SAFETY DATA SHEET

1. Identification

Product identifier NICKEL AMMONIUM SULFATE, REAGENT

Other means of identification
Product code 971
Synonyms AMMONIUM NICKEL SULFATE * NICKEL AMMONIUM SULFATE HEXAHYDRATE

Recommended use professional, scientific and technical activities: other professional, scientific and technical activities

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name GFS Chemicals, Inc.
Address P.O. Box 245
Powell, OH 43065
United States

Telephone Phone 740-881-5501
Toll Free 800-858-9682
Fax 740-881-5989

Website www.gfschemicals.com
E-mail service@gfschemicals.com
Emergency phone number Emergency Assistance Chemtrec 800-424-9300

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards
Acute toxicity, oral Category 4
Acute toxicity, inhalation Category 4
Sensitization, respiratory Category 1
Sensitization, skin Category 1
Germ cell mutagenicity Category 2
Carcinogenicity (inhalation) Category 1A
Reproductive toxicity (the unborn child) Category 1B
Specific target organ toxicity, repeated exposure Category 1

Environmental hazards
Hazardous to the aquatic environment, acute hazard Category 1
Hazardous to the aquatic environment, long-term hazard Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Harmful if swallowed. May cause an allergic skin reaction. Harmful if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Suspected of causing genetic defects. May cause cancer by inhalation. May damage the unborn child. Causes damage to organs through prolonged or repeated exposure. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
Precautionary statement

**Prevention**
Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Avoid breathing dust/fume. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Contaminated work clothing must not be allowed out of the workplace. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection. In case of inadequate ventilation wear respiratory protection.

**Response**
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. If inhaled: Remove person to fresh air and keep comfortable for breathing. If exposed or concerned: Get medical advice/attention. If respiratory symptoms occur: Call a POISON CENTER or doctor/physician. Wash contaminated clothing before reuse. Collect spillage.

**Storage**
Store locked up.

**Disposal**
Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Hazard(s) not otherwise classified (HNOC)
None known.

Supplemental information
None.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Common name and synonyms</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICKEL AMMONIUM SULFATE</td>
<td>AMMONIUM NICKEL SULFATE NICKEL AMMONIUM SULFATE HEXAHYDRATE</td>
<td>7785-20-8</td>
<td>100</td>
</tr>
</tbody>
</table>

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

**Inhalation**
Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

**Skin contact**
Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions.

**Eye contact**
Do not rub eyes. Rinse with water. Get medical attention if irritation develops and persists.

**Ingestion**
Rinse mouth. If vomiting occurs, keep head low so that stomach content doesn’t get into the lungs. Get medical advice/attention if you feel unwell.

**Most important symptoms/effects, acute and delayed**
Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash. Prolonged exposure may cause chronic effects.

**Indication of immediate medical attention and special treatment needed**
Provide general supportive measures and treat symptomatically. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

**General information**
IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before reuse.

5. Fire-fighting measures

**Suitable extinguishing media**
Use extinguishing agent suitable for type of surrounding fire. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

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

**Specific hazards arising from the chemical**
During fire, gases hazardous to health may be formed.

**Special protective equipment and precautions for firefighters**
Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting equipment/instructions**
Use water spray to cool unopened containers.

**Specific methods**
Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards

No unusual fire or explosion hazards noted. Not applicable.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Avoid inhalation of dust. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). This product is miscible in water. This material is classified as a water pollutant under the Clean Water Act and should be prevented from contaminating soil or from entering sewage and drainage systems which lead to waterways. Stop the flow of material, if this is without risk. Large Spills: Wet down with water and dike for later disposal. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. When using, do not eat, drink or smoke. Pregnant or breastfeeding women must not handle this product. Should be handled in closed systems, if possible. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Avoid release to the environment. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

No exposure limits noted for ingredient(s).

Biological limit values

No biological exposure limits noted for the ingredient(s).

Appropriate 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. General ventilation normally adequate.

Individual protection measures, such as personal protective equipment

Eye/face protection

Wear safety glasses with side shields (or goggles). Eye wash fountains are required.

Skin protection

Hand protection

Wear appropriate chemical resistant gloves.

Other

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection

Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. In case of inadequate ventilation or risk of inhalation of dust, use suitable respiratory equipment with particle filter.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

When using, do not eat, drink or smoke. 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. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance

Crystals

Physical state

Solid.

Form

Solid.

Color

Green.

Odor

Odorless.
<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor threshold</td>
<td>Not available</td>
</tr>
<tr>
<td>pH</td>
<td>Not available</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>185 - 192.2 °F (85 - 89 °C) Literature</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>Not available</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not available</td>
</tr>
<tr>
<td>Upper/lower flammability or explosive limits</td>
<td></td>
</tr>
<tr>
<td>Flammability limit - lower (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Flammability limit - upper (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Explosive limit - lower (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Explosive limit - upper (%)</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not available</td>
</tr>
<tr>
<td>Relative density</td>
<td>Not available</td>
</tr>
<tr>
<td>Solubility(ies)</td>
<td></td>
</tr>
<tr>
<td>Solubility (water)</td>
<td>104 g/kg at 20 C</td>
</tr>
<tr>
<td>Partition coefficient (n-octanol/water)</td>
<td>Not available</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>Other information</td>
<td></td>
</tr>
<tr>
<td>Density</td>
<td>1.92 g/cm³</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>Ni(NH₄)₂(SO₄)₂·6H₂O</td>
</tr>
<tr>
<td>Molecular weight</td>
<td>395.00</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.92</td>
</tr>
</tbody>
</table>

### 10. Stability and reactivity

**Reactivity**
The product is stable and non-reactive under normal conditions of use, storage and transport.

**Chemical stability**
Material is stable under normal conditions.

**Possibility of hazardous reactions**
Hazardous polymerization does not occur.

**Conditions to avoid**
Contact with incompatible materials.

**Incompatible materials**
Strong oxidizing agents.

**Hazardous decomposition products**
Nickel. Ammonia.

### 11. Toxicological information

**Information on likely routes of exposure**

**Inhalation**
Harmful if inhaled. May cause cancer by inhalation. May cause allergy or asthma symptoms or breathing difficulties if inhaled.

**Skin contact**
May cause an allergic skin reaction.

**Eye contact**
Direct contact with eyes may cause temporary irritation.

**Ingestion**
Harmful if swallowed.

**Symptoms related to the physical, chemical and toxicological characteristics**
Difficulty in breathing. May cause an allergic skin reaction. Dermatitis. Rash.

**Information on toxicological effects**

**Acute toxicity**
Harmful if inhaled. Harmful if swallowed. May cause an allergic skin reaction.
### Test Results

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICKEL AMMONIUM SULFATE (CAS 7785-20-8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>Rat</td>
<td>399 mg/kg</td>
</tr>
</tbody>
</table>

* Estimates for product may be based on additional component data not shown.

### Skin corrosion/irritation
- Prolonged skin contact may cause temporary irritation.

### Serious eye damage/eye irritation
- Direct contact with eyes may cause temporary irritation.

### Respiratory or skin sensitization
- **Respiratory sensitization**
  - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- **Skin sensitization**
  - May cause an allergic skin reaction.
- **Germ cell mutagenicity**
  - Suspected of causing genetic defects.
- **Carcinogenicity**
  - May cause cancer.

**IARC Monographs. Overall Evaluation of Carcinogenicity**

<table>
<thead>
<tr>
<th>Product</th>
<th>Species</th>
<th>Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICKEL AMMONIUM SULFATE (CAS 7785-20-8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Reproductive toxicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>May damage the unborn child.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Specific target organ toxicity**
- **- single exposure**
  - Not classified.
- **- repeated exposure**
  - Causes damage to organs through prolonged or repeated exposure.

**Aspiration hazard**
- Not available.

**Chronic effects**
- Prolonged exposure may cause chronic effects. Causes damage to organs through prolonged or repeated exposure.

### 12. Ecological information

#### Ecotoxicity
- Very toxic to aquatic life with long lasting effects.

#### Persistence and degradability
- No data is available on the degradability of this product.

#### Bioaccumulative potential
- No data available.

#### Mobility in soil
- No data available.

#### Other adverse effects
- No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

### 13. Disposal considerations

**Disposal instructions**
- Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

**Local disposal regulations**
- Dispose in accordance with all applicable regulations.

**Hazardous waste code**
- The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

**Waste from residues / unused products**
- Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging**
- Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

### 14. Transport information

**DOT**
- **UN number**: UN3077
- **UN proper shipping name**: Environmentally hazardous substances, solid, n.o.s. (NICKEL AMMONIUM SULFATE RQ = 100 LBS), MARINE POLLUTANT

**Transport hazard class(es)**
- **Class**: 9
- **Subsidiary risk**: -
- **Label(s)**: 9
- **Packing group**: III
Environmental hazards
  Marine pollutant: Yes

Special precautions for user
  Read safety instructions, SDS and emergency procedures before handling.

Special provisions
  8, 146, 335, A112, B54, IB8, IP3, N20, T1, TP33

Packaging exceptions
  155

Packaging non bulk
  213

Packaging bulk
  240

IATA
  UN number: UN3077
  UN proper shipping name: Environmentally hazardous substance, solid, n.o.s. (NICKEL AMMONIUM SULFATE)

Transport hazard class(es)
  Class: 9
  Subsidiary risk: -
  Packing group: III
  Environmental hazards: Yes
  ERG Code: 9L
  Special precautions for user: Read safety instructions, SDS and emergency procedures before handling.

Other information
  Passenger and cargo aircraft: Allowed.
  Cargo aircraft only: Allowed.

IMDG
  UN number: UN3077
  UN proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (NICKEL AMMONIUM SULFATE), MARINE POLLUTANT

Transport hazard class(es)
  Class: 9
  Subsidiary risk: -
  Packing group: III
  Environmental hazards: Yes
  Marine pollutant: Yes
  EmS: F-A, S-F
  Special precautions for user: Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
  Not applicable.

DOT; IATA; IMDG

Marine pollutant

General information
  DOT Regulated Marine Pollutant. IMDG Regulated Marine Pollutant.
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.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)
Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)
NICKEL AMMONIUM SULFATE (CAS 7785-20-8) Listed.

SARA 304 Emergency release notification
Not regulated.

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

SARA 302 Extremely hazardous substance
Not listed.

SARA 311/312
Hazardous chemical
Yes

SARA 313 (TRI reporting)

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS number</th>
<th>% by wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICKEL AMMONIUM SULFATE</td>
<td>7785-20-8</td>
<td>100</td>
</tr>
</tbody>
</table>

Other federal regulations
Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List
NICKEL AMMONIUM SULFATE (CAS 7785-20-8)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
Not regulated.

Clean Water Act (CWA)
Priority pollutant
Toxic pollutant

Safe Drinking Water Act (SDWA)
Not regulated.

US state regulations
US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)
Not listed.

US. Massachusetts RTK - Substance List
NICKEL AMMONIUM SULFATE (CAS 7785-20-8)

US. New Jersey Worker and Community Right-to-Know Act
NICKEL AMMONIUM SULFATE (CAS 7785-20-8)

US. Pennsylvania Worker and Community Right-to-Know Law
NICKEL AMMONIUM SULFATE (CAS 7785-20-8)

US. Rhode Island RTK
NICKEL AMMONIUM SULFATE (CAS 7785-20-8)

US. California Proposition 65
WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance
NICKEL AMMONIUM SULFATE (CAS 7785-20-8) Listed: May 7, 2004

International Inventories

<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>
</tbody>
</table>

Material name: NICKEL AMMONIUM SULFATE, REAGENT
971 Version #: 01 Revision date: Issue date: June-23-2015 7 / 8
<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>No</td>
</tr>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand</td>
<td>New Zealand Inventory</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines</td>
<td>Philippine Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States &amp; Puerto Rico</td>
<td>Toxic Substances Control Act (TSCA) Inventory</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

### 16. Other information, including date of preparation or last revision

<table>
<thead>
<tr>
<th>Issue date</th>
<th>June-23-2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version #</td>
<td>01</td>
</tr>
</tbody>
</table>

**Disclaimer**

GFS Chemicals cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user’s responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in this sheet was written based on the best knowledge and experience currently available.

**Revision Information**

Product and Company Identification: Synonyms
Composition / Information on Ingredients: Ingredients
Physical & Chemical Properties: Multiple Properties
Toxicological Information: Toxicological Data
Regulatory Information: Safety Phrases