxyxilated</td>
<td>1520 mg/kg</td>
</tr>
</tbody>
</table>

**Effects**
- **Eye Effects:** No published data available. Expected to be moderately irritating to eyes.
- **Skin Effects:** No published data available. Expected to be slightly irritating to the skin.
- **Inhalation Effects:** Prolonged breathing of vapors may cause headache.
- **Ingestion Effects:** May cause nausea.

12. **Ecological Information**

- **Ecotoxicity:** Antimony does not appear to bioconcentrate appreciably in fish. Plant uptake of antimony from soil is minor and correlates to the amount of available antimony. Antimony does not appear to biomagnify from lower to higher trophic levels in the food chain. No data available for organic components.
- **Persistence:** Reports claim that antimony compounds released in the environment are absorbed by soil with no general mobility except in sandy soils. Some methylated antimony compounds can form in reducing conditions such as found in anaerobic sediment. No data available for organic components.

13. **Disposal Considerations**

- **Disposal Considerations:** APE1540 should be recycled or solidified for disposal in a landfill approved for chemical waste or burned in an incinerator with scrubber approved for chemical waste.
- **United States:** APE1540 that becomes a waste material should be tested by the TCLP test for disposal status.

14. **Transport Information**

<table>
<thead>
<tr>
<th>Regulations</th>
<th>Shipping Name</th>
<th>Hazard Class</th>
<th>Packing Group</th>
<th>U.N. Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. D.O.T.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>ICAO / IATA</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>IMO / IMDG</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>ADR</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
</tr>
</tbody>
</table>

15. **Regulatory Information**

- **U.S. Federal Regulations**
  - EPA TSCA Inventory: All ingredients listed.
  - SARA Section 313: This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40 CFR 372:
    - **Chemical Name** | **CAS RN** | **% By Weight**
    - Antimony Pentoxide | 1314-60-9 | 44
    - Antimony Oxide | 1327-33-9 | 2
- **U.S. D.O.T. Regulations:** See Section 14.
- **State Right–to–Know Laws:** Section 2 of this MSDS lists all components of APE1540.  

*continued →*
15. Regulatory Information, continued

Canadian Regulations
Domestic Substance List: All ingredients listed.
WHMIS: Class D, Division 2, material causing other toxic effects.
Transportation of Dangerous Goods (TDG): Not applicable. APE1540 does not meet dangerous goods criteria.

This MSDS contains all the information items specified in Schedule 1, Column 3 of the Controlled Products Regulations in a 16-heading format.

EEC Regulations
Classification: Harmful.
Symbol: [X] St. Andrew’s Cross.
Risk Phrases: Harmful by inhalation or if swallowed.
Safety Phrases: Do not breathe dust, wear suitable protective clothing, wear suitable gloves.

16. Other Information

NFPA 704 Hazard Rating: Health – 0, Flammability – 1, Reactivity – 0, Special – 0
HMIS® Hazard Rating: Health – 1, Flammability – 1, Reactivity – 0
Protective Equipment – B: Safety Glasses, Gloves
Recommended Use: APE1540 is recommended for use as a flame retardant synergist. Other uses have not been investigated and may have other hazards. For industrial use only, not for food, drug or home use.

Workers using APE1540 should read and understand this MSDS and be trained in the proper use of this material.

MSDS Prepared By: David L. Catone
Technical Service & Product Development Manager
R&D Department
Nyacol Nano Technologies, Inc.
Telephone: 508-881-2220 (U.S.A.)

Revision Date: September 21, 2007
Supersedes: March 22, 2007

This MSDS has been prepared with data from Nyacol Nano Technologies, Inc.’s laboratories, raw material suppliers, and government publications.

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