Section 1  Product Description

Product Name: Kovac Solution
Recommended Use: Science education applications
Synonyms: Kovac's Reagent
Distributor: Carolina Biological Supply Company
2700 York Road, Burlington, NC 27215
1-800-227-1150

Chemical Information:
800-227-1150 (8am-5pm ET) M-F
Chemtrec: 800-424-9300 (Transportation Spill Response 24 hours)

Section 2  Hazard Identification

Classification of the chemical in accordance with paragraph (d) of §1910.1200;

**DANGER**

Flammable liquid and vapor. Harmful if swallowed. Causes severe skin burns and eye damage. Causes serious eye damage. May cause respiratory irritation. May cause drowsiness or dizziness.

GHS Classification:
Skin Corrosion/Irritation Category 1A, Serious Eye Damage/Eye Irritation Category 1, Flammable Liquid Category 3, Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 3, Acute Toxicity - Oral Category 4

Section 3  Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS #</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Butanol</td>
<td>71-36-3</td>
<td>71</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>15.07</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>7647-01-0</td>
<td>8.93</td>
</tr>
<tr>
<td>p-Dimethlaminobenzaldehyde</td>
<td>100-10-7</td>
<td>5</td>
</tr>
</tbody>
</table>

Section 4  First Aid Measures

Emergency and First Aid Procedures

Inhalation: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Eyes: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Skin Contact: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse.

Ingestion: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

Section 5  Firefighting Procedures

Extinguishing Media: Use dry chemical, CO2 or appropriate foam.

Fire Fighting Methods and Protection: Firefighters should wear full protective equipment and NIOSH approved self-contained breathing apparatus.

Fire and/or Explosion Hazards: Fire or excessive heat may produce hazardous decomposition products.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide, Hydrogen chloride
Section 6  Spill or Leak Procedures

Steps to Take in Case Material Is Released or Spilled:

Exposure to the spilled material may be severely irritating or toxic. Follow personal protective equipment recommendations found in Section 8 of this SDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including: the material spilled, the quantity of the spill, the area in which the spill occurred, and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits.

Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation. Shut off ignition sources; including electrical equipment and flames. Do not allow smoking in the area. If this material is released into a work area, evacuate the area immediately.

Section 7  Handling and Storage

Handling: Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/…/ equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Avoid direct sunlight and heat.


Section 8  Protection Information

Chemical Name
1-Butanol
Hydrogen Chloride
p-Dimethylaminobenzaldehyde
ACGIH
20 ppm TWA
N/A
N/A
OSHA PEL
100 ppm TWA; 300 mg/m3 TWA
N/A
5 ppm (Ceiling)
N/A

Control Parameters

Engineering Measures: Local exhaust ventilation, process enclosures, or other engineering controls are necessary when handling or using this product to avoid overexposure.

Personal Protective Equipment (PPE):

Respiratory Protection: Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms.

Respirator Type(s): NIOSH approved air purifying respirator with organic vapor/acid gas cartridge.

Eye Protection: Wear chemical splash goggles when handling this product. Have an eye wash station available.

Skin Protection: Avoid skin contact by wearing chemically resistant gloves, an apron and other protective equipment depending upon conditions of use. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work.

Gloves: Nitrile, Natural rubber, Neoprene, Butyl rubber

Section 9  Physical Data

Formula: See section 3
Molecular Weight: No data available
Appearance: Yellow Colorless Liquid
Odor: Moderate Strong Sweet Rancid
Odor Threshold: No data available
pH: No data available
Melting Point: No data available -90 C
Boiling Point: No data available
Flash Point: Estimated > 37 C
Flammable Limits in Air: 1-Butanol: 1.4 - 11.2

Vapor Pressure: No data available
Evaporation Rate (BuAc=1): No data available
Vapor Density (Air=1): No data available
Specific Gravity: No data available
Solubility in Water: Slightly Soluble
Log Pow (calculated): No data available
Autoignition Temperature: No data available
Decomposition Temperature: No data available
Viscosity: No data available
Percent Volatile by Volume: 87%
Section 10  Reactivity Data

Reactivity: Mildly reactive - See below
Chemical Stability: Stable under normal conditions.
Conditions to Avoid: Temperatures above the high flash point of this combustible material in combination with sparks, open flames, or other sources of ignition. Reaction with water is exothermic. Exposure to light.
Hazardous Decomposition Products: Hydrogen chloride, Carbon dioxide, Carbon monoxide
Hazardous Polymerization: Will not occur

Section 11  Toxicity Data

Routes of Entry Inhalation, ingestion, eye or skin contact.
Symptoms (Acute): Central Nervous System Disorders, Headache, Gastrointestinal,, Respiratory Irritation, Anesthetic properties
Delayed Effects: No data available

Acute Toxicity:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Butanol</td>
<td>71-36-3</td>
<td>Oral LD50 Rat 790 mg/kg</td>
<td>Oral LD50 Rabbit 90000 mg/kg</td>
<td>INHALATION LC50 Rat 8000 ppm</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Oral LD50 Rat 90000 mg/kg</td>
<td>Oral LD50 Rabbit 900 mg/kg</td>
<td>INHALATION LC50 Rat 3700 ppm</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>7647-01-0</td>
<td>Oral LD50 Rabbit 900 mg/kg</td>
<td>Oral LD50 Mouse 800 mg/kg</td>
<td>INHALATION LC50 Mouse 1108 ppm</td>
</tr>
</tbody>
</table>

Carcinogenicity:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>IARC</th>
<th>NTP</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen Chloride</td>
<td>7647-01-0</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
<tr>
<td>p-Dimethylaminobenzaldehyde</td>
<td>100-10-7</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

Chronic Effects:

| Mutagenicity:                           | No evidence of a mutagenic effect. |
| Teratogenicity:                         | No evidence of a teratogenic effect (birth defect). |
| Sensitization:                          | No evidence of a sensitization effect. |
| Reproductive:                           | No evidence of negative reproductive effects. |
| Target Organ Effects:                   |                             |
| Acute:                                  | Central Nervous System, Kidneys, Liver |
| Chronic:                                | No data available |

Section 12  Ecological Data

Kovac Solution
Overview:
Slight ecological hazard. In high concentrations, this product may be dangerous to plants and/or wildlife.

Mobility:
This material is expected to have moderate mobility in soil. It absorbs to most soil types.

Persistence:
Evaporation into atmosphere, Evaporation into atmosphere, dissolved in water.

Bioaccumulation:
No data

Degradability:
No data

Other Adverse Effects:
No data

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>Eco Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Butanol</td>
<td>71-36-3</td>
<td>96 HR LC50 PIMEPHALES PROMELAS 1910000 µG/L [STATIC]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 HR EC50 DAPHNIA MAGNA 1983 MG/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72 HR EC50 DESMODESMUS SUBSPICATUS &gt; 500 MG/L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>96 HR EC50 DESMODESMUS SUBSPICATUS &gt; 500 MG/L</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>No data available</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>7647-01-0</td>
<td>96 HR LC50 GAMBUSIA AFFINIS 282 MG/L [STATIC]</td>
</tr>
<tr>
<td>p-Dimethylaminobenzaldehyde</td>
<td>100-10-7</td>
<td></td>
</tr>
</tbody>
</table>

Section 13 Disposal Information

Disposal Methods:
Dispose in accordance with all applicable Federal, State and Local regulations. Always contact a permitted waste disposer (TSD) to assure compliance.

Waste Disposal Code(s):
If discarded, this product is considered a RCRA ignitable waste, D001.
If discarded, this product is considered a RCRA corrosive waste, D002.

Section 14 Transport Information

Ground - DOT Proper Shipping Name:
UN2924
Flammable Liquids, corrosive, N.O.S.
(1-Butanol, Hydrochloric Acid)
Class 3
P.G. II

Air - IATA Proper Shipping Name:
UN2924
Flammable Liquids, corrosive, N.O.S.
(1-Butanol, Hydrochloric Acid)
Class 3
P.G. II

Section 15 Regulatory Information

TSCA Status:
All components in this product are on the TSCA Inventory.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS Number</th>
<th>§ 313 Name</th>
<th>§ 304 RQ</th>
<th>CERCLA RQ</th>
<th>§ 302 TPQ</th>
<th>CAA 112(2) TQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Butanol</td>
<td>71-36-3</td>
<td>n-Butyl alcohol</td>
<td>No</td>
<td>5000 lb final RQ; 2270 kg final RQ</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>7647-01-0</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>p-Dimethylaminobenzaldehyde</td>
<td>100-10-7</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Section 16 Additional Information

Revised: 09/09/2015
Replaces: 09/09/2015
Printed: 10-29-2015

The information provided in this (Material) Safety Data Sheet represents a compilation of data drawn directly from various sources available to us. Carolina Biological Supply makes no representation or guarantee as to the suitability of this information to a particular application of the substance covered in the (Material) Safety Data Sheet.

Glossary
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstract Service Number</td>
</tr>
<tr>
<td>CERCLA</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act</td>
</tr>
<tr>
<td>DOT</td>
<td>U.S. Department of Transportation</td>
</tr>
<tr>
<td>IARC</td>
<td>International Agency for Research on Cancer</td>
</tr>
<tr>
<td>N/A</td>
<td>Not Available</td>
</tr>
<tr>
<td>NTP</td>
<td>National Toxicology Program</td>
</tr>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td>PEL</td>
<td>Permissible Exposure Limit</td>
</tr>
<tr>
<td>ppm</td>
<td>Parts per million</td>
</tr>
<tr>
<td>RCRA</td>
<td>Resource Conservation and Recovery Act</td>
</tr>
<tr>
<td>SARA</td>
<td>Superfund Amendments and Reauthorization Act</td>
</tr>
<tr>
<td>TLV</td>
<td>Threshold Limit Value</td>
</tr>
<tr>
<td>TSCA</td>
<td>Toxic Substances Control Act</td>
</tr>
<tr>
<td>IDLH</td>
<td>Immediately dangerous to life and health</td>
</tr>
</tbody>
</table>