Material Safety Data Sheet

SAMPLE DILUENT - AMINO ACID

1. Product and company identification

<table>
<thead>
<tr>
<th>Product name</th>
<th>SAMPLE DILUENT - AMINO ACID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product part number</td>
<td>4374871</td>
</tr>
<tr>
<td>Kit name</td>
<td>AMINO ACID 20/20 STANDARDS SET - HYDROLYSATE</td>
</tr>
<tr>
<td>Kit part number</td>
<td>4374877</td>
</tr>
<tr>
<td>Material uses</td>
<td>For research use only. Not for use in diagnostic procedures.</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>AB SCIEX Pte. Ltd. 110 Marsh Drive Foster City, CA USA 94404 1-877-740-2129</td>
</tr>
<tr>
<td>Validation date</td>
<td>10/15/2010.</td>
</tr>
<tr>
<td>Prepared by</td>
<td>Atrion Regulatory Services, Inc.</td>
</tr>
<tr>
<td>In case of emergency</td>
<td>Chemtrec : 1-800-424-9300 (24H) 1-877-740-2129 (8:30A PT - 5:00P PT)</td>
</tr>
</tbody>
</table>

2. Hazards identification

| Physical state                    | Liquid.                                               |
| Color                             | Not available.                                        |
| Odor                              | Not available.                                        |

Emergency overview

- Signal word: DANGER!
- Hazard statements: CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Precautions: Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

OSHA/HCS status: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Routes of entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

- Inhalation: Severely corrosive to the respiratory system.
- Ingestion: Harmful if swallowed. May cause burns to mouth, throat and stomach.
- Skin: Severely corrosive to the skin. Causes severe burns.
- Eyes: Severely corrosive to the eyes. Causes severe burns.

Potential chronic health effects

- Chronic effects: Contains material that may cause target organ damage, based on animal data.
- Carcinogenicity: No known significant effects or critical hazards.
- Mutagenicity: No known significant effects or critical hazards.
- Teratogenicity: No known significant effects or critical hazards.
- Developmental effects: No known significant effects or critical hazards.
- Fertility effects: No known significant effects or critical hazards.

Target organs: Contains material which may cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract, skin, eyes.
2. **Hazards identification**

**Over-exposure signs/symptoms**

**Inhalation**: Adverse symptoms may include the following:
- respiratory tract irritation
- coughing

**Ingestion**: Adverse symptoms may include the following:
- stomach pains

**Skin**: Adverse symptoms may include the following:
- pain or irritation
- redness
- blistering may occur

**Eyes**: Adverse symptoms may include the following:
- pain
- watering
- redness

**Medical conditions aggravated by over-exposure**: Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

3. **Composition/information on ingredients**

**United States**

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>64-18-6</td>
<td>1-5</td>
</tr>
</tbody>
</table>

**Canada**

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>64-18-6</td>
<td>1-5</td>
</tr>
</tbody>
</table>

**Mexico**

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS number</th>
<th>UN number</th>
<th>%</th>
<th>IDLH</th>
<th>H</th>
<th>F</th>
<th>R</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>64-18-6</td>
<td>UN1779</td>
<td>1-5</td>
<td>30 ppm</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. **First aid measures**

**Eye contact**: Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

**Skin contact**: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

**Ingestion**: Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
4. First aid measures

**Protection of first-aiders**: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the resuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**Notes to physician**: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

**Flammability of the product**: In a fire or if heated, a pressure increase will occur and the container may burst.

**Extinguishing media**

- **Suitable**: Use an extinguishing agent suitable for the surrounding fire.
- **Not suitable**: None known.

**Special exposure hazards**: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Hazardous thermal decomposition products**: Decomposition products may include the following materials:

- Carbon dioxide
- Carbon monoxide

**Special protective equipment for fire-fighters**: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

**Personal precautions**: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

**Environmental precautions**: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

**Methods for cleaning up**

- **Small spill**: Stop leak if without risk. Move containers from spill area. Absorb with an inert material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

- **Large spill**: Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7. Handling and storage

**Handling**: Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a
7. Handling and storage

compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

United States

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>ACGIH TLV (United States, 2/2010).</td>
</tr>
<tr>
<td></td>
<td>TWA: 5 ppm 8 hour(s).</td>
</tr>
<tr>
<td></td>
<td>TWA: 9.4 mg/m³ 8 hour(s).</td>
</tr>
<tr>
<td></td>
<td>STEL: 10 ppm 15 minute(s).</td>
</tr>
<tr>
<td></td>
<td>STEL: 19 mg/m³ 15 minute(s).</td>
</tr>
<tr>
<td></td>
<td>TWA: 5 ppm 8 hour(s).</td>
</tr>
<tr>
<td></td>
<td>TWA: 9 mg/m³ 8 hour(s).</td>
</tr>
<tr>
<td></td>
<td>NIOSH REL (United States, 6/2009).</td>
</tr>
<tr>
<td></td>
<td>TWA: 5 ppm 10 hour(s).</td>
</tr>
<tr>
<td></td>
<td>TWA: 9 mg/m³ 10 hour(s).</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL (United States, 11/2006).</td>
</tr>
<tr>
<td></td>
<td>TWA: 5 ppm 8 hour(s).</td>
</tr>
<tr>
<td></td>
<td>TWA: 9 mg/m³ 8 hour(s).</td>
</tr>
</tbody>
</table>

Canada

<table>
<thead>
<tr>
<th>Occupational exposure limits</th>
<th>TWA (8 hours)</th>
<th>STEL (15 mins)</th>
<th>Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredient</td>
<td>ppm</td>
<td>mg/m³</td>
<td>Other</td>
</tr>
<tr>
<td>Formic acid</td>
<td>5</td>
<td>9.4</td>
<td>-</td>
</tr>
<tr>
<td>9.4</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>9.4</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>9.4</td>
<td>-</td>
<td>-</td>
<td>10</td>
</tr>
</tbody>
</table>

[3]Skin sensitization

Mexico

Occupational exposure limits

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Exposure limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>NOM-010-STPS (Mexico, 9/2000).</td>
</tr>
<tr>
<td></td>
<td>LMPE-PPT: 5 ppm 8 hour(s).</td>
</tr>
<tr>
<td></td>
<td>LMPE-PPT: 9 mg/m³ 8 hour(s).</td>
</tr>
</tbody>
</table>

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures: If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures: Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

8. Exposure controls/personal protection

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Respiratory: Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Eyes: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin: Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9. Physical and chemical properties

Physical state: Liquid.
Flash point: Not available.
Auto-ignition temperature: Not available.
Flammable limits: Not available.
Color: Not available.
Odor: Not available.
pH: 2.5
Boiling/condensation point: Not available.
Melting/freezing point: Not available.
Critical temperature: Not available.
Relative density: Not available.
Vapor pressure: Not available.
Vapor density: Not available.
Volatility: Not available.
Odor threshold: Not available.
Evaporation rate: Not available.
Viscosity: Not available.
Solubility: Not available.
LogKow: Not available.
10. Stability and reactivity

Chemical stability: The product is stable.
Conditions to avoid: Keep away from flames and hot surfaces. Keep away from sources of ignition.
Incompatible materials: Reactive or incompatible with the following materials: oxidizing materials, reducing materials, metals, acids and alkalis.

Hazardous decomposition products: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions: Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Dose</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>LC50 Inhalation Vapor</td>
<td>Rat</td>
<td>7400 mg/m3</td>
<td>4 hours</td>
</tr>
<tr>
<td></td>
<td>LD50 Oral</td>
<td>Rat</td>
<td>730 mg/kg</td>
<td>-</td>
</tr>
</tbody>
</table>

Chronic toxicity

Not available.

Irritation/Corrosion

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Score</th>
<th>Exposure</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>Eyes - Severe irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Skin - Mild irritant</td>
<td>Rabbit</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Sensitizer

Not available.

Carcinogenicity
Classification

Not available.

Mutagenicity

Not available.

Teratogenicity

Not available.

Reproductive toxicity

Not available.

12. Ecological information

Ecotoxicity: No known significant effects or critical hazards.

Aquatic ecotoxicity

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Result</th>
<th>Species</th>
<th>Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formic acid</td>
<td>Acute EC50 151200 ug/L Fresh water</td>
<td>Daphnia - Daphnia magna - LARVAE - &lt;24 hours</td>
<td>48 hours</td>
</tr>
<tr>
<td></td>
<td>Acute LC50 80000 to 90000 ug/L Marine water</td>
<td>Crustaceans - Carcinus maenas - Adult</td>
<td>48 hours</td>
</tr>
</tbody>
</table>

Persistence/degradability

10/15/2010. North America
12. Ecological information

Not available.

Other adverse effects: No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal: The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

DOT/TDG/MXT/IMDG/IATA: Not regulated.

15. Regulatory information

United States

HCS Classification: Corrosive material
Target organ effects

U.S. Federal regulations: TSCA 8(a) IUR: Partial exemption
United States inventory (TSCA 8b): All components are listed or exempted.
SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Formic acid
SARA 311/312 MSDS distribution - chemical inventory - hazard identification:
Formic acid: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 311: Formic acid
Clean Air Act (CAA) 112 accidental release prevention: No products were found.

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs): Not listed
Clean Air Act Section 602 Class I Substances: Not listed
Clean Air Act Section 602 Class II Substances: Not listed
DEA List I Chemicals (Precursor Chemicals): Not listed
DEA List II Chemicals (Essential Chemicals): Not listed
15. Regulatory information

<table>
<thead>
<tr>
<th></th>
<th>Product name</th>
<th>CAS number</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form R - Reporting requirements</td>
<td>Formic acid</td>
<td>64-18-6</td>
<td>1-5</td>
</tr>
<tr>
<td>Supplier notification</td>
<td>Formic acid</td>
<td>64-18-6</td>
<td>1-5</td>
</tr>
</tbody>
</table>

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

**State regulations**

- **Massachusetts**: The following components are listed: FORMIC ACID
- **New York**: The following components are listed: Formic acid
- **New Jersey**: The following components are listed: FORMIC ACID
- **Pennsylvania**: The following components are listed: FORMIC ACID
- **California Prop. 65**: None of the components are listed.

**Canada**

- **WHMIS (Canada)**: Class E: Corrosive material
- **Canadian lists**
  - **Canadian NPRI**: The following components are listed: Formic acid
  - **CEPA Toxic substances**: None of the components are listed.
  - **Canada inventory**: All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

**Mexico**

- **Classification**: 

<table>
<thead>
<tr>
<th>Flammability</th>
<th>Health</th>
<th>Reactivity</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**International regulations**

- **International lists**
  - **Australia inventory (AICS)**: All components are listed or exempted.
  - **China inventory (IECSC)**: All components are listed or exempted.
  - **Japan inventory**: All components are listed or exempted.
  - **Korea inventory**: All components are listed or exempted.
  - **New Zealand Inventory of Chemicals (NZIoC)**: All components are listed or exempted.
  - **Philippines inventory (PICCS)**: All components are listed or exempted.
  - **United States inventory (TSCA 8b)**: All components are listed or exempted.
  - **Europe inventory**: All components are listed or exempted.
  - **Canada inventory**: All components are listed or exempted.

- **Chemical Weapons Convention List Schedule I Chemicals**: Not listed
- **Chemical Weapons Convention List Schedule II Chemicals**: Not listed
- **Chemical Weapons Convention List Schedule III Chemicals**: Not listed
16. Other information

Label requirements: CAUSES SEVERE RESPIRATORY TRACT, EYE AND SKIN BURNS. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.):

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.):

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Date of issue: 10/15/2010.

Date of previous issue: No previous validation.

Version: 1

† Indicates information that has changed from previously issued version.

Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.