SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifier
Product Name: Adipic Acid
Synonym(s): Hexanedioic acid; 1,4-Butanedicarboxylic acid; 1,6-Hexanediol acid
REACH Registration Number: No data available at this time.

1.2 Relevant identified uses of the substance or mixture and uses advised against
General use: Laboratory and industrial use
Uses advised against: None known

1.3 Details of the supplier and of the safety data sheet
Manufacturer/Distributor
Silver Fern Chemical, Inc.
2226 Queen Anne Avenue North
Suite C
Seattle, WA 98109 USA
1-866-282-3384
Website - www.silverfernchemical.com; email address - info@silverfernchemical.com

1.4 Emergency telephone number: INFO-TRAC +1-800-535-5053; Outside USA & Canada +1-352-323-3500

SECTION 2 - HAZARDS IDENTIFICATION

2.1 Classification of substance or mixture
Product definition: Substance
Classification in accordance with 29 CFR 1910 (OSHA HCS) and Regulation EC No. 1272/2008
Eye Irritant - Category 2A [H319]

2.2 Label Elements
Hazard Symbol(s):

Signal Word: Warning
Hazard Statement(s): H319 - Causes serious eye irritation
Precautionary Statements:
[Prevention] P264 - Wash hands and other skin areas exposed to material thoroughly after handling.
P280 - Wear protective gloves, protective clothing and eye protection.
[Response] P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 - If eye irritation persists: Get medical attention.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
May form combustible dust concentrations in air

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>% by Weight</th>
<th>Ingredient</th>
<th>CAS Number</th>
<th>EC Number</th>
<th>Annex Number</th>
<th>GHS Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;99</td>
<td>Adipic Acid</td>
<td>124-04-9</td>
<td>204-673-3</td>
<td>607-144-00-9</td>
<td>H319</td>
</tr>
</tbody>
</table>

There are no ingredients present in this product which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

3.2 Mixtures
Not applicable

Effective Date: 8 July 2017
Supercedes: 28 October 2013
Safety Data Sheet
Adipic Acid
4.1 Description of first aid measures

**Inhalation:** If exposure to product dust causes respiratory irritation or distress, move the exposed person to fresh air immediately. If breathing is difficult or irregular, administer oxygen; if respiratory arrest occurs, start artificial respiration by trained personnel. If unconscious, maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. If irritation persists or if the victim feels unwell, seek medical attention.

**Eyes:** Do not rub eyes. Immediately flush eyes with large amounts of water or saline solution for at least 15 minutes, occasionally lifting the upper and lower lids. Remove contact lenses, if present and easy to do, after first 2 minutes and continue rinsing. If irritation persists seek medical advice, preferably from an ophthalmologist.

**Skin:** Flush skin with large amounts of water while removing contaminated clothing. Wash the affected area with soap and water and continue rinsing. Wash contaminated clothing and shoes thoroughly before reuse. If irritation persists, seek medical attention.

**Ingestion:** Rinse mouth with water if the victim is conscious. Remove dentures, if present. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious or convulsing person. Do not leave the victim unattended. Seek immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed

**Potential health symptoms and effects**

**Eyes:** Causes severe eye irritation with inflammation, pain and tearing. May cause slight corneal injury.

**Skin:** Prolonged and repeated contact with unprotected skin may cause skin irritation with localized redness, itching and discomfort.

**Inhalation:** Inhalation of dust may cause irritation of the upper respiratory tract. Symptoms may include headache, cough and difficulty breathing.

**Ingestion:** May cause irritation of the digestive tract with nausea, vomiting, abdominal pain and diarrhea. Causes irritation of the mucous membranes of the mouth, throat, esophagus and digestive tract.

**Chronic:** Prolonged and repeated exposure to unprotected skin may cause contact dermatitis. Chronic inhalation may result in asthma.

4.3 Indication of any immediate medical attention and special treatment needed

**Advice to Doctor and Hospital Personnel**

Treat symptomatically and supportively

SECTION 5 - FIRE FIGHTING MEASURES

5.1 Extinguishable media

**Suitable methods of extinction:** Use extinguishing media such as water spray or fog, carbon dioxide, foam and dry chemical.

**Unsuitable methods of extinction:** None known

5.2 Special hazards arising from the substance or mixture

Closed containers may rupture due to the buildup of pressure when exposed to extreme heat. During emergency conditions overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent or may be delayed. Obtain medical attention.

**Explosion hazards:** May form combustible dust concentrations in air.

5.3 Advice for firefighters

Full protective equipment including self-contained breathing apparatus should be used. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion when exposed to extreme heat. If possible, firefighters should control runoff water to prevent environmental contamination.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate non-essential personnel. Wear appropriate protective clothing designated in Section 8.2. Do not inhale dust. Remove all sources of ignition. No smoking. Ventilate the area. Clean up spills immediately.

6.2 Environmental precautions

Avoid dispersal of spilled material or runoff and prevent contact with soil and entry into drains, sewers or waterways.

6.3 Methods and materials for containment and cleaning up

Cover drains and contain spill. Avoid dust generation during cleanup. Carefully collect material and place into an approved container for proper disposal. Observe possible material restrictions (Sections 7.2 and 10.5). Wash contaminated area with soap and water. Do not allow material or runoff from rinsing contaminated areas to enter floor drains or storm drains and ditches that lead to to waterways. Dispose of in accordance with state and local regulations.

6.4 Reference to other sections

For indications about waste treatment, see Section 13.

SECTION 7 - HANDLING AND STORAGE

7.1 Precautions for safe handling

Wear all appropriate personal protective equipment specified in Section 8.2. Avoid dust generation and accumulation during handling. Do not get in eyes or on skin or clothing. Do not inhale dust. No smoking. If normal use of material presents a respiratory hazard, use only adequate ventilation or wear an appropriate respirator. Wash contaminated clothing and shoes thoroughly before reuse.
7.2 Conditions for safe storage, including any incompatibilities
Store in dry, cool, well-ventilated areas away incompatible materials (see Section 10.5), food and drink. Transfer only to approved containers having correct labeling. Keep containers tightly closed when not in use. Protect containers against physical damage. Containers that have been opened must be carefully resealed and kept upright to prevent spillage. Containers are hazardous when empty as they contain product residues. Use appropriate containment to avoid environmental contamination. Ventilate closed areas. Do not take internally. Keep out of reach of children.

7.3 Specific end uses
Apart from the uses mentioned in Section 1.2, no other specific uses are stipulated.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters
Occupational exposure limit values

<table>
<thead>
<tr>
<th>CAS Number</th>
<th>Ingredient</th>
<th>OSHA PEL - TWA</th>
<th>ACGIH TLV</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>124-04-9</td>
<td>Adipic Acid</td>
<td>---------------</td>
<td>5 mg/m³ TWA</td>
<td>------------</td>
</tr>
</tbody>
</table>

8.2 Exposure controls
Engineering measures: Technical measures and appropriate working operations should be given priority over the use of personal protective equipment. Use adequate ventilation. Local exhaust is preferable.

Individual protection measures: Wear protective clothing to prevent repeated or prolonged contact with product. Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the representative supplier.

Hygiene measures: Facilities storing or using this material should be equipped with an eyewash station and safety shower. Change contaminated clothing. Preventive skin protection is recommended. Wash hands thoroughly after use, before eating, drinking, smoking or using the lavatory.

Eye/face protection: Wear safety glasses with unperforated side shields or protective splash goggles during use.

Hand Protection: Wear gloves recommended by glove supplier for protection against materials in Section 3. Gloves should be impermeable to chemicals and oil. Breakthrough time of selected gloves must be greater than the intended use period.

Skin protection: Wear protective clothing. Wear protective boots if the situation requires.

Respiratory protection: Always use an approved dust mask when dusts are generated. Where risk assessment shows air-purifying respirators are appropriate use a full-faced respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Follow OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149.

Environmental exposure controls: Do not empty into drains.

PPE must not be considered a long-term solution to exposure control. PPE usage must be accompanied by employer programs to properly select, maintain, clean fit and use. Consult a competent industrial hygiene resource to determine hazard potential and/or the PPE manufacturers to ensure adequate protection.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance: Colorless to white crystalline powder
Odor: Odorless
Odor Threshold: No data available
Molecular Weight: 146.14 g/mol
Chemical Formula: C₆H₁₀O₄
pH: 2.7 (2.3% aqueous solution @ 25 °C)
Melting Point: 150.85 °C (303.5 °F)
Boiling Point: 338 °C (640.4 °F)
Evaporation Rate: Not applicable
Flammability (solid, gas): Non-flammable
Flash Point: 196 °C (384.8 °F) closed cup
Autoignition Temperature: >400 °C (>752 °F)
Decomposition Temperature: 338 °C (640.4 °F)
Lower Explosive Limit (LEL): No data available
Upper Explosive Limit (UEL): No data available
Vapor Pressure: 0.0727 mm Hg
Vapor Density: 5.04 (Air = 1)
Density: 1.36 g/cc
SECTION 10 - STABILITY AND REACTIVITY

10.1 Reactivity
No special reactivity has been reported.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerization will not occur.

10.4 Conditions to avoid
High temperatures, contact with incompatible materials, dust generation and accumulation

10.5 Incompatible materials
Strong oxidizing agents, strong reducing agents, strong bases

10.6 Hazardous decomposition products
Thermal decomposition products include oxides of carbon, various hydrocarbons.

SECTION 11 - TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute oral toxicity
LD$_{50}$, rat - 5,560 mg/kg (male and female)

Acute inhalation toxicity
LC$_{50}$, rat - 7.7 mg/l, 4 h (male and female)

Acute dermal toxicity
LD$_{50}$, rabbit - >7,940 mg/kg

Skin irritation
May cause skin irritation.

Eye irritation
Causes serious eye irritation. May cause slight corneal damage.

Sensitization
No data available

Genotoxicity in vitro
No data available

Mutagenicity
No data available

Specific organ toxicity - single exposure
No data available

Specific organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Further information
Adipic Acid (CAS #124-04-9) is not listed as a carcinogen by IARC, ACGIH, NTP or OSHA.

No conclusive data is available regarding the mutagenicity or teratogenicity of this product, nor is there any available data that indicates it causes adverse developmental or fertility effects.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12 - ECOLOGICAL INFORMATION

12.1 Toxicity
This substance is harmful to aquatic life. Large discharges of Adipic Acid to the environment may decrease the pH of aquatic systems to a value <3, which may be fatal to aquatic life and soil micro-organism.

Acute and prolonged toxicity to fish: LC$_{50}$ - Pimephales promelas (Fathead minnow), 96 h: 97 mg/l

Toxicity to aquatic invertebrates: EC$_{50}$ - Daphnia magna (Water flea), 48 h: 86 mg/l
Toxicity to aquatic invertebrates: EC₅₀ - Desmodesmus subspicatus (Green algae), 72 h: 31 mg/l

12.2 Persistence and degradability
This substance is readily biodegradable.

12.3 Bioaccumulation potential
Bioaccumulation potential for this substance is low.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
No data available

12.6 Other adverse effects
Additional ecological information
Do not allow material to run into surface waters, wastewater or soil. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

SECTION 13 - DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Methods of disposal: The generation of waste should be avoided or minimized whenever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

RCRA P-Series: No listing
RCRA U-Series: No listing

SECTION 14 - TRANSPORT INFORMATION

Note: Transportation information provided is for reference only. Customer is urged to consult 49 CFR 100 - 177, IMDG, IATA, EC, United Nations TDG and WHMIS (Canada) TDG information manuals for detailed regulations and exceptions covering specific container sizes, packaging materials and methods of shipping.

US DOT (Domestic Ground Transportation)
Not regulated for transport

IMO/IMDG (Water Transportation)
Not regulated for transport
Consult IMO regulations before transporting ocean bulk

ICAO/IATA (Air Transportation)
Not regulated for transport

RID/ADR (Rail Transportation)
Not regulated for transport

SECTION 15 - REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for substance or mixture
U. S. Federal Regulations
OSHA Hazard Communication Standard: This material is classified as hazardous in accordance with OSHA 29 CFR 1910-1200.
EPA Risk Management Planning Standard: This product is not regulated under EPA RMP Standard (RMP) 40 CFR Part 68.
EPA Federal Insecticide, Fungicide and Rodenticide Act: This product is not a registered Pesticide under the FIFRA, 40 CFR Part 150.
Toxic Substance Control Act (TSCA) Inventory: Adipic Acid (CAS #124-04-9) is listed on the TSCA Inventory. It is not subject to TSCA 12(b) Export Notification.

Drug Enforcement Administration (DEA) List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.4(f)(2) and Chemical Code Number Not listed
Drug Enforcement Administration (DEA) List s1 & 2, Exempt Chemical Mixtures (21 CFR 1310.12(c)) and Code Number Not listed
Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS) Chemicals
Superfund Amendments and Reauthorization Act (SARA)
SARA Section 311/312 Hazard Categories: Acute Health Hazard
SARA 313 Information: No components of the product exceed the threshold (de minimis) reporting requirements of Section 313 of the Emergency Planning and Community Right-to Know Act of 1986.
This product does not contain any chemicals listed as Hazardous Air Pollutants (HAPs) designated in CAA Section 112(b).

**Clean Air Act (CAA)**
This product does not contain any Class 1 Ozone depletors.
This product does not contain any Class 2 Ozone depleters.

**Clean Water Act (CWA)**
Adipic Acid (CAS #124-04-9) is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

**U.S. State Regulations**
California Prop 65, Safe Drinking Water and Toxic Enforcement Act of 1986
None of the chemical(s) in this product are not known to the State of California to cause cancer, birth defects or other reproductive harm.

**Other U.S. State Inventories**
Adipic Acid (CAS #124-04-9) is listed on the following State Hazardous Substance Inventories, Right-to-Know lists and/or Air Quality/Air Pollutants lists: CA, DE, MA, MN, NJ, NY, PA, RI, WI.

**Canada**
WHMIS Hazard Symbol and Classification
Causes serious eye irritation; May cause respiratory irritation; May form combustible dust concentrations in air

**Canadian National Pollutant Release Inventory (NPRI):** None of the chemicals in this product are listed on the NPRI.

**European Economic Community**
WGK, Germany (Water danger/protection): 1 (low hazard to waters)

**Global Chemical Inventory Lists**

<table>
<thead>
<tr>
<th>Country</th>
<th>Inventory Name</th>
<th>Inventory Listing*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada:</td>
<td>Domestic Substance List (DSL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Canada:</td>
<td>Non-Domestic Substance List (NDSL)</td>
<td>No</td>
</tr>
<tr>
<td>Europe:</td>
<td>Inventory of New and Existing Chemicals (EINECS)</td>
<td>Yes</td>
</tr>
<tr>
<td>United States:</td>
<td>Toxic Substance Control Act (TSCA)</td>
<td>Yes</td>
</tr>
<tr>
<td>Australia:</td>
<td>Australian Inventory of Chemical Substances (AICS)</td>
<td>Yes</td>
</tr>
<tr>
<td>New Zealand:</td>
<td>New Zealand Inventory of Chemicals (NZIoC)</td>
<td>Yes</td>
</tr>
<tr>
<td>China:</td>
<td>Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Yes</td>
</tr>
<tr>
<td>Japan:</td>
<td>Inventory of Existing and New Chemical Substances (ENCS)</td>
<td>Yes</td>
</tr>
<tr>
<td>Korea:</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
<tr>
<td>Philippines:</td>
<td>Philippines Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Yes - All components of this product are in compliance with the inventory requirements administered by the governing country.
No - One or more components of this product are not on the inventory or are exempt from listing.

**15.2 Chemical safety assessment**
For this product a chemical safety assessment was not carried out.

**SECTION 16 - OTHER INFORMATION**

<table>
<thead>
<tr>
<th>Hazardous Material Information System (HMIS)</th>
<th>National Fire Protection Association (NFPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Flammability</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Flammability</td>
<td>1</td>
</tr>
<tr>
<td>Physical Hazard</td>
<td>0</td>
</tr>
<tr>
<td>Personal Protection</td>
<td>F</td>
</tr>
<tr>
<td>HMIS Hazard Rating Legend</td>
<td>NFPA Hazard Rating Legend</td>
</tr>
<tr>
<td>0 = Minimal 1 = Slight 2 = Moderate 3 = Serious</td>
<td>0 = Insignificant 1 = Slight 2 = Moderate 3 = High 4 = Extreme</td>
</tr>
<tr>
<td>4 = Severe * = Chronic Health Hazard</td>
<td>Special</td>
</tr>
</tbody>
</table>

**Abbreviation Key**

- ACGIH: American Conference of Governmental Industrial Hygienists
- ADR: Accord Dangereux Routier (European regulations concerning the international transport of dangerous goods by road)
- CAS: Chemical Abstract Services
- CFR: Code of Federal Regulations
- DOT: Department of Transportation

**Effective Date:** 8 July 2017
**Supercedes:** 28 October 2013

**Safety Data Sheet**
**Adipic Acid**
DISCLAIMER OF RESPONSIBILITY

The information on this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume damage or expense arising out of or in any way responsibility and expressly disclaim liability for loss, connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this SDS information may not be applicable.

Revision Date: 8 July 2017