Safety Data Sheet

Section 1 - Product and Company Identification

Product name： Sulfamic acid
Other names：--
Product use： Metal & ceramic cleaning; Nitrite removal in azo dye operations; Gas liberating compositions; Organic synthesis; Analytical acidimetric standard; Amine sulfamates used as plasticizers & fire retardants for paper & cellulosics; Stabilizing agent for chlorine & hypochlorite in swimming pools, closed water systems; Bleaching paper pulp & textiles; Catalyst for urea-formaldehyde resins.
Supplier's name：San Fu Chemical Co., Ltd.
Supplier's address：340 Hsiao Hsin Li, Shan-Hua District, Tainan City, Taiwan, R.O.C.
Supplier’s phone：886-6-5837608 Emergency phone：886-6-5837608
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Section 2 - Hazards Identification

Classification：

1. Corrosive to Metals Category 1
2. Skin Corrosion/Irritation Category 1
3. Serious Eye Damage/Eye Irritation Category 1
4. Hazardous to the aquatic environment (Chronic aquatic toxicity) Category 3

The Most Important Hazards and effect

Label element：

- Hazard symbol： Corrosive

- Signal word：Danger

Hazard statement：

1. May corrode metals
2. Cause severe skin burns and eyes damage
3. Cause serious eye irritation
4. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Precautionary statement：

1. If contact with eyes, flush with plenty of water. Get medical attention immediately.
2. Avoid discharge into the environment.
3. Wear appropriate protective gear, including clothing, gloves, chemical safety goggles and/or a full face shield.

Others Hazard：--

Section 3 - Composition/Information On Ingredients

pure substance：

Chemical name：Sulfamic acid
Synonyms：Amidsulfonic acid; Amidsulfuric acid; Aminesulfonic acid; Aminosulfonic acid; Aminosulfuric acid; Sulfamidic acid; Sulphamic acid
CAS No.：5329-14-6
Ingredient contributing to the hazard(%)：>99%

Section 4 - First Aid Measures

The First-aid Information：

■ Inhalation：

1. Remove to fresh air immediately
2. If not breathing, induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
3. If breathing is difficult, give oxygen as trained.
4. Get medical attention immediately.

■ Skin Contact：

1. Remove all contaminated clothing and shoes. Wash off with soap and plenty of water for at least 15 minutes.
2. Get medical attention immediately.
3. Wash and dry clothing before reuse.
4. Destroy contaminated shoes.

■ Eye Contact：

1. Immediately hold eyelids apart and flush the eye continuously with running water for at least 15 minutes.
2. Get medical attention immediately.

■ Ingestion：

1. For advice, contact a Poisons Information Centre or a doctor at once.
2. Do NOT induce vomiting or give liquid to an unconscious person.
3. Give plenty of water or milk. Allow vomiting.
4. If vomiting occurs, lean patient forward (head-down position, if possible) to maintain open airway and prevent aspiration.
5. If becoming unconscious, place the patient’s head on the left side.
6. Get medical attention immediately.

The Most Important Symptoms and Hazardous Effects： respiratory tract burns, skin burns, eye burns, mucous membrane burns
Protection of First-aiders：First-aid in safety zone, wearing Chemical protective suit (Level C)
Notes to a Physician：If inhaled, consider treating with oxygen. If swallowed, avoid further vomit and gastric lavage.

Section 5 - Fire Fighting Measures

Extinguishing Media： Non-flammable
1. Specific Hazards when Fire-fight：Not considered to be a significant fire risk. 2. Acids may react with metals to produce hydrogen, a highly flammable and explosive gas.
1. Specific Fire-fighting Procedure： Move the undamaged containers from fire area if safe to do so.

2. Water spray may be used to reduce vapors and cool containers exposed to fire. 3. Stay away from tanks.
Specific Protection of Firefighters： 1. As in any fire, wear a self-contained breathing apparatus in pressure demand, MSHA/NIOSH (approved or equivalent), and full chemical protective suit. 2. If necessary, may cover a spark-proof coat on the protective suit.

Section 6 - Accidental Release Measures

Personal Precautions： 1. Keep unnecessary and unprotected people away from area. 2. Ensure clean up is conducted by trained personnel only. 3. Wear proper personal protection gears.
Environmental Precautions： 1. Isolate contaminated area. 2. Provide ventilation. 3. Notify the occupational safety health unit or environmental protection unit.
Methods for Cleaning up： 1. Avoid contact with spills. 2. If safe to do so, stop or reduce spills. 3. Small spills: absorb spill with sand or other inert and non-flammable materials. Seal in suitable containers for disposal. 4. Small spills: move containers to safe place, away from contaminated area. 5. Large spills: dike spill with sand or other inert materials. Collect residues and seal in labeled drums for disposal.

Section 7 - Handling and Storage

Handling： 1. Keep work area clean. 2. Wear protective clothing. 3. Avoid contact with skin and eye. 4. When handling, do NOT eat, drink or smoke. 5. Operate and open container carefully. 6. Do not put unused substance back into container. 7. Avoid physical damage to containers. 8. Always wash hands with soap and water after handling. 9. Work clothes should be laundered separately.
Storage： 1. Check all containers are clearly labeled and free from leaks. 2. The flooring should be covered or coated with anti-acid materials. 3. Store in original containers. 4. Keep containers securely sealed. 5. Store in a cool, dry, well-ventilated area. 6. Store away from incompatible materials and foodstuff containers. 7. Protect containers against physical damage and check regularly for leaks.

Section 8 - Exposure Controls & Personal Protection

Engineering measures：A system of local and/or general exhaust is recommended to keep employee exposures as low as possible.

Control parameters			
TWA	STEL	Ceiling	Biological standards
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Personal protective equipment：

- ■ Respiratory Protection：
  1. Wear a half-face dust/mist respirator for exposure to high concentration.
  2. The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
  3. Observe manufacturer's warnings and recommendations before use.
  4. Use a (powered) respirator with high effective prefilter against dust, vapor, and smoke.
  5. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator.
  6. Use an approved positive-pressure, self-contained breathing apparatus.
- ■ Hand Protection： chemical protective gloves
- ■ Eye Protection：
  1. Wear chemical protective goggles/mask
  2. Provide an eyewash facility and a safety shower.
- ■ Skin and Body Protection： chemical protective clothing

Hygiene measures：

1. Remove contaminated clothes, clean thoroughly before reuse or disposal. Must advise the danger to the laundry worker.
2. Wash hand thoroughly after handing this substance.
3. Maintain a clean work environment.

Section 9 - Physical & Chemical Properties

Appearance：solid	Odor：odorless
Color：white	Melting Point: --
pH value：1.18 (1% solution)	Boiling point/boiling range： Decomposes
Flammability: --	Flash point： --
Decomposition temp：200℃	Test method：--
Auto ignition temp：--	Explosion properties：--
Vapor pressure：--	Vapor density：/
Density：2.15 (water= 1)	Solubility：solubility in water 14.7%@0℃. Soluble in liquid ammonia, N-dimethylformamide, Pyridine, formamide, and nitrogen-containing organic solvent. Insoluble in ether.

log Kow：--	Evaporation Rate：/

Section 10 - Stability & Reactivity Data

Stability：Stable when dry
Possible hazardous reactions under specific conditions： 1. Alkali - Violent reaction 2. Bromine gas – Oxidize to sulphuric acid, nitrogen 3. Chlorine – Forms sensitive, explosive nitrogen trichloride 4. Metal Nitrates + Nitrites – Violent reaction with heat 5. Nitric acid – Violent release of nitrous oxide 6. Oxidizers (strong) – Fire and explosion hazard 7. Potassium Chlorate – Oxidize to sulphuric acid, nitrogen
Conditions to avoid： 1. Avoid contact with heat, sparks, flames, or other sources of ignition. 2. Dangerous gas may accumulate in confined space. 3. If contact with flammable materials, may cause fire or explosion.
Materials to avoid：oxidizing agents, bases, halogen
Hazardous decomposition products：nitrogen oxides, ammonia, sulfur oxides

Section 11 - Toxicological Information

Route of exposure：skin、ingestion、inhalation, eye
Symptoms：coughing, choking, mucous membrane damage, dizziness, headache, nausea, weakness, chest tightness, shortness of breath, frothy phlegm, and cyanosis; skin pain, and burns; eye pain, tears, sensitivity to light, burns and blindness; pain and burns around and in the mouth, the throat and oesophagus.
Immediate Toxicity： ■ Skin： 1. Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue. 2. Skin contact is not thought to have harmful health effects; the material may still produce health damage following entry through wounds, lesions or abrasions. 3. Solution of material in moisture on the skin, or perspiration, may markedly increase skin corrosion and accelerate tissue destruction. ■ Inhalation： 1. The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. 2. Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness. 3. Swelling of the lungs can occur, either immediately or after a delay; symptoms of this include chest tightness, shortness of breath, frothy phlegm and cyanosis. Lack of oxygen can cause death hours after onset. 4. Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive

concentrations of particulate are inhaled

- Eye：
  1. If applied to the eyes, this material causes severe eye damage.
  2. Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns.
  3. Mild burns of the epithelia generally recover rapidly and completely. Severe burns produce long-lasting and possibly irreversible damage.
  4. The appearance of the burn may not be apparent for several weeks after the initial contact. The cornea may ultimately become deeply opaque resulting in blindness.
- Ingestion：
  1. Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus.
  2. Immediate pain and difficulties in swallowing and speaking may also be evident.
  3. Swelling of the epiglottis may make it difficult to breathe which may result in suffocation.
  4. More severe exposure may result in vomiting blood and thick mucus, shock, abnormally low blood pressure, fluctuating pulse, shallow respiration and clammy skin, inflammation of stomach wall, and rupture of oesophageal tissue.
  5. Untreated shock may eventually result in kidney failure.
  6. Severe cases may result in perforation of the stomach and abdominal cavity with consequent infection, rigidity and fever.
  7. There may be severe narrowing of the oesophageal or pyloric sphincters; this may occur immediately or after a delay of weeks to years.
  8. There may be coma and convulsions, followed by death due to infection of the abdominal cavity, kidneys or lungs.
  9. The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
  10. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (eg. liver, kidney) damage is evident.
  11. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health).
  12. Gastrointestinal tract discomfort may produce nausea and vomiting.
  13. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.
  - LD_{50}: 3160 mg/kg (RAT, ORAL)
  - LC_{50}:
    1. 500mg/24H (rabbit, skin) serious irritation
    2. 250μg/24H (rabbit, eye) serious irritation

Specific effects：

1. Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.
2. Chronic exposure may inflame the skin or conjunctiva. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.
3. Long term exposure to high dust concentrations may cause changes in lung function i.e.

pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

4. Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems

Section 12 - Ecological Information

Ecotoxicology：

- LC_{50}(fish)：70300 μg/L/96 Year (Pimephales promelas)
- EC_{50}(Aquatic Invertebrates)：--
- Bioconcentration factor (BCF)：--

Persistence and degradability：

- Half-Life (Air)：--
- Half-Life (Water surface)：--
- Half-Life (Groundwater)：--
- Half-Life (Soil)：--

Bioaccumulative potential：--

Mobility in soil：--

Other adverse effects：--

Section 13 - Disposal Considerations

Methods of disposal：

1. Land treatment or burial (sanitary landfill) disposal practices. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices.
2. Neutralization & discharge to sewer: Carefully dissolve in water and neutralize with dilute acetic acid. Flush to sewer with lots of water, regulations permitting or dispose of through a licensed contractor. Consider use of waste caustic for neutralizing plant acid wastes.
3. Recycle any unused portion of the material for its approved use or return it to the manufacturer or supplier.

Section 14 - MSDS Transport Information

UN classification number：2967

Proper D.O.T Shipping Name：Sulfamic acid

Hazard Class：8

Packing Group：Ⅲ

Marine pollution：No

Specific precautionary transport measures and conditions：--

Section 15 - Regulatory Information

Regulations：

1. Enforcement Rules of the Labor Safety and Health Act

2. Regulation of Labelling and Hazard Communication of Dangerous and Harmful Materials 3. Standards of Permissible Exposure Limits of Airborne Hazardous Substances in Workplace 4. Road Traffic Safety Regulations 5. Industrial Waste Storage and Disposal Regulations and Facility Standards

Section 16 - Other Information

Literature references	1. RTECS Data Bank, TOMES PLUS CD, Vol.68, 2006 2. ChemWatch Data Bank, 2006-1 3. OHS MSDS Data Bank, 2006 4. HSDB Data Bank TOMES PLUS CD, Vol.68, 2006	
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Remarks	Symbols Explanations: "--" No information is available at this time. "/" Not applicable to this substance.	

■ This information above has consulted national or international papers and manufacturer or supplier's provided information. The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Users should make their own determination of the suitability of the information for their particular purposes.