Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Propylamine

STATEMENT OF HAZARDOUS NATURE

NFPA

SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

EMERGENCY
ChemWatch
Within the US & Canada: 877–715–9305
Outside the US & Canada: +800 2436 2255
(1–800-CHEMCALL) or call +613 9573 3112

SYNONYMS
C3-H9-N, CH3-CH2-CH2-NH2, 1-aminopropane, mono-n-propylamine, monopropylamine, propanamine, 1-propylamine, propylamine, "RCRA Waste No.: U194"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Toxicity</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Body Contact</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Reactivity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chronic</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

CANADIAN WHMIS SYMBOLS

1 of 7
EMERGENCY OVERVIEW
RISK
Causes burns.
Risk of serious damage to eyes.
May cause SENSITISATION by skin contact.
Harmful by inhalation, in contact with skin and if swallowed.
Highly flammable.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED
- Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
- The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.
- Amines without benzene rings when swallowed are absorbed throughout the gut. Corrosive action may cause damage throughout the gastrointestinal tract.

EYE
- The material can produce chemical burns to the eye following direct contact.
  - Vapors or mists may be extremely irritating.
  - If applied to the eyes, this material causes severe eye damage.
  - Vapors of volatile amines irritate the eyes, causing excessive secretion of tears, inflammation of the conjunctiva and slight swelling of the cornea, resulting in "halos" around lights.
  - This effect is temporary, lasting only for a few hours.

SKIN
- Skin contact with the material may be harmful; systemic effects may result following absorption.
- The material can produce chemical burns following direct contact with the skin.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
- Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED
- If inhaled, this material can irritate the throat and lungs of some persons.
- Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be harmful.
- Inhalation of quantities of liquid mist may be extremely hazardous, even lethal due to spasm, extreme irritation of larynx and bronchi, chemical pneumonitis and pulmonary edema.
- Material is highly volatile and may quickly form a concentrated atmosphere in confined or unventilated areas. Vapor is heavier than air and may displace and replace air in breathing zone, acting as a simple asphyxiant.
- Inhalation of amine vapors may cause irritation of the mucous membrane of the nose and throat, and lung irritation with respiratory distress and cough.
- Swelling and inflammation of the respiratory tract is seen in serious cases; with headache, nausea, faintness and anxiety. There may also be wheezing.
- The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing.
- Before starting consider control of exposure by mechanical ventilation.

CHRONIC HEALTH EFFECTS
- Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.
- Skin contact with the material is more likely to cause a sensitization reaction in some persons compared to the general population.
- Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-propylamine</td>
<td>107-10-8</td>
<td>&gt;98</td>
</tr>
</tbody>
</table>

Section 4 - FIRST AID MEASURES

SWALLOWED
- For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE
- If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
- If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly
remove all contaminated clothing, including footwear.

**INHALED**
- If fumes or combustion products are inhaled remove from contaminated area. Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g.

**NOTES TO PHYSICIAN**
- For acute or short-term repeated exposures to highly alkaline materials:
  - Respiratory stress is uncommon but present occasionally because of soft tissue edema.
- Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort.

### Section 5 - FIRE FIGHTING MEASURES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Pressure (mmHg)</td>
<td>247.52 @ 20 C</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>10.4</td>
</tr>
<tr>
<td>Specific Gravity (water=1)</td>
<td>0.719</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**EXTINGUISHING MEDIA**
- Water spray or fog.
- Foam.

**FIRE FIGHTING**
- Alert Emergency Responders and tell them location and nature of hazard.
- May be violently or explosively reactive.
When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 1000 metres in all directions.

**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS**
- Liquid and vapor are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidizers.
Combustion products include: carbon dioxide (CO2), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.
Contains low boiling substance: Closed containers may rupture due to pressure buildup under fire conditions.

**FIRE INCOMPATIBILITY**
- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

**PERSONAL PROTECTION**
Glasses:
- Full face-shield.
Gloves:
- 1. TEFLON
Respirator:
- Type KAX Filter of sufficient capacity

### Section 6 - ACCIDENTAL RELEASE MEASURES

**MINOR SPILLS**
- Remove all ignition sources.
- Clean up all spills immediately.
- Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
- Check regularly for spills and leaks.

**MAJOR SPILLS**
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.

### Section 7 - HANDLING AND STORAGE

**PROCEDURE FOR HANDLING**
- Containers, even those that have been emptied, may contain explosive vapours.
- Do NOT cut, drill, grind, weld or perform similar operations on or near containers.
Contains low boiling substance:
Storage in sealed containers may result in pressure buildup causing violent rupture of containers not rated appropriately.
- Check for bulging containers.
- Vent periodically.
- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

**RECOMMENDED STORAGE METHODS**
Packing as supplied by manufacturer. Plastic containers may only be used if approved for flammable liquid.

- For low viscosity materials (i): Drums and jerricans must be of the non-removable head type. (ii): Where a can is to be used as an inner package, the can must have a screwed enclosure.
- For materials with a viscosity of at least 2680 cSt. (23 deg. C).

**STORAGE REQUIREMENTS**
- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- Cool before opening.

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**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

**PERSONAL PROTECTION**

**RESPIRATOR**
Type KAX Filter of sufficient capacity
Consult your EHS staff for recommendations

**EYE**
- Chemical goggles.
- Full face shield.

**HANDS/FEET**
- Wear chemical protective gloves, eg. PVC.
- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

**NOTE:** The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

**OTHER**
- Overalls.
- PVC Apron.
- Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
- For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

**ENGINEERING CONTROLS**
- For flammable liquids and flammable gases, local exhaust ventilation or a process enclosure ventilation system may be required. Ventilation equipment should be explosion-resistant.

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**Section 9 - PHYSICAL AND CHEMICAL PROPERTIES**

**PHYSICAL PROPERTIES**

Liquid.
Mixes with water.
Corrosive.
Alkaline.

<table>
<thead>
<tr>
<th>State</th>
<th>Liquid</th>
<th>Molecular Weight</th>
<th>59.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°F)</td>
<td>-117</td>
<td>Viscosity</td>
<td>Not Available</td>
</tr>
<tr>
<td>Boiling Range (°F)</td>
<td>118</td>
<td>Solubility in water (g/L)</td>
<td>Miscible</td>
</tr>
</tbody>
</table>
**{propylamine}**

### APPEARANCE

Colourless liquid with strong ammonia-like odour; mixes with water, methanol, ethanol, ethyl ether, ethyl acetate, acetone, aromatic hydrocarbons, mineral oil, oleic and stearic acid. Flammability Color Physical State Odor Miscibility with water Highly Clear Liquid Miscible flammable Colourless

**log Kow (Sangster 1997):** 0.48

### Section 10 - CHEMICAL STABILITY

**CONDITIONS CONTRIBUTING TO INSTABILITY**
- Presence of incompatible materials.
- Product is considered stable.

**STORAGE INCOMPATIBILITY**
- Avoid oxidizing agents, acids, acid chlorides, acid anhydrides.
- Avoid contact with copper, aluminium and their alloys.

For incompatible materials - refer to Section 7 - Handling and Storage.

### Section 11 - TOXICOLOGICAL INFORMATION

**n-propylamine**

**TOXICITY AND IRRITATION**

**N-PROPYLAMINE:**
- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

**TOXICITY**

<table>
<thead>
<tr>
<th>Inhalation (rat) LC50</th>
<th>2310 ppm/4h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin (rabbit):</td>
<td>0.1 mg/24h SEVERE</td>
</tr>
<tr>
<td>Inhalation (mouse) LC50</td>
<td>2500 mg/m³/2h</td>
</tr>
<tr>
<td>Eye (rabbit):</td>
<td>0.72 mg - SEVERE</td>
</tr>
<tr>
<td>Dermal (rabbit) LD50</td>
<td>560 mg/kg</td>
</tr>
<tr>
<td>Inhalation (mammal) LC50</td>
<td>2500 mg/m³</td>
</tr>
</tbody>
</table>

**IRRITATION**

- Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. Primary irritation recorded.

**CARCINOGEN**

- US - Rhode Island Hazardous Substance List
- IARC

### Section 12 - ECOLOGICAL INFORMATION

This material and its container must be disposed of as hazardous waste.

**Ecotoxicity**
Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions
A. General Product Information
Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)
B. Component Waste Numbers
When n-propylamine is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U194 (waste code I,T).

Disposal Instructions
All waste must be handled in accordance with local, state and federal regulations.
- Puncture containers to prevent re-use and bury at an authorized landfill.
- Legislation addressing waste disposal requirements may differ by country, state and/or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
- A Hierarchy of Controls seems to be common - the user should investigate:
  · Reduction
  · Reuse
  · Recycling
  · Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
- DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 3
Identification Numbers: UN1277 PG: II
Label Codes: 3, 8 Special provisions: A7, IB2, N34, T7, TP1
Packaging: Exceptions: 150 Packaging: Non-bulk: 202
Packaging: Exceptions: 150 Quantity limitations: 1 L
Passenger aircraft/rail:
Quantity Limitations: Cargo 5 L Vessel stowage: Location: E airplane only:
Vessel stowage: Other: 40
Hazardous materials descriptions and proper shipping names:
Propylamine
Air Transport IATA:
ICAO/IATA Class: 3 (8) ICAO/IATA Subrisk: None
UN/ID Number: 1277 Packing Group: II
Special provisions: None
Cargo Only
Packaging Instructions: 5 L Maximum Qty/Pack: 1 L
Passenger and Cargo Passenger and Cargo
Packaging Instructions: 363 Maximum Qty/Pack: 352
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packaging Instructions: 0.5 L Maximum Qty/Pack: Y340
Shipping Name: PROPYLAMINE
Maritime Transport IMDG:
IMDG Class: 3 IMDG Subrisk: 8
UN Number: 1277 Packing Group: II
EMS Number: F-E, S-C Special provisions: None
Limited Quantities: 1 L
Shipping Name: PROPYLAMINE 1277

Section 15 - REGULATORY INFORMATION

n-propylamine (CAS: 107-10-8) is found on the following regulatory lists;
Section 16 - OTHER INFORMATION

ND
Substance CAS Suggested codes n-propylamine 107-10-8 Xn; R22 R43 Xi; R38

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For additional technical information please call our toxicology department on +800 CHEMCALL.

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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