Section 1 - Product and Company Information

Product Name: THIAMINE HYDROCHLORIDE
Product Number: T4625
Brand: SIGMA
Company: Sigma-Aldrich Canada, Ltd
Street Address: 2149 Winston Park Drive
City, State, Zip, Country: Oakville ON L6H 6J8 CA
Technical Phone: 9058299500
Emergency Phone: 800-424-9300
Fax: 9058299292

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
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<tbody>
<tr>
<td>THIAMINE HYDROCHLORIDE</td>
<td>67-03-8</td>
<td>No</td>
</tr>
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</table>

Formula: C12H17ClN4OS · HCl
Synonyms: Aneurine hydrochloride * Apane drops * Beatine *
Bedome * Begiolan * Benerva * Beguin * Berin *
Bethezine * Beuion * Bevitex * Bevitine * Bewon *
* Biuno * Bivatin * Bivita * Clotiamina * Eskapen *
* Eskaphen * Lixa-Beta * Metabolin * Slowten *
ThD * Thiodoxine * Thiaminal * Thiamin chloride *
Thiamin dichloride * Thiamine chloride * Thiamine *
dichloride * Thiamine hydrochloride * Thiamin *
hydrochloride * Thiaminium chloride hydrochloride *
* Thiamol * Thiavit * Tiamidon * Tiaminal *
Throhite * USAF CB-20 * Vetalin S * Vinothiam *
* Vitamin B1 hydrochloride * Vitamin B(sub 1) *
hydrochloride * Vitaneuron

RTECS Number: XI7350000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Caution: Avoid contact and inhalation.

HMIS RATING
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 1

NFPA RATING
HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 1

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 contact, immediately wash skin with soap and copious amounts of water.

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: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

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(S) OF PERSONAL PRECAUTION(S)
Exercise appropriate precautions to minimize direct contact with skin or eyes and prevent inhalation of dust.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid inhalation. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed.

SPECIAL REQUIREMENTS
Hygroscopic. Light sensitive.

Section 8 - Exposure Controls / PPE
ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Wear dust mask.
Hand: Protective gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Physical State: Solid</th>
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<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
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<tbody>
<tr>
<td>Molecular Weight</td>
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<tr>
<td>pH</td>
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<tr>
<td>BP/BP Range</td>
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<td>MP/MP Range</td>
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<td>Freezing Point</td>
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<tr>
<td>Vapor Pressure</td>
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<tr>
<td>Vapor Density</td>
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<td>Saturated Vapor Conc.</td>
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<tr>
<td>SG/Density</td>
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<tr>
<td>Bulk Density</td>
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<tr>
<td>Odor Threshold</td>
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<tr>
<td>Volatile%</td>
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<tr>
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<tr>
<td>Water Content</td>
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<tr>
<td>Solvent Content</td>
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<td>Evaporation Rate</td>
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<td>Viscosity</td>
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<td>Partition Coefficient</td>
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<td>Decomposition Temp.</td>
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<td>Miscellaneous Data</td>
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<tr>
<td>Solubility</td>
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</table>

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur
ROUTE OF EXPOSURE
Skin Contact: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: May be harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
Exposure to high concentrations can cause nausea, tightness of the throat, itching, and weakness. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Intramuscular
Woman
5 MG/KG
LDLo

Oral
Rat
3710 mg/kg
LD50

Intraperitoneal
Rat
481 MG/KG
LD50

Subcutaneous
Rat
560 MG/KG
LD50

Intravenous
Rat
118 MG/KG
LD50

Oral
Mouse
8224 mg/kg
LD50

Intraperitoneal
Mouse
200 MG/KG
LD50

Subcutaneous
Mouse
266 MG/KG
LD50

Intravenous
Mouse
74 MG/KG
LD50

Intravenous
Cat
75 MG/KG
LD50

Intravenous
Rabbit
117 MG/KG
LD50
Remarks: Behavioral: Muscle contraction or spasticity. Lungs, Thorax, or Respiration: Cyanosis. Lungs, Thorax, or Respiration: Other changes.

Subcutaneous
Guinea pig
872 MG/KG
LD50

Intravenous
Guinea pig
140 MG/KG
LD50

Intravenous
Pigeon
180 MG/KG
LD50

Subcutaneous
Frog
2600 MG/KG
LD50

Section 12 - Ecological Information
No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air
Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
S: 22 24/25
Safety Statements: Do not breathe dust. Avoid contact with skin and eyes.

US CLASSIFICATION AND LABEL TEXT
US Statements: Caution: Avoid contact and inhalation.

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 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.