Standard Operating Procedure
For
Sodium Azide

\[
\text{Na}^+ \\
\text{N}^-=\text{N}^+=\text{N}^-
\]

PURPOSE:

Describe proper handling and disposal procedures for Sodium Azide and Sodium Azide solutions.

Sodium Azide is a colorless, odorless, crystalline solid that is readily soluble in water. It is used as a preservative of samples and stock solutions in laboratories. Typically, it is used in strengths of 0.1 to 2.0%. Pure Sodium Azide and concentrated solutions of Sodium Azide are acutely toxic and can be reactive when heated near their decomposition temperature. Dilute solutions of Sodium Azide should not be poured down the drain because it can react with metals in plumbing systems to form explosive metal halides.

Sodium Azide is also used as an explosive trigger in automobile airbags, as well as a chemical reagent in organic synthesis labs.

HEALTH EFFECTS:

Sodium Azide is extremely toxic. Ingestion of small amounts can be fatal, LD50 Oral – Rabbit – 10mg/kg. Skin contact may also be fatal, LD50 Dermal – rabbit – 20mg/kg. Inhalation may also be fatal, LC50 Inhalation – rat – 37mg/m^3. Sodium Azide prevents oxygen from being used by the cells in the body, thus killing them.

\textit{Signs of acute exposure:}

- **Eyes:** Redness, pain, irritation
- **Skin:** Irritation, redness, blisters. May be fatal if absorbed through the skin.
Ingestion: Irritation of the digestive tract, abdominal pain, nausea, sweating, vomiting, and diarrhea. May cause low blood pressure, rapid heart rate, skin discoloration, and possible coma.

Inhalation: Severe irritation of the respiratory tract with sore throat, cough, clear drainage from the nose, blurred vision, dizziness, shortness of breath, respiratory failure leading to death.

(Note: Hydrazoic Acid, generated when sodium azide reacts with acid or water, in gaseous form is lighter than air.)

**Signs of chronic exposure:** Liver and Kidney damage. Repeated exposure may cause spleen damage. Laboratory studies have shown mutagenic effects, development of tumors in animals, and blood effects. Survivors of Sodium Azide poisoning may exhibit brain and heart damage.

**REGULATORY LIMITS:**

NIOSH: Recommended exposure limit is 0.3 mg/m³ - ceiling (skin) - as Sodium Azide. 0.1ppm as Hydrazoic Acid.

ACGIH: Recommended threshold limit value – ceiling – of 0.3mg/m³ as Sodium Azide. 0.1ppm as Hydrazoic Acid.

**REQUIREMENTS:**

Based on the risk associated with the use of Sodium Azide, the safety procedures outlined below are required by all research staff when working with Sodium Azide.

**Administrative Controls:**

- Anyone who uses Sodium Azide is required to review this SOP and the attached Safety Data Sheet (SDS) prior to work.
- Storage should take place in a secure, cool, ventilated area, with a tightly closed container.
- Keep segregated away from acids and other incompatibles such as metals and oxidizing or reducing reagents.
- Keep quantities to a minimum and only order what you will be using.
- An eye wash should be available in the room with a safety shower accessible nearby.
- If using large quantities or heating sodium azide in a chemical reaction, a blast shield should be in place.
- Never use a metal spatula when manipulating Sodium Azide.

**Engineering Controls:**

- Sodium Azide powder must be used in a functioning chemical fume hood including when weighing out powders or if being used in a chemical reaction.
- Concentrating solutions on a rotary evaporator or drying under vacuum should also take place within a chemical fume hood.

**Personal Protective Equipment (PPE):**

- For sodium azide solutions: Nitrile gloves, a lab coat, and safety glasses.
If using large quantities or heating sodium azide in a chemical reaction, nitrile gloves (double gloving recommended), a lab coat, safety glasses and a face shield should be used during manipulations.

**Waste Disposal:**
- All Sodium Azide waste, including dilute solutions and contaminated solid waste (weigh paper, pipet tips, gloves, etc) will be disposed of as a hazardous material through EHS (https://itsapps.unc.edu/HazMat_Pickup/)
- Do not discard Sodium Azide waste down the sink. Do not mix Sodium Azide waste with acidic waste.

**Accidents or Injuries:**
- If Sodium Azide is splashed on an individual or in eyes, flush for 15 minutes with copious quantities of water and immediately contact the University Employee Occupational Health Clinic (919-966-9119).
- Spill procedures:
  - Do not attempt to clean-up if you feel unsure of your ability to do so or if you perceive the risk to be greater than normal laboratory operations.
  - If a small spill occurs within a chemical fume hood, Sodium azide crystals should be swept up and surfaces or equipment cleaned with pH-adjusted water (pH greater than 9.0). Cover spills of sodium azide solution with absorbent material, and clean surfaces with pH-adjusted water. Collect spilled material and clean up material into appropriately labeled, non-metallic waste container. All spill clean-up material should be disposed of as hazardous waste.
  - If a large spill occurs, notify others in the area and evacuate room immediately. Contact EHS (919-962-5507) during working hours and 911 if after hours.
1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers
- Product name: Sodium azide
- Product Number: S2002
- Brand: Sigma-Aldrich
- Index-No.: 011-004-00-7
- CAS-No.: 26628-22-8

1.2 Relevant identified uses of the substance or mixture and uses advised against
- Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
- Company: Sigma-Aldrich
  3050 Spruce Street
  SAINT LOUIS MO 63103
  USA
- Telephone: +1 800-325-5832
- Fax: +1 800-325-5052

1.4 Emergency telephone number
- Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
- GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
  - Acute toxicity, Oral (Category 2), H300
  - Acute toxicity, Dermal (Category 1), H310
  - Acute aquatic toxicity (Category 1), H400
  - Chronic aquatic toxicity (Category 1), H410
- For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements
- Pictogram
- Signal word: Danger
- Hazard statement(s)
  - H300 + H310: Fatal if swallowed or in contact with skin
  - H410: Very toxic to aquatic life with long lasting effects.
- Precautionary statement(s)
  - P262: Do not get in eyes, on skin, or on clothing.
  - P264: Wash skin thoroughly after handling.
  - P270: Do not eat, drink or smoke when using this product.
  - P273: Avoid release to the environment.
  - P280: Wear protective gloves/ protective clothing.
  - P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P302 + P350 IF ON SKIN: Gently wash with plenty of soap and water.
P310 Immediately call a POISON CENTER or doctor/ physician.
P322 Specific measures (see supplemental first aid instructions on this label).
P330 Rinse mouth.
P361 Remove/Take off immediately all contaminated clothing.
P363 Wash contaminated clothing before reuse.
P391 Collect spillage.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
Contact with acids liberates very toxic gas.
Sodium Azide may react with lead and copper plumbing to form highly explosive metal azides., Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS
3.1 Substances

<table>
<thead>
<tr>
<th>Formula</th>
<th>Molecular Weight</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N₃Na</td>
<td>65.01 g/mol</td>
<td>26628-22-8</td>
<td>247-852-1</td>
<td>011-004-00-7</td>
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</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium azide</td>
<td>Acute Tox. 2; Acute Tox. 1; Aquatic Acute 1; Aquatic Chronic 1; H300 + H310, H410</td>
<td>-</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES
4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES
5.1 Extinguishing media

Suitable extinguishing media
Dry powder
5.2 Special hazards arising from the substance or mixture
Sodium oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage. Do not store near acids.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
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<tbody>
<tr>
<td>Sodium azide</td>
<td>26628-22-8</td>
<td>C</td>
<td>0.1 ppm</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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</table>

Remarks
Potential for dermal absorption

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<td></td>
<td>C</td>
<td></td>
<td>0.3 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
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Potential for dermal absorption

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<tr>
<td></td>
<td>C</td>
<td></td>
<td>0.1 ppm</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
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Skin notation

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<td>Skin notation</td>
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<tbody>
<tr>
<td></td>
<td>C</td>
<td></td>
<td>0.11 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
</tbody>
</table>

Lung damage
Cardiac impairment
Not classifiable as a human carcinogen
8.2 Exposure controls

**Appropriate engineering controls**
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Personal protective equipment**

- **Eye/face protection**
  - Face shield and safety glasses
  - Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

- **Skin protection**
  - Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

  - Full contact
    - Material: Nitrile rubber
    - Minimum layer thickness: 0.11 mm
    - Break through time: 480 min
    - Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

  - Splash contact
    - Material: Nitrile rubber
    - Minimum layer thickness: 0.11 mm
    - Break through time: 480 min
    - Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M)

  - Data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

  - If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

- **Body Protection**
  - Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

- **Respiratory protection**
  - Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) 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).

- **Control of environmental exposure**
  - Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

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### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1 Information on basic physical and chemical properties

- **Appearance**
  - Form: crystalline
  - Colour: white

- **Odour**
  - No data available

- **Odour Threshold**
  - No data available

- **pH**
  - 10 at 65 g/l at 25 °C (77 °F)

- **Melting point/freezing**
  - 275 °C (527 °F)
9.2 Other safety information

Bulk density
0.8 kg/m³

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
An explosion occurred when a mixture of sodium azide, methylene chloride, dimethyl sulfoxide, and sulfuric acid were being concentrated on a rotary evaporator.

10.5 Incompatible materials
Halogenated hydrocarbon, Metals, Acids, Acid chlorides

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD₅₀ Oral - rabbit - 10 mg/kg
LC50 Inhalation - rat - 37 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Other. Behavioral: Convulsions or effect on seizure threshold. Lungs, Thorax, or Respiration: Structural or functional change in trachea or bronchi.

LD50 Dermal - rabbit - 20 mg/kg
no data available

**Skin corrosion/irritation**
no data available

**Serious eye damage/eye irritation**
no data available

**Respiratory or skin sensitisation**
no data available

**Germ cell mutagenicity**
no data available

**Carcinogenicity**
IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

**Reproductive toxicity**
no data available

**Specific target organ toxicity - single exposure**
no data available

**Specific target organ toxicity - repeated exposure**
no data available

**Aspiration hazard**
no data available

**Additional Information**
RTECS: VY8050000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Nausea, Headache, Vomiting, Laboratory experiments in animals have shown sodium azide to produce a profound hypotensive effect, demyelination of myelinated nerve fibers in the central nervous system, testicular damage, blindness, attacks of rigidity, and hepatic and cerebral effects.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

### 12. ECOLOGICAL INFORMATION

#### 12.1 Toxicity
no data available

Toxicity to daphnia and other aquatic invertebrates

**EC50 - Daphnia pulex (Water flea)** - 4.2 mg/l - 48 h

#### 12.2 Persistence and degradability
no data available

#### 12.3 Bioaccumulative potential
no data available
12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1687  Class: 6.1  Packing group: II
Proper shipping name: Sodium azide
Reportable Quantity (RQ): 1000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1687  Class: 6.1  Packing group: II
Proper shipping name: SODIUM AZIDE
Marine pollutant: No
EMS-No: F-A, S-A

IATA
UN number: 1687  Class: 6.1  Packing group: II
Proper shipping name: Sodium azide

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

<table>
<thead>
<tr>
<th>CAS-No.</th>
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<tbody>
<tr>
<td>26628-22-8</td>
<td>2007-07-01</td>
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Sodium azide

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

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Sodium azide

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

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Sodium azide

Pennsylvania Right To Know Components

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Sodium azide

New Jersey Right To Know Components

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Sodium azide
California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

| Acute Tox. | Acute toxicity |
| Aquatic Acute | Acute aquatic toxicity |
| Aquatic Chronic | Chronic aquatic toxicity |
| H300 | Fatal if swallowed. |
| H300 + H310 | Fatal if swallowed or in contact with skin |
| H310 | Fatal in contact with skin. |

HMIS Rating
Health hazard: 4
Chronic Health Hazard: *
Flammability: 0
Physical Hazard 0

NFPA Rating
Health hazard: 4
Fire Hazard: 0
Reactivity Hazard: 0

Further information
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Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956
Version: 6.7 Revision Date: 05/28/2014 Print Date: 06/17/2014