



BTIproductsLLC

## Safety Data Sheet

**Section 1: Identification**

Product Name: MICKit® 4 Test Kit  
Product Code: MICKit® 4

Manufacturer: BTI Products, LLC.  
652 Silver Hills Road  
Bayfield, Colorado 81122  
USA

Telephone: (970) 884-4629  
Website: [www.bti-labs.com](http://www.bti-labs.com)  
Email: [products@bti-labs.com](mailto:products@bti-labs.com)

Emergency Phone: (800) 262-8200 CHEMTREC

Recommended Use: Microbiological testing for active corrosion

Restrictions on Use: Use only as directed on instructions

**Section 2: Hazardous Component Identification**

United States (US)  
According to OSHA 1910.1200

**Components: (see following individual SDS for detailed information)**

- 2N Hydrochloric Acid (HCl) 20%
- Buffer Solution:
  - Ammonium Chloride 6.29%
  - Ammonium Hydroxide 53.19%

**Section 3: Composition/Information on Ingredients**

See following individual SDS for detailed information

**Section 4: First-Aid Measures**

See following individual SDS for detailed information

**Section 5: Fire-Fighting Measures**

See following individual SDS for detailed information

**Section 6: Accidental Release Measures**

See following individual SDS for detailed information

**Section 7: Handling and Storage**

See following individual SDS for detailed information

**Section 8: Exposure Controls/ Personal Protection**

See following individual SDS for detailed information

**Section 9: Physical and Chemical Properties**

See following individual SDS for detailed information

**Section 10: Stability and Reactivity**

See following individual SDS for detailed information

**Section 11: Toxicological Information**

See following individual SDS for detailed information

**Section 12: Ecological Information**

See following individual SDS for detailed information

**Section 13: Disposal Considerations**

See following individual SDS for detailed information

**Section 14: Transport Information**

See following individual SDS for detailed information

**Section 15: Regulatory Information**

See following individual SDS for detailed information

|                                      |
|--------------------------------------|
| <b>Section 16: Other Information</b> |
|--------------------------------------|

Date of Last Revision: August 30, 2019

Preparation Date: July 31, 2015

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## SAFETY DATA SHEET

Version 5.5  
Revision Date 02/26/2015  
Print Date 04/28/2015

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**1. PRODUCT AND COMPANY IDENTIFICATION****1.1 Product identifiers**

Product name : Ammonium chloride

Product Number : 213330  
Brand : Sigma-Aldrich  
Index-No. : 017-014-00-8

CAS-No. : 12125-02-9

**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

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**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 4), H302  
Eye irritation (Category 2A), H319  
Acute aquatic toxicity (Category 2), H401  
Chronic aquatic toxicity (Category 2), H411

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

Warning

Hazard statement(s)

H302  
H319  
H411

Harmful if swallowed.  
Causes serious eye irritation.  
Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264  
P270  
P273  
P280  
P301 + P312 + P330

Wash skin thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
Avoid release to the environment.  
Wear eye protection/ face protection.  
IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.

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 advice/ attention.  
 P391 Collect spillage.  
 P501 Dispose of contents/ container to an approved waste disposal plant.

**2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none**

**3. COMPOSITION/INFORMATION ON INGREDIENTS**

**3.1 Substances**

Synonyms : Salmiac  
 Formula : H<sub>4</sub>CIN  
 Molecular weight : 53.49 g/mol  
 CAS-No. : 12125-02-9  
 EC-No. : 235-186-4  
 Index-No. : 017-014-00-8

**Hazardous components**

| Component                | Classification  | Concentration |
|--------------------------|---|---------------|
| <b>Ammonium chloride</b> |   |               |
|                          | Acute Tox. 4; Eye Irrit. 2A;<br>Aquatic Acute 2; Aquatic<br>Chronic 2; H302, H319, H411 | <= 100 %      |

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. Consult a physician.

**In case of eye contact**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**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**

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

**5.2 Special hazards arising from the substance or mixture**

No data available

**5.3 Advice for firefighters**

Wear self-contained breathing apparatus for firefighting if necessary.

**5.4 Further information**

No data available

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## 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. 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. Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections

For disposal see section 13.

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## 7. HANDLING AND STORAGE

### 7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.

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.

Hygroscopic.

Storage class (TRGS 510): Non Combustible Solids

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### Components with workplace control parameters

| Component         | CAS-No.    | Value  | Control parameters             | Basis                                   |
|-------------------|------------|--|--------------------------------|---|
| Ammonium chloride | 12125-02-9 | TWA  | 10.000000<br>mg/m <sup>3</sup> | USA. ACGIH Threshold Limit Values (TLV) |
|                   | Remarks    | Eye & Upper Respiratory Tract irritation             |                                |   |
|                   |            | STEL   | 20.000000<br>mg/m <sup>3</sup> | USA. ACGIH Threshold Limit Values (TLV) |
|                   |            | Eye & Upper Respiratory Tract irritation             |                                |   |
|                   |            | TWA  | 10.000000<br>mg/m <sup>3</sup> | USA. NIOSH Recommended Exposure Limits  |
|                   |            | ST   | 20.000000<br>mg/m <sup>3</sup> | USA. NIOSH Recommended Exposure Limits  |
|                   |            | TWA  | 10.000000<br>mg/m <sup>3</sup> | USA. ACGIH Threshold Limit Values (TLV) |
|                   |            | Upper Respiratory Tract irritation<br>Eye irritation |                                |   |
|                   |            | STEL   | 20.000000<br>mg/m <sup>3</sup> | USA. ACGIH Threshold Limit Values (TLV) |
|                   |            | Upper Respiratory Tract irritation<br>Eye irritation |                                |   |

|  |  |     |                    |   |
|--|--|-----|--------------------|---|
|  |  | TWA | 10.000000<br>mg/m3 | USA. NIOSH Recommended<br>Exposure Limits |
|  |  | ST  | 20.000000<br>mg/m3 | USA. NIOSH Recommended<br>Exposure Limits |

## 8.2 Exposure controls

### Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

### Personal protective equipment

#### Eye/face protection

Safety glasses with side-shields conforming to EN166 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: Dermatrill® (KCL 740 / Aldrich Z677272, Size M)

#### Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 480 min

Material tested: Dermatrill® (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

For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator. For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. 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.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

- |                                 |  |
|---------------------------------|--|
| a) Appearance                   | Form: Crystalline powder                       |
| b) Odour                        | No data available                              |
| c) Odour Threshold              | No data available                              |
| d) pH                           | 4.5 - 5.5 at 50.00000 g/l at 20.0 °C (68.0 °F) |
| e) Melting point/freezing point | Melting point/range: 340 °C (644 °F) - lit.    |
| f) Initial boiling point and    | No data available                              |

boiling range

- |   |   |
|---|---|
| g) Flash point                                  | Not applicable                            |
| h) Evaporation rate                             | No data available                         |
| i) Flammability (solid, gas)                    | No data available                         |
| j) Upper/lower flammability or explosive limits | No data available                         |
| k) Vapour pressure                              | 1.3 hPa (1.0 mmHg) at 160.4 °C (320.7 °F) |
| l) Vapour density                               | No data available                         |
| m) Relative density                             | No data available                         |
| n) Water solubility                             | soluble                                   |
| o) Partition coefficient: n-octanol/water       | No data available                         |
| p) Auto-ignition temperature                    | No data available                         |
| q) Decomposition temperature                    | No data available                         |
| r) Viscosity                                    | No data available                         |
| s) Explosive properties                         | No data available                         |
| t) Oxidizing properties                         | No data available                         |

## 9.2 Other safety information

|              |                       |
|--------------|-----------------------|
| Bulk density | 500 kg/m <sup>3</sup> |
|--------------|-----------------------|

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## 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

Exposure to moisture may affect product quality.

### 10.5 Incompatible materials

Strong acids, Strong bases, Strong oxidizing agents

### 10.6 Hazardous decomposition products

Other decomposition products - No data available  
In the event of fire: see section 5

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## 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on toxicological effects

#### Acute toxicity

LD50 Oral - Rat - 1,650 mg/kg

Inhalation: No data available

Dermal: No data available

No data available



**Skin corrosion/irritation**

Skin - Rabbit

Result: No skin irritation

**Serious eye damage/eye irritation**

Eyes - Rabbit

Result: Eye irritation

**Respiratory or skin sensitisation**

Will not occur

**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.

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

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

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: BP4550000

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

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**12. ECOLOGICAL INFORMATION****12.1 Toxicity**

Toxicity to fish LC50 - Cyprinus carpio (Carp) - 209.00 mg/l - 96 h  
LC50 - Oncorhynchus mykiss (rainbow trout) - 3.98 mg/l - 96 h  
NOEC - Oncorhynchus mykiss (rainbow trout) - 57 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates LC50 - Daphnia magna (Water flea) - 161 mg/l - 48 h

Growth inhibition NOEC - Daphnia magna (Water flea) - 0.1 mg/l - 216 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.  
Toxic to aquatic life.

No data available

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## 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.

#### Contaminated packaging

Dispose of as unused product.

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## 14. TRANSPORT INFORMATION

### DOT (US)

UN number: 3077      Class: 9      Packing group: III  
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Ammonium chloride)  
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

### IMDG

Not dangerous goods

### IATA

Not dangerous goods

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## 15. REGULATORY INFORMATION

### SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

### SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

### SARA 311/312 Hazards

Acute Health Hazard

### Massachusetts Right To Know Components

|                   | CAS-No.    | Revision Date |
|-------------------|------------|---------------|
| Ammonium chloride | 12125-02-9 | 1994-04-01    |

### Pennsylvania Right To Know Components

|                   | CAS-No.    | Revision Date |
|-------------------|------------|---------------|
| Ammonium chloride | 12125-02-9 | 1994-04-01    |

### New Jersey Right To Know Components

|                   | CAS-No.    | Revision Date |
|-------------------|------------|---------------|
| Ammonium chloride | 12125-02-9 | 1994-04-01    |

### 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.

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## 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       |
| Eye Irrit.      | Eye irritation                 |
| H302            | Harmful if swallowed.          |
| H319            | Causes serious eye irritation. |
| H401            | Toxic to aquatic life.         |

### HMIS Rating

|                        |   |
|------------------------|---|
| Health hazard:         | 2 |
| Chronic Health Hazard: |   |
| Flammability:          | 0 |
| Physical Hazard        | 0 |

### NFPA Rating

|                    |   |
|--------------------|---|
| Health hazard:     | 2 |
| 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: 5.5

Revision Date: 02/26/2015

Print Date: 04/28/2015

## SAFETY DATA SHEET

Version 4.15  
Revision Date 07/28/2015  
Print Date 07/29/2015

**1. PRODUCT AND COMPANY IDENTIFICATION****1.1 Product identifiers**

Product name : Ammonium hydroxide solution

Product Number : 221228  
Brand : Sigma-Aldrich

CAS-No. : 1336-21-6

**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 4), H302  
Skin corrosion (Category 1), H314  
Serious eye damage (Category 1), H318  
Acute aquatic toxicity (Category 1), H400

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)

H302 : Harmful if swallowed.  
H314 : Causes severe skin burns and eye damage.  
H318 : Causes serious eye damage.  
H400 : Very toxic to aquatic life.

Precautionary statement(s)

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/ eye protection/ face protection.  
P301 + P312 + P330 : IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you

|  |  |
|--|--|
| P301 + P330 + P331<br>P303 + P361 + P353 | feel unwell. Rinse mouth.<br>IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  |
| P304 + P340 + P310                       | IF ON SKIN (or hair): Take off immediately all contaminated clothing.<br>Rinse skin with water/shower.   |
| P305 + P351 + P338 + P310                | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.<br>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician. |
| 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

Lachrymator.

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

### 3.2 Mixtures

Formula : H<sub>5</sub>NO  
Molecular weight : 35.05 g/mol

#### Hazardous components

| Component                 | Classification   | Concentration  |
|---------------------------|--|----------------|
| <b>Ammonium hydroxide</b> |  |                |
| CAS-No. 1336-21-6         | Acute Tox. 4; Skin Corr. 1B;<br>Eye Dam. 1; Aquatic Acute 1;<br>H302, H314, H318, H400 | >= 50 - < 70 % |
| EC-No. 215-647-6          |  |                |
| Index-No. 007-001-01-2    |  |                |

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

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

#### If inhaled

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

#### In case of skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

#### If swallowed

Do NOT induce vomiting. 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

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

## 5.2 Special hazards arising from the substance or mixture

Nitrogen oxides (NO<sub>x</sub>)

## 5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

## 5.4 Further information

No data available

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## 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

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

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections

For disposal see section 13.

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## 7. HANDLING AND STORAGE

### 7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Avoid contact with skin and eyes. Always open containers slowly to allow any excess pressure to vent.

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. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

May develop pressure. Refrigerate before opening. Handle and open container with care.

Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control parameters

#### Components with workplace control parameters

| Component          | CAS-No.   | Value  | Control parameters | Basis                                   |
|--------------------|-----------|--|--------------------|---|
| Ammonium hydroxide | 1336-21-6 | TWA  | 25.000000 ppm      | USA. ACGIH Threshold Limit Values (TLV) |
|                    | Remarks   | Upper Respiratory Tract irritation<br>Eye damage |                    |   |
|                    |           | TWA  | 25.000000 ppm      | USA. ACGIH Threshold Limit Values (TLV) |
|                    |           | Upper Respiratory Tract irritation<br>Eye damage |                    |   |
|                    |           | STEL   | 35.000000 ppm      | USA. ACGIH Threshold Limit Values (TLV) |
|                    |           | Upper Respiratory Tract irritation<br>Eye damage |                    |   |

|  |  |  |                                  |   |
|--|--|--|----------------------------------|---|
|  |  | STEL   | 35.000000 ppm                    | USA. ACGIH Threshold Limit Values (TLV) |
|  |  | Upper Respiratory Tract irritation<br>Eye damage |                                  |   |
|  |  | TWA  | 25.000000 ppm<br>18.000000 mg/m3 | USA. NIOSH Recommended Exposure Limits  |
|  |  | Often used in an aqueous solution.               |                                  |   |
|  |  | TWA  | 25.000000 ppm<br>18.000000 mg/m3 | USA. NIOSH Recommended Exposure Limits  |
|  |  | Often used in an aqueous solution.               |                                  |   |
|  |  | ST   | 35.000000 ppm<br>27.000000 mg/m3 | USA. NIOSH Recommended Exposure Limits  |
|  |  | Often used in an aqueous solution.               |                                  |   |
|  |  | ST   | 35.000000 ppm<br>27.000000 mg/m3 | USA. NIOSH Recommended Exposure Limits  |
|  |  | Often used in an aqueous solution.               |                                  |   |
|  |  | TWA  | 25 ppm                           | USA. ACGIH Threshold Limit Values (TLV) |
|  |  | Upper Respiratory Tract irritation<br>Eye damage |                                  |   |
|  |  | STEL   | 35 ppm                           | USA. ACGIH Threshold Limit Values (TLV) |
|  |  | Upper Respiratory Tract irritation<br>Eye damage |                                  |   |
|  |  | TWA  | 25 ppm<br>18 mg/m3               | USA. NIOSH Recommended Exposure Limits  |
|  |  | Often used in an aqueous solution.               |                                  |   |
|  |  | ST   | 35 ppm<br>27 mg/m3               | USA. NIOSH Recommended Exposure Limits  |
|  |  | Often used in an aqueous solution.               |                                  |   |

## 8.2 Exposure controls

### Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

### Personal protective equipment

#### Eye/face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). 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: butyl-rubber

Minimum layer thickness: 0.3 mm

Break through time: 480 min

Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

#### Splash contact

Material: Nitrile rubber

Minimum layer thickness: 0.11 mm

Break through time: 240 min

Material tested: Dermatrill® (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 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).

### **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.

---

## **9. PHYSICAL AND CHEMICAL PROPERTIES**

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

- |   |  |
|---|--|
| a) Appearance                                   | Form: liquid<br>Colour: colourless                               |
| b) Odour  | No data available  |
| c) Odour Threshold                              | No data available  |
| d) pH   | 11.7 at 20 °C (68 °F)  |
| e) Melting point/freezing point                 | -60 °C (-76 °F)  |
| f) Initial boiling point and boiling range      | 38 - 100 °C (100 - 212 °F) at 1,013 hPa (760 mmHg)               |
| g) Flash point                                  | Not applicable   |
| h) Evaporation rate                             | No data available  |
| i) Flammability (solid, gas)                    | No data available  |
| j) Upper/lower flammability or explosive limits | Upper explosion limit: 27 %(V)<br>Lower explosion limit: 16 %(V) |
| k) Vapour pressure                              | 153 hPa (115 mmHg) at 20 °C (68 °F)                              |
| l) Vapour density                               | 1.21 - (Air = 1.0)   |
| m) Relative density                             | 0.9 g/cm <sup>3</sup> at 25 °C (77 °F)                           |
| n) Water solubility                             | No data available  |
| o) Partition coefficient: n-octanol/water       | No data available  |
| p) Auto-ignition temperature                    | No data available  |
| q) Decomposition temperature                    | No data available  |
| r) Viscosity                                    | No data available  |
| s) Explosive properties                         | No data available  |
| t) Oxidizing properties                         | No data available  |

### **9.2 Other safety information**



Relative vapour density 1.21 - (Air = 1.0)

---

## 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

No data available

### 10.5 Incompatible materials

Copper, Iron, Zinc

### 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

No data available

Inhalation: No data available

Dermal: No data available

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.

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

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

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: Not available

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

---

**12. ECOLOGICAL INFORMATION****12.1 Toxicity**

No data available

**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**

Very toxic to aquatic life.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

---

**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: 2672      Class: 8      Packing group: III

Proper shipping name: Ammonia solution

Reportable Quantity (RQ): 1621 lbs

Poison Inhalation Hazard: No

**IMDG**

UN number: 2672      Class: 8      Packing group: III      EMS-No: F-A, S-B

Proper shipping name: AMMONIA SOLUTION

Marine pollutant: yes

**IATA**

UN number: 2672      Class: 8      Packing group: III

Proper shipping name: Ammonia solution

---

**15. REGULATORY INFORMATION****SARA 302 Components**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

### SARA 313 Components

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

|                    | CAS-No.   | Revision Date |
|--------------------|-----------|---------------|
| Ammonium hydroxide | 1336-21-6 | 2007-03-01    |

### SARA 311/312 Hazards

Acute Health Hazard

### Massachusetts Right To Know Components

|                    | CAS-No.   | Revision Date |
|--------------------|-----------|---------------|
| Ammonium hydroxide | 1336-21-6 | 2007-03-01    |

### Pennsylvania Right To Know Components

|                    | CAS-No.   | Revision Date |
|--------------------|-----------|---------------|
| Ammonium hydroxide | 1336-21-6 | 2007-03-01    |
| Water              | 7732-18-5 |               |

### New Jersey Right To Know Components

|                    | CAS-No.   | Revision Date |
|--------------------|-----------|---------------|
| Ammonium hydroxide | 1336-21-6 | 2007-03-01    |
| Water              | 7732-18-5 |               |

### 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                   |
| Eye Dam.      | Serious eye damage                       |
| H302          | Harmful if swallowed.                    |
| H314          | Causes severe skin burns and eye damage. |
| H318          | Causes serious eye damage.               |
| H400          | Very toxic to aquatic life.              |
| Skin Corr.    | Skin corrosion                           |

### HMIS Rating

|                        |   |
|------------------------|---|
| Health hazard:         | 3 |
| Chronic Health Hazard: |   |
| Flammability:          | 0 |
| Physical Hazard        | 0 |

### NFPA Rating

|                    |   |
|--------------------|---|
| Health hazard:     | 3 |
| 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: 4.15

Revision Date: 07/28/2015

Print Date: 07/29/2015

## SIGMA-ALDRICH

## MATERIAL SAFETY DATA SHEET

Date Printed: 28.04.2015

Date Updated: 14.06.2012

Version 1.11

## Section 1 - Product and Company Information

Product Name HYDROCHLORIC ACID SOLUTION 2.0 N  
Product Number H3037  
Brand SIGMA

Company Sigma-Aldrich  
Address 3050 Spruce Street  
SAINT LOUIS MO 63103 US  
Technical Phone: 800-325-5832  
Fax: 800-325-5052  
Emergency Phone: 314-776-6555

## Section 2 - Composition/Information on Ingredient

| Substance Name                             | CAS #     | SARA 313 |
|--|-----------|----------|
| HYDROCHLORIC ACID SOLUTION, >=5% -<br><10% | 7647-01-0 | No       |

| Ingredient Name   | CAS #     | Percent       | SARA 313 |
|-------------------|-----------|---------------|----------|
| WATER             | 7732-18-5 | >= 90<br>< 95 | No       |
| HYDROCHLORIC ACID | 7647-01-0 | >= 5<br>< 10  |          |

Formula HCl  
Synonyms Acide chlorhydrique (French) \* Acido cloridrico  
(Italian) \* Anhydrous hydrochloric acid \*  
Chloorwaterstof (Dutch) \* Chlorohydric acid \*  
Chlorowodor (Polish) \* Chlorwasserstoff (German)  
\* Hydrochloride \* Hydrogen chloride (ACGIH:OSHA)  
\* Muriatic acid \* Spirits of salt  
RTECS Number: MW4025000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Irritant.  
Irritating to eyes, respiratory system and skin.

## HMIS RATING

HEALTH: 2  
FLAMMABILITY: 0  
REACTIVITY: 0

## NFPA RATING

HEALTH: 2  
FLAMMABILITY: 0  
REACTIVITY: 0

For additional information on toxicity, please refer to Section 11.

---

## Section 4 - First Aid Measures

---

### ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

### INHALATION EXPOSURE

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

### DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

### EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

---

## Section 5 - Fire Fighting Measures

---

### FLASH POINT

N/A

### AUTOIGNITION TEMP

N/A

### FLAMMABILITY

N/A

### EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

---

## Section 6 - Accidental Release Measures

---

### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

---

## Section 7 - Handling and Storage

---

### HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing.

### STORAGE

Suitable: Keep tightly closed.

## SPECIAL REQUIREMENTS

May develop pressure. Open carefully.

---

## Section 8 - Exposure Controls / PPE

---

### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

### PERSONAL PROTECTIVE EQUIPMENT

**Respiratory:** Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face 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.

**Hand:** Compatible chemical-resistant gloves.

**Eye:** Chemical safety goggles.

### GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Discard contaminated shoes. Wash contaminated clothing before reuse.

### EXPOSURE LIMITS, RTECS

| Country                  | Source        | Type    | Value              |
|--------------------------|---------------|---------|--------------------|
| USA                      | ACGIH         | Ceiling | co2 PPM            |
| USA                      | MSHA Standard | Ceiling | co5 PPM (7 MG/M3)  |
| USA                      | OSHA.         | PEL     | CL 5 PPM (7 MG/M3) |
| New Zealand OEL          |               |         |                    |
| Remarks: check ACGIH TLV |               |         |                    |
| USA                      | NIOSH         | Ceiling | co5 PPM            |

### EXPOSURE LIMITS

| Country | Source | Type  | Value |
|---------|--------|-------|-------|
| Poland  |        | NDS   | 5     |
| Poland  |        | NDSch | 10    |
| Poland  |        | NDSP  | -     |

---

## Section 9 - Physical/Chemical Properties

---

**Appearance** Physical State: Liquid  
Color: Colorless  
Form: Clear liquid

| Property              | Value        | At Temperature or Pressure |
|-----------------------|--------------|----------------------------|
| Molecular Weight      | 36,4600 AMU  |                            |
| pH                    | N/A          |                            |
| BP/BP Range           | N/A          |                            |
| MP/MP Range           | N/A          |                            |
| Freezing Point        | N/A          |                            |
| Vapor Pressure        | N/A          |                            |
| Vapor Density         | N/A          |                            |
| Saturated Vapor Conc. | N/A          |                            |
| SG/Density            | 1,0330 g/cm3 |                            |
| Bulk Density          | N/A          |                            |
| Odor Threshold        | N/A          |                            |
| Volatile%             | N/A          |                            |
| VOC Content           | N/A          |                            |

|                       |     |
|-----------------------|-----|
| Water Content         | N/A |
| Solvent Content       | N/A |
| Evaporation Rate      | N/A |
| Viscosity             | N/A |
| Surface Tension       | N/A |
| Partition Coefficient | N/A |
| Decomposition Temp.   | N/A |
| Flash Point           | N/A |
| Explosion Limits      | N/A |
| Flammability          | N/A |
| Autoignition Temp     | N/A |
| Refractive Index      | N/A |
| Optical Rotation      | N/A |
| Miscellaneous Data    | N/A |
| Solubility            | N/A |

N/A = not available

---

## Section 10 - Stability and Reactivity

---

### STABILITY

Stable: Stable.

Materials to Avoid: Bases, Amines, Alkali metals, Metals.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Hydrogen chloride gas.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

---

## Section 11 - Toxicological Information

---

### ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes eye irritation.

Inhalation: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

### SIGNS AND SYMPTOMS OF EXPOSURE

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

### TOXICITY DATA

Oral

Man

2,857,000 mg/kg

LDLO

Remarks: Lungs, Thorax, or Respiration: Respiratory depression.

Gastrointestinal: Changes in structure or function of esophagus.

Vascular: BP lowering not characterized in autonomic section.

Oral



Woman  
420 UL/KG  
LDLO  
Remarks: Behavioral:Excitement. Cardiac:Pulse rate. Kidney,  
Ureter, Bladder:Hematuria.

Inhalation  
Human  
1.300, ppm  
LCLO

Inhalation  
Human  
3.000, ppm  
LCLO

Inhalation  
Rat  
3.124, ppm  
LC50  
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and  
Taste):Olfaction:Other changes. Sense Organs and Special Senses  
(Nose, Eye, Ear, and Taste):Eye:Iritis.

Inhalation  
Mouse  
1.108, ppm  
LC50  
Remarks: Lungs, Thorax, or Respiration:Respiratory stimulation.  
Sense Organs and Special Senses (Nose, Eye, Ear, and  
Taste):Eye:Other. Skin and Appendages:Skin: After systemic  
exposure: Dermatitis, other

Intraperitoneal  
Mouse  
40142 UG/KG  
LD50

Oral  
Rabbit  
900,000000 mg/kg  
LD50

#### IRRITATION DATA

Eyes  
Rabbit  
5,000000 mg  
30S  
Remarks: Rinsed

#### CHRONIC EXPOSURE - CARCINOGEN

Result: This product is or contains a component that is not  
classifiable as to its carcinogenicity based on its IARC, ACGIH,  
NTP, or EPA classification.

#### IARC CARCINOGEN LIST

Rating: Group 3

CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 450 MG/M3/1H  
Route of Application: Inhalation  
Exposure Time: (1D PRE)  
Result: Specific Developmental Abnormalities: Homeostasis  
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g.,  
stunted fetus).

CHRONIC EXPOSURE - MUTAGEN

Species: Hamster  
Dose: 30 MMOL/L  
Cell Type: lung  
Mutation test: Cytogenetic analysis

Species: Hamster  
Dose: 8 MMOL/L  
Cell Type: ovary  
Mutation test: Cytogenetic analysis

---

Section 12 - Ecological Information

---

No data available.

---

Section 13 - Disposal Considerations

---

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose  
of this material. Observe all federal, state, and local  
environmental regulations.

---

Section 14 - Transport Information

---

DOT

Proper Shipping Name: Hydrochloric acid  
UN#: 1789  
Class: 8  
Packing Group: Packing Group III  
Hazard Label: Corrosive  
PIH: Not PIH

IATA

Proper Shipping Name: Hydrochloric acid  
IATA UN Number: 1789  
Hazard Class: 8  
Packing Group: III

---

Section 15 - Regulatory Information

---

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: Xi  
Indication of Danger: Irritant.  
R: 36/37/38  
Risk Statements: Irritating to eyes, respiratory system and skin.  
S: 26  
Safety Statements: In case of contact with eyes, rinse  
immediately with plenty of water and seek medical advice.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Irritant.

Risk Statements: Irritating to eyes, respiratory system and skin.

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

---

Section 16 - Other Information

---

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2010 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.