1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: AS-50™ Agricultural Streptomycin
EPA Reg. No.: 55146-98
Synonyms: Ag Strep
Product Type: Antibiotic for Agricultural Control of Bacterial Diseases in Plants

Company Name: Nufarm Americas Inc. AGT Division
150 Harvester Drive, Suite 200
Burr Ridge, IL 60527

Telephone Numbers: For Chemical Emergency, Spill, Leak, Fire, Exposure, or Accident,
Call CHEMTREC Day or Night: 1-800-424-9300
For Medical Emergencies Only, Call 1-877-325-1840

Date of Issue: March 2, 2012
Supersedes: March 29, 2004
Sections Revised: MSDS reformatted; Sections 7, 8, 11, 12, 13, 16 revised

2. HAZARDS IDENTIFICATION

Emergency Overview:
Appearance and Odor: Off-white odorless or almost odorless powder.
Warning Statements: CAUTION. Keep out of reach of children. Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Prolonged or frequently repeated skin contact may cause allergic reaction in some individuals.

Potential Health Effects:
Likely Routes of Exposure: Eye and skin contact.
Eye Contact: Exposure may cause eye irritation.
Skin Contact: Exposure may cause skin irritation. A skin sensitization (allergic) reaction may occur in some individuals.
Ingestion:
Inhalation:

Medical Conditions Aggravated by Exposure: Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema or bronchitis. Skin contact may aggravate existing skin disease. Antibiotics have the potential to significantly change the microflora of the intestine and allow overgrowth of nonsusceptible organisms.

See Section 11: TOXICOLOGICAL INFORMATION for more information.

Potential Environmental Effects:
Streptomycin Sulfate: Practically non-toxic to fish, invertebrates, birds and bees.

See Section 12: ECOLOGICAL INFORMATION for more information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CAS NO.</th>
<th>% BY WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptomycin Sulfate</td>
<td>3810-74-0</td>
<td>65.8</td>
</tr>
<tr>
<td>Other Ingredients, including</td>
<td></td>
<td>34.2</td>
</tr>
<tr>
<td>Crystalline Silica, Quartz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaolin Clay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mica</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

March 2, 2012
4. FIRST AID MEASURES

If on Skin or Clothing: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15 to 20 minutes. Call a poison control center or doctor for treatment advice.
If in Eyes: Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
If Inhaled: Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.
If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flash Point: Not Available
Autoignition Temperature: Not Applicable 
Flammability Limits: Not Applicable

Extinguishing Media: Recommended for large fires: dry chemical, foam or CO2 extinguishing media. Recommended for small fires: dry chemical or carbon dioxide.
Special Fire Fighting Procedures: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full fire-fighting turn out gear. Evacuate nonessential personnel from the area to prevent human exposure to fire, smoke, fumes or products of combustion. Prevent use of contaminated buildings, area, and equipment until decontaminated. Dike area to prevent runoff and contamination of water sources. Water runoff can cause environmental damage. Dispose of fire control water later.
Unusual Fire and Explosion Hazards: During a fire, irritating and possibly toxic gases may be generated by thermal decomposition or combustion.
Hazardous Decomposition Materials (Under Fire Conditions): Thermal decomposition products may include, but are not limited to oxides of nitrogen, carbon and sulfur.

National Fire Protection Association (NFPA) Hazard Rating:
Rating for this product: Health: 2 Flammability: 1 Reactivity: 0
Hazards Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear appropriate protective gear for the situation. See Personal Protection information in Section 8.
Environmental Precautions: Prevent material from entering public sewer systems or any waterways. Do not flush to drain. Large spills to soil or similar surfaces may necessitate removal of topsoil. The affected area should be removed and placed in an appropriate container for disposal.
Methods for Containment: Dike spill using absorbent or impervious materials such as earth, sand or clay. Collect and contain contaminated absorbent and dike material for disposal.
Methods for Cleanup and Disposal: Avoid creation of dusty conditions. If dry, sweep or scoop up material and place into container for disposal. If wet, pump any free liquid into an appropriate closed container. Decontaminate tools and equipment following cleanup. See Section 13: DISPOSAL CONSIDERATIONS for more information.
Other Information: Large spills may be reportable to the National Response Center (800-424-8802) and to state and/or local agencies.
7. HANDLING AND STORAGE

Handling:
Causes moderate eye irritation. Harmful if absorbed through skin. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Remove contaminated clothing and wash before reuse.

Users should wash hands before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove clothing/Personal Protective Equipment (PPE) immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If pesticide gets on skin, wash immediately with soap and water. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Storage:
Keep tightly closed. Store at a cool temperature when possible, and with minimum exposure to atmosphere. Do not contaminate water, food, or feed by storage or disposal.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls:
Where engineering controls are indicated by specific use conditions or a potential for excessive exposure, use local exhaust ventilation at the point of generation.

Personal Protective Equipment:

Eye/Face Protection: To avoid contact with eyes, wear chemical goggles or shielded safety glasses. An emergency eyewash or water supply should be readily accessible to the work area.

Skin Protection: To avoid contact with skin wear long sleeved shirt and long pants, shoes plus socks, chemical resistant gloves made of any waterproof material such as barrier laminate, butyl rubber ≥ 14 mils, nitrile rubber ≥ 14 mils, or viton ≥ 14 mils. When mixing, loading, or cleaning equipment a chemical resistant apron must be worn. An emergency shower or water supply should be readily accessible to the work area.

Respiratory Protection: NIOSH approved particulate filtering respirator with N, P or R 95 or HE class filter media.

General Hygiene Considerations: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material: 1) do not store, use and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored; 2) wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet.

Exposure Guidelines:

<table>
<thead>
<tr>
<th>Component</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWA</td>
<td>STEL</td>
</tr>
<tr>
<td>Crystalline Silica, Quartz</td>
<td>10% SiO₂ +2</td>
<td>NE</td>
</tr>
<tr>
<td>Mica</td>
<td>3</td>
<td>NE</td>
</tr>
<tr>
<td>Streptomycin Sulfate</td>
<td>NE</td>
<td>NE</td>
</tr>
</tbody>
</table>

NE = Not Established
9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Off-white odorless or almost odorless powder
Boiling Point: Not applicable
Density: Not available
Evaporation Rate: Not applicable
Freezing Point: Not available
pH: 5 - 6
Solubility in Water: 20 g/l in water (28º C)
Specific Gravity: 0.80 g/ml
Vapor Density: Not available
Vapor Pressure: Not available

Note: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable under normal handling and storage conditions. Hygroscopic.
Conditions to Avoid: Protect from moisture in airtight containers.
Hazardous Decomposition Products: Thermal decomposition products may include, but are not limited to oxides of nitrogen, carbon and sulfur.
Hazardous Reactions: Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Data:
Data from laboratory studies on this product are summarized below:
   Oral: Rat LD₅₀:  9,000 mg/kg
   Dermal: Rat LD₅₀:  600 mg/kg body weight
   Inhalation: Rat 4-hr LC₅₀: Not available
   Eye Irritation: Rabbit: Not available
   Skin Irritation: Rabbit: Not available
   Skin Sensitization: Not available

For Streptomycin Sulfate:
   Subchronic (Target Organ) Effects: Streptomycin may cause severe allergic reactions (anaphylactic) in sensitive individuals. Clinical studies reported kidney damage and ear damage manifested by nausea, vomiting, dizziness, numbness/tingling of face. Inhalation of excessive amounts of kaolin dust may produce coughing, sneezing and nasal irritation. This product contains clay. Crystalline silica (e.g. quartz) is a naturally occurring component of clay. Inhalation of crystalline silica may cause pulmonary fibrosis (silicosis). Crystalline silica has been classified by IARC as carcinogenic to humans (Group 1), by the U.S. National Toxicology Program as a known human carcinogen and by ACGIH as a suspected human carcinogen (A2).
   Carcinogenicity / Chronic Health Effects: Prolonged overexposure to streptomycin may cause effects to kidneys, ears and skin. Streptomycin did not cause cancer in laboratory animals.
   Reproductive/Development Toxicity: Streptomycin may cause auditory nerve damage in the developing fetus.
   Developmental Toxicity: None observed.
   Genotoxicity: None observed.
Assessment of Carcinogenicity:
This product contains substances that are considered to be probable or suspected human carcinogens as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Regulatory Agency Listing As Carcinogen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ACGIH</td>
</tr>
<tr>
<td>Streptomycin Sulfate</td>
<td>NO</td>
</tr>
<tr>
<td>Crystalline Silica, Quartz</td>
<td>NE</td>
</tr>
<tr>
<td>Mica</td>
<td>NO</td>
</tr>
</tbody>
</table>

See Section 2: HAZARDS IDENTIFICATION for more information.

12. ECOLOGICAL INFORMATION

Ecotoxicity:
Data on Streptomycin:
- 96-hour LC$_{50}$ Bluegill: > 180 ppm
- 96-hour LC$_{50}$ Rainbow Trout: >180 ppm
- Bees LC$_{50}$/EC$_{50}$: >100ug/bee
- Invertebrate (Water Flea) LC$_{50}$/EC$_{50}$: 650 ppm
- Bobwhite Quail Acute Oral LC$_{50}$: >2,000 mg/kg
- Bobwhite Quail 8-day Dietary LC$_{50}$: >5,620 ppm
- Mallard Duck 8-day Dietary LC$_{50}$: 4,640 ppm

Environmental Fate:
Do not apply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:
Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Handling and Disposal:
Nonrefillable Plastic Containers: Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying.

Nonrefillable Containers 5 Gallons or Less: Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration, or, if allowed by State and local authorities, by burning. If burned stay out of smoke.

Nonrefillable containers larger than 5 gallons: Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by State and local authorities. Plastic containers are also disposable by incineration. Do not burn unless permitted by state and local ordinance. If burned, stay out of smoke.

Nonrefillable bags: Nonrefillable container. Do not reuse or refill this container. Completely empty bag into application equipment, then offer for recycling if available, or dispose of empty bag in a sanitary
landfill or by incineration. Do not burn unless permitted by state and local ordinance. If burned, stay out of smoke.

**Refillable Drum with Nonrefillable Liner:** Refillable this container with pesticide only. Do not use this container for any other purpose. Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by state and local authorities by burning. If burned, stay out of smoke. If drum is contaminated and cannot be reused, dispose of in the same manner required for its liner. To recycle, contact NuFarm’s Customer Service Department at 1-800-345-3330 to arrange for return of the empty refillable container.

### 14. TRANSPORTATION INFORMATION

Follow the precautions indicated in Section 7: HANDLING AND STORAGE of this MSDS.

**DOT**
- Not regulated by DOT

**IMDG**

**IATA**

### 15. REGULATORY INFORMATION

**U.S. Federal Regulations:**

**TSCA Inventory:** This product is exempted from TSCA because it is solely for FIFRA regulated use.

**SARA Hazard Notification/Reporting:**

**Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370.66):**
- Immediate, delayed

**Section 313 Toxic Chemical(s):**
- Not applicable

**Reportable Quantity (RQ) under U.S. CERCLA:**
- None

**RCRA Waste Code:**
- None

**State Information:**
- Other state regulations may apply. Check individual state requirements.

**California Proposition 65:** WARNING. This product contains chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.
16. OTHER INFORMATION

This Material Safety Data Sheet (MSDS) serves different purposes than and DOES NOT REPLACE OR MODIFY THE EPA-ACCEPTED PRODUCT LABELING (attached to and accompanying the product container). This MSDS provides important health, safety and environmental information for employers, employees, emergency responders and others handling large quantities of the product in activities generally other than product use, while the labeling provides that information specifically for product use in the ordinary course.

Use, storage and disposal of pesticide products are regulated by the EPA under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) through the product labeling, and all necessary and appropriate precautionary, use, storage, and disposal information is set forth on that labeling. It is a violation of Federal law to use a pesticide product in any manner not prescribed on the EPA-accepted label.

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