Safety Data Sheet
As per Globally Harmonized System (GHS)

Product Identification: 2-Amino-5-bromopyridine 0145A01 Div.03 sds 2-Amino-5-bromopyridine

Date of issue: June 17, 2013

SDS Code: 0145A01 Div.03 sds 2-Amino-5-bromopyridine
Date of Compilation: October 29, 2012
Date of Revision: June 17, 2013
Due Date of Revision: May, 2015
Revision Number: 01
Version Number: 0145A01 Div.03 sds 2-Amino-5-bromopyridine
Supersedes date: October 29, 2012
Supersedes version: 0145A00 Div.03 sds 2-Amino-5-bromopyridine
SECTION 1.: IDENTIFICATION

PRODUCT NAME: 2-Amino-5-bromopyridine
CAS RN: 1072-97-5
EC#: 214-019-9
SYNONYMS: 2-Pyridinamine ,5-bromo- ; 5-bromo-2-pyridylamine
SYSTEMATIC NAME: 2-Amino-5-bromopyridine
MOLECULAR FORMULA: C₅H₅BrN₂
STRUCTURAL FORMULA:

\[
\begin{array}{c}
\text{Cl} \\
\text{N} \\
\text{NH₂}
\end{array}
\]

FACTORY & REGISTERED OFFICE:
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Product Identification: 2-Amino-5-bromopyridine 0145A01 Div.03 sds 2-Amino-5-bromopyridine

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Product Uses:
- 2-Amino-5-bromopyridine is used as an intermediate in the pharmaceutical industry for the manufacture of olprinone.

SECTION 2: HAZARDS IDENTIFICATION

GHS CLASSIFICATION
Skin corrosion / irritant: Category 2
Serious eye damage/eye irritant: Category 2B
Acute toxicity Oral: Category 4

Hazard Pictogram: GHS 07
Signal Word: Warning!

HAZARD AND PRECAUTIONARY STATEMENTS:

HAZARD STATEMENTS
- H302: Harmful if swallowed.
- H315: Causes skin, irritation.
- H320: Causes eye irritation.

PRECAUTIONARY STATEMENTS
Prevention
- P264: Wash hands thoroughly after handling.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P270: Do not eat, drink or smoke when using this product.

Response
- P302+352: IF ON SKIN: Wash with plenty of soap and water.
- P332+313: If skin irritation occurs: Get medical advice/attention.
- P362: Take off contaminated clothing and wash before reuse.
- P305+351+338: IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
- P337+313: If eye irritation persists: Get medical advice/attention.
- P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P330: Rinse mouth.

Disposal
- P501: Dispose of contents/container to local/regional/national/international regulations.
SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Chemical</th>
<th>CAS #</th>
<th>EC#</th>
<th>Purity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2-Amino-5-bromopyridine</td>
<td>1072-97-5</td>
<td>214-019-9</td>
<td>&gt;98%</td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

Key symptoms
- **Acute effects:**
  2-Amino-5-bromopyridine is harmful if swallowed. It causes skin irritation and eye irritation.
- **Chronic effects:**
  To the best of our knowledge, the chronic health effects of this product have not been fully investigated.

FIRST AID:
- **Eyes:** If in eyes rinse cautiously with water for at least 15 minutes. Remove contact lenses if easy to do so. Continue rinsing. Seek medical attention.
- **Skin:** Immediately take off all contaminated clothing. Wash thoroughly with water for at least 15 minutes. Wash contaminated clothes before reuse. Seek immediate medical attention.
- **Inhalation:** Remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if you feel unwell.
- **Ingestion:** If swallowed call a poison center if you feel unwell. Rinse mouth. Do NOT induce vomiting by use of emetics. Seek medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

**Flash Point:** >110°C  
**Flammability:** Non Flammable

**Extinguishing media:**
- *Appropriate extinguishing media:* Dry chemical powder, carbon dioxide, and alcohol resistant foam. Water spray may also be used. Water can be effective in cooling down the fire-exposed containers and knocking down the vapours. Water jets may be used to flush spills away and dilute the same to non-flammable mixtures fog or alcohol-resistant foam by directing streams to the periphery of the fires to prevent spread.

**Special Protective Equipment and Precautions for Fire Fighter:**
- Evacuate the area and fight fires from a safe distance.
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- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions or as per locally valid procedures.
- Fire fighters must wear Self Contained Breathing Apparatus (SCBA) and full protective clothing. The chemical is harmful in contact with skin.
- Report any run-off of fire waters contaminated with this chemical as per local and federal procedures applicable.

Unusual fire and explosion hazard:
- Toxic vapors may be released on thermal decomposition including nitrogen oxides, hydrogen chloride, carbon monoxide and Carbon di-oxide.
- High vapor concentration may result in an explosion hazard.
- When heated to decomposition, it emits highly toxic fumes of Bromine.
- Vapors are heavier than air. May travel considerable distance from source and flashback.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Minor Spills
- Clean up all spills immediately following relevant Standard Operating Procedures.
- Avoid breathing vapors and contact with skin and eyes.
- Shut off leak source if possible.
- Shut off all possible sources of ignition.
- Wear protective clothing, boots, impervious gloves and safety glasses.
- Wipe up.
- Decontaminate all equipment.

Major Spill
- Alert Emergency Responders and tell them location and nature of hazard.
- Shut off all possible sources of ignition and increase ventilation.
- Wear protective clothing, full boots, impervious gloves, safety glasses and Self Contained Breathing Apparatus (SCBA), as may be deemed appropriate.
- Clear area of personnel and move upwind.
- Stop leaks if possible.
- Prevent, by any means available, spillage from entering drains or water and watercourses.
- Collect recoverable product into labeled containers for recycling, recovery or disposal.
- Contain spill with sand, earth or vermiculite.
- Spread area with lime or absorbent material, and leave for at least 1 hour before washing.
- Clean up all tools and equipment.
- Inform authorities in event of contamination of any public sewers, drains or water bodies.

Jubilant Life Sciences Limited
SECTION 7: HANDLING AND STORAGE

Handling
- Do not breathe vapor or mist.
- Wear protective gloves/clothing and eye/face protection.
- Wash thoroughly after handling.
- Ground and secure containers when dispensing or pouring product.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Launder contaminated clothing before re-use.
- If on skin or hair, IMMEDIATELY remove all contaminated clothing and rinse/shower with plenty of water.
- Use in a well ventilated place/Use protective clothing commensurate with exposure levels.

Storage
- Store in a cool, well ventilated place.
- Store away from incompatible materials.
- Keep only in original container.
- Keep securely closed when not in use.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters
Exposure Limits Values

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Amino-5-bromopyridine</td>
<td>None listed</td>
<td>None listed</td>
<td>None listed</td>
</tr>
</tbody>
</table>

Exposure Limits (International):
- Not available.

Exposure controls
Appropriate Engineering Controls:
- Provide exhaust ventilation or other engineering controls to keep the relevant airborne concentrations below their respective occupational exposure limits. Local ventilation is usually preferred. Ensure that eyewash stations and safety showers are close to the workstation location.
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Personal Protection:
- Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.
- **Hands**: Wear appropriate protective gloves to prevent skin exposure. The protective gloves to be used must comply with the specifications of EC directives 89/686/EEC and the resultant standard EN374.
- **Eyes**: Safety goggles/ Chemical Safety glasses and Face shield.
- **Clothing**: Boots and clothing to prevent contact.
- **Respirator**: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary. For emergency situations, wear a positive pressure, pressure-demand, full face piece self-contained breathing apparatus (SCBA) or pressure-demand supplied air respirator with escape SCBA and a fully-encapsulating, chemical resistant suit. (EPA,1998).

General Hygiene and general comments:
- Wash hands and face after working with substance.
- Immediately change contaminated clothing.
- Apply skin protective barrier cream.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES
- Information on basic physical and chemical properties.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Parameter</th>
<th>Typical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Appearance</td>
<td>Off white to light tan crystalline powder</td>
</tr>
<tr>
<td>2.</td>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>3.</td>
<td>Odor Threshold</td>
<td>Not Available</td>
</tr>
<tr>
<td>4.</td>
<td>pH</td>
<td>Not Available</td>
</tr>
<tr>
<td>5.</td>
<td>Melting point/Freezing point</td>
<td>136-138 °C</td>
</tr>
<tr>
<td>6.</td>
<td>Boiling Point</td>
<td>Not available</td>
</tr>
</tbody>
</table>
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<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Flash point</td>
<td>&gt;110°C</td>
</tr>
<tr>
<td>8.</td>
<td>Evaporation rate (n-BuAc=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>9.</td>
<td>Flammability</td>
<td>Non Flammable</td>
</tr>
<tr>
<td>10.</td>
<td>Upper/lower flammability or Explosive limits</td>
<td>Not available</td>
</tr>
<tr>
<td>11.</td>
<td>Vapor pressure</td>
<td>Not available</td>
</tr>
<tr>
<td>12.</td>
<td>Vapor density (air=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>13.</td>
<td>Relative density/Bulk density</td>
<td>0.74 g/cm³</td>
</tr>
<tr>
<td>14.</td>
<td>Solubility</td>
<td>Insoluble in water</td>
</tr>
<tr>
<td>15.</td>
<td>Partition coefficient : n-(Octonol / water)</td>
<td>Not available</td>
</tr>
<tr>
<td>16.</td>
<td>Auto-ignition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>17.</td>
<td>Decomposition temperature</td>
<td>Not available</td>
</tr>
<tr>
<td>18.</td>
<td>Viscosity</td>
<td>Not available</td>
</tr>
<tr>
<td>19.</td>
<td>Explosive property</td>
<td>No</td>
</tr>
<tr>
<td>20.</td>
<td>Oxidizing property</td>
<td>No</td>
</tr>
</tbody>
</table>

### SECTION 10: STABILITY AND REACTIVITY

- **Stability:** Stable under normal temperature and pressures.
- **Conditions to avoid:** Keep away from High temperature, sparks, moist condition, mechanical shock, incompatible materials, and ignition sources, excess heat UV light and strong oxidants.
- **Incompatible chemicals:** Strong-oxidizing agents, strong acids, strong bases.
- **Hazardous decomposition products:** Thermal decomposition may produce carbon monoxide and oxides of nitrogen, carbon dioxide & nitrogen, Hydrogen bromide, hydrogen cyanide and irritating and toxic fumes.
- **Hazardous Polymerization:** Not expected.
SECTION 11: TOXICOLOGICAL INFORMATION

a) Acute toxicity
   - 2-Amino-5-bromopyridine is harmful if swallowed. It causes skin irritation and eye irritation.
   RTECS#: Not listed.
   LD50/LC50: Not available.

b) Skin corrosion/irritation
   - Causes skin irritation.

c) Serious eye damage/irritation
   - Causes eye irritation.

d) Respiratory or skin sensitization
   - No data is available.

e) Germ cell Mutagenicity
   - No data is available.

f) Carcinogenicity
   - Not listed by NTP, IARC and OSHA.
   - Not present on the EU CMR list.
   - According to information presently available 2-Amino-5-bromopyridine is not found to be carcinogenic.

g) Reproductive toxicity
   - No data is available.

h) STOT-single exposure
   - No data is available.

i) STOT- repeated exposure
   - No data available.

j) Aspiration Hazards
   - No data available.
SECTION 12: ECOLOGICAL INFORMATION

Toxicity:
Ecotoxicity:
The Ecotoxicity data is not available.
- Fish ChV : - 0.34 mg/l (Estimated).
  It is expected that 2-Amino-5-bromopyridine is chronically toxic to fish.

Persistence and degradability
- It has estimated that 2-Amino-5-bromopyridine is expected to be found predominantly in soil and its persistence estimate is based on its transformation in this medium. Its half-life in soil, 75 days, exceeds the EPA criteria of >= 2 months (and <= 6 months). Therefore, 2-Amino-5-bromopyridine is estimated to be persistent in the environment.

Bio accumulative potential
- BCF = 4
- Log Kow= 1.41 at 25 °C

Based on the Log Kow and bio concentration factor value it is expected to have low potential to concentrate in fatty tissue of fish and aquatic organisms relative to its surroundings. The estimated bio concentration factor (BCF) for 2-AMINO-5-BROM-PYRIDIN, 4, does not exceed the EPA bio concentration criteria. It has estimates that 2-Amino-5-bromopyridine is not expected to bio accumulate in the food chain because it does not exceed the BCF criteria

Mobility in soil
- Henry's Law Constant= 0.00000000099 atm/m³ mole at 25 degrees.
- Log Kow=1.41 at 25 °C (estimated). Low potential to bioaccumulation.

Other adverse effects.
- Environment Fate:
  Based on the environmental modeling, this material is expected to be found predominantly in soil and it has estimated to be persistent in the environment. It is not expected to bio accumulate in the food chain because it does not exceed the BCF criteria. Since this is an estimated result it is recommended that the material should not be disposed into the environment. The material should never be disposed into the sewage.

SECTION 13: DISPOSAL CONSIDERATIONS

- Dispose of this material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws. Note that disposal regulations may also apply to empty containers and equipment reinstates.
SECTION 14: TRANSPORT INFORMATION

- This substance is considered to be Non Hazardous for transport by Air/Rail/Road and Sea and thus Not regulated by IATA/ICAO/ARD/RID/IMO/IMDG.

Environmental hazards:
- Marine pollutant: No

SECTION 15: REGULATORY INFORMATION

European Union Information

Classification as per Regulation 67/548/EEC: Xn: R22 - Xi: R36/38
- Xn - Harmful
- Xi - Irritant

Risk Phrases:
- R22: Harmful if swallowed.
- R36/38: Irritating to eyes and skin.

Safety Phrases:
- S 26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
- S 24/25: Avoid contact with skin and eyes.
- S 45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S 28A: After contact with skin, wash immediately with plenty of water.

Classification as per CLP Regulation 1272/2008:
- Hazards Class and Category: Acute Tox Oral Cat.2, Skin irrit Cat.2, Eye damage Cat.2
- Hazard Statements: H302; H315; H319

<table>
<thead>
<tr>
<th>Chemical Inventory Lists:</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSCA:</td>
<td>Not listed</td>
</tr>
<tr>
<td>EINECS:</td>
<td>214-019-9</td>
</tr>
<tr>
<td>Canada(DSL/NDSL):</td>
<td>Not listed</td>
</tr>
<tr>
<td>Japan:</td>
<td>Not listed</td>
</tr>
<tr>
<td>Korea:</td>
<td>Present</td>
</tr>
<tr>
<td>Australia:</td>
<td>Not listed</td>
</tr>
<tr>
<td>China: IECSC</td>
<td>Present</td>
</tr>
</tbody>
</table>
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US information

Health & Safety Reporting List
- None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules
- None of the chemicals in this product are under a Chemical Test Rule.

Section 12b
- None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule
- None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs
- None of the chemicals in this material have an RQ.

SARA Section 302 Extremely Hazardous Substances
- None of the chemicals in this product have a TPQ.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:
- This material does not contain any hazardous air pollutants.
- This material does not contain any Class 1 Ozone depletors.
- This material does not contain any Class 2 Ozone depletors.

Clean Water Act:
- None of the chemicals in this product are listed as Hazardous Substances under the CWA.
- None of the chemicals in this product are listed as Priority Pollutants under the CWA.
- None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:
- None of the chemicals in this product are considered highly hazardous by OSHA.

STATE
- CAS# 1072-97-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

California Prop 65
- California No Significant Risk Level: None of the chemicals in this product are listed.

WGK (Water Danger/Protection)
- CAS# 1072-97-5: No information available.

Canada - WHMIS
- WHMIS: Not available.
- This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all of the information required by those regulations.
SECTION 16: OTHER INFORMATION

Compilation information of safety data sheet
Chemical: 2-Amino-5-bromopyridine
CAS #: 1072-97-5
File Name: 0145A01 Div.03 sds 2-Amino-5-bromopyridine
Revision Number: 01
Date of Issue of SDS: June 17, 2013
Revision Due Date: May, 2015

(a) A key or legend to aberrations and acronyms used in the safety data sheet:
- PBT = Persistent Bio accumulative and Toxic.
- vPvB = Very Persistent and Very Bio accumulative.
- SCBA = Self Contained Breathing Apparatus.
- NIOSH REL = National Institute for Occupational Safety and Health Recommended Exposure Limit.
- OSHA PEL = Occupational Safety and Health Administration Permissible Exposure Limit.
- OELTWA = Occupational Exposure Limit Time Weighted Averages.
- IDLH = Immediately Dangerous to Life or Health.
- UEL = Upper Explosive Limit.
- LEL = Lower Explosive Limit.
- RTECS = Registry of Toxic Effects of Chemical Substances.
- NTP = National Toxicology Program.
- IARC = International Agency for Research on Cancer.
- EPA = Environmental Protection Agency.
- TSCA = Toxic Substances Control Act.
- SARA = Superfund Amendments and Reauthorization Act.
- DSL/NDSL = Domestic/Non-Domestic Substances List.
- CSR = Chemical Safety Report.
- BCF = Bio Concentration Factor.
- DNEL = Derived No Effect Level.
- PNEC = Predicted No Effect Concentration.
- TLV = Threshold Limit Value.
- ACGIH = American Conference of Governmental Industrial Hygienists.
- REACH = Registration, Evaluation, Authorization and Restriction of Chemicals.
- CLP = Classification, Labeling and Packaging.
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- LD / LC = Lethal Doses / Lethal Concentration.
- GHS = Globally Harmonized System.
- ADR = Accord européen relative au transport international de marchandises.
- EmS = Emergency measures on Sea.
- ICAO = International Civil Aviation Organization.
- IATA/DGR= International Air Transport Association/Dangerous Goods Regulation.

(b) Key Literature reference and sources for data

Biographical reference and data sources
- CLP REG (regulation) (EC) no. 1272/2008, last modification by regulation (EC) no. 790/2009
- DIR 67/548/EWG, last modification by DIR 2009/2/EC

Internet
- RTECS
- ESIS
- PBT Profiler

Company’s Declaration:

Information contained in this SDS is believed to be correct but no representation, guarantee or warranties of any kind are made as to its accuracy, suitability for a particular application or results to be obtained from them. This SDS shall be used as a guide only. Jubilant Life Sciences Limited makes no warranties expressed or implied of the adequacy of this document for any particular purpose.

(End of Safety Data Sheet)