Section 1 - Product and Company Information

<table>
<thead>
<tr>
<th>Product Name</th>
<th>HYDROCHLORIC ACID ACS REAGENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>H7020</td>
</tr>
<tr>
<td>Brand</td>
<td>SIGMA</td>
</tr>
<tr>
<td>Company</td>
<td>Sigma-Aldrich</td>
</tr>
<tr>
<td>Street Address</td>
<td>3050 Spruce Street</td>
</tr>
<tr>
<td>City, State, Zip, Country</td>
<td>SAINT LOUIS MO 63103 US</td>
</tr>
<tr>
<td>Technical Phone:</td>
<td>314 771 5765</td>
</tr>
<tr>
<td>Emergency Phone:</td>
<td>414 273 3850 Ext. 5996</td>
</tr>
<tr>
<td>Fax:</td>
<td>800 325 5052</td>
</tr>
</tbody>
</table>

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID &gt;=25%</td>
<td>7647-01-0</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ingredient Name</th>
<th>CAS #</th>
<th>Percent</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROCHLORIC ACID</td>
<td>7647-01-0</td>
<td>&gt; 25</td>
<td></td>
</tr>
<tr>
<td>WATER</td>
<td>7732-18-5</td>
<td>&lt;= 75</td>
<td>No</td>
</tr>
</tbody>
</table>

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

RTECS Number: MW4025000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Toxic.
Toxic by inhalation. Causes burns. Irritating to respiratory system.

HMIS RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 2

NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 2

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: Carbon dioxide, dry chemical powder, or appropriate foam.
Unsuitable: Do not use water.

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 TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, 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. Store in a cool dry place.

SPECIAL REQUIREMENTS
May develop pressure. Open carefully.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use only in a chemical fume hood.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Government approved respirator in nonventilated areas and/or for exposure above the TLV or PEL.
Hand: Rubber gloves.
Eye: Chemical safety goggles.
Other: Faceshield (8-inch minimum).

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>Ceiling co2 PPM</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard</td>
<td>Ceiling co5 PPM</td>
<td>(7 MG/M3)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>CL 5 PPM (7 MG/M3)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>OEL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarks:</td>
<td>check ACGIH TLV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

USA NIOSH Ceiling co5 PPM

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>5 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td>7 MG/M3</td>
<td></td>
</tr>
</tbody>
</table>

Section 9 - Physical/Chemical Properties

Appearance
Physical State: Liquid
Color: Faintly yellow Clear
Odor: Pungent

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>36.46 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>-114.2 °C</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A -114.2 °C</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>166.991 mmHg</td>
<td>21.1 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>1.3 g/l</td>
<td></td>
</tr>
<tr>
<td>Saturated Vapor Conc.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>SG/Density</td>
<td>1.2 g/cm3</td>
<td></td>
</tr>
<tr>
<td>Bulk Density</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Volatile%</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Surface Tension</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Decomposition Temp.</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Flash Point</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: Do not allow water to enter container because of violent reaction.
Materials to Avoid: Bases, Amines, Alkali metals Copper, Copper alloys, Aluminum.

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 burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: Toxic if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
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 mg/kg
LDLo

Oral
Woman
420 UL/KG
LDLo

Inhalation
Human
1,300 ppm
LCLO

Inhalation
Human
3,000 ppm
LCLO

Inhalation
Rat
3,124 ppm
LC50

Inhalation
Mouse
1,108 ppm
LC50
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Eye: Other. Lungs, Thorax, or Respiration: Respiratory stimulation. Skin and Appendages: Skin: After systemic exposure: Dermatitis, other

Intraperitoneal
Mouse
40142 UG/KG
LD50

Oral
Rabbit
900 mg/kg
LD50

IRRITATION DATA

Eyes
Rabbit
5 mg
30S
Remarks: Rinsed

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: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Homeostasis

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

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 II
Hazard Label: Corrosive
PIH: Not PIH

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

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: C
Indication of Danger: Corrosive.
R: 34 37
Risk Statements: Causes burns. Irritating to respiratory system.
S: 26 36/37/39 45
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Toxic.
Risk Statements: Toxic by inhalation. Causes burns. Irritating to respiratory system.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.