Section 1 - Product and Company Information

Product Name                      HEXAMETHYLENETETRAMINE, 99%
Product Number                    H11300
Brand                              ALDRICH
Company                            Sigma-Aldrich
Street Address                     3050 Spruce Street
City, State, Zip, Country         SAINT LOUIS MO 63103 US
Technical Phone:                   314 771 5765
Emergency Phone:                  414 273 3850 Ext. 5996
Fax:                              800 325 5052

Section 2 - Composition/Information on Ingredient

Substance Name: HEXAMETHYLENETETRAMINE
CAS #                 100-97-0
SARA 313       No

Formula         C6H12N4
Synonyms        Aceto HMT * Aminoform * Ammoform *
                Ammonioformaldehyde * Cystamin * Cystogen *
                Esametilentetramina (Italian) * Formamine *
                Formin * Hexaform * Hexamethylamine *
                Hexamethyleneamine * Hexamethylenetetraamine *
                Hexamethylenetetramine * Hexilmethylenamine *
                1,3,5,7-Tetraazaadamantane *
                1,3,5,7-Tetraazatricyclo(3.3.1.1(sup 37))decane *
                Resotropin * 1,3,5,7-Tetraazaadamantane *
                Uritone * Urotropin * Urotropine

RTECS Number: MN4725000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Flammable (USA) Highly Flammable (EU). Harmful.
May cause sensitization by inhalation and skin contact.
Target organ(s): Kidneys.

HMIS RATING
HEALTH: 3*
FLAMMABILITY: 2
REACTIVITY: 1

NFPA RATING
HEALTH: 3
FLAMMABILITY: 2
REACTIVITY: 1

*additional chronic hazards present.

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 not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

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

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION DATA
Dust Potential: This material, like most materials in powder form, is capable of creating a dust explosion.

FLASH POINT
482 °F   250 °C   Method: closed cup

AUTOIGNITION TEMP
410 °C

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): Flammable solid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Avoid raising dust. Sweep up, place in a bag and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.
Section 7 - Handling and Storage

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

STORAGE
Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

SPECIAL REQUIREMENTS
Hygroscopic.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Wash contaminated clothing before reuse.

EXPOSURE LIMITS
<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>4 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Physical State: Solid</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
<td></td>
</tr>
<tr>
<td>Form</td>
<td>Crystals</td>
<td></td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>140.19 AMU</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>N/A</td>
<td></td>
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<tr>
<td>BP/BP Range</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>280 °C</td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
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</tr>
<tr>
<td>Vapor Pressure</td>
<td>&lt; 0.01 mmHg</td>
<td>20 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
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<td></td>
</tr>
<tr>
<td>Saturated Vapor Conc.</td>
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</tr>
<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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<td></td>
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<tr>
<td>Volatile%</td>
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<tr>
<td>VOC Content</td>
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<td></td>
</tr>
<tr>
<td>Water Content</td>
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<td></td>
</tr>
<tr>
<td>Solvent Content</td>
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<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
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</tr>
<tr>
<td>Viscosity</td>
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<tr>
<td>Surface Tension</td>
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<td></td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Decomposition Temp. N/A
Flash Point 482 °F 250 °C Method: closed cup
Explosion Limits N/A
Flammability N/A
Autoignition Temp 410 °C
Refractive Index N/A
Optical Rotation N/A
Miscellaneous Data N/A
Solubility Solubility in Water: soluble
Other Solvents: ETHANOL, ACETONE, CHLOROFORM

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Conditions to Avoid: Protect from moisture.
Materials to Avoid: Strong acids, Reacts with acids liberating formaldehyde, Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Nitrogen oxides.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

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.

SENSITIZATION
Sensitization: May cause allergic reaction.

TARGET ORGAN(S) OR SYSTEM(S)
Kidneys.

TOXICITY DATA

Intravenous
Rat
9200 MG/KG
LD50

Oral
Mouse
569 mg/kg
LD50

Subcutaneous
Mouse
215 MG/KG
LD50
Remarks: Behavioral: Tremor. Gastrointestinal: Changes in
structure or function of salivary glands.

Intravenous
Mouse
17700 UL/KG
LD50

CHRONIC EXPOSURE - CARCINOGEN

Species: Rat
Route of Application: Subcutaneous
Dose: 140 GM/KG
Exposure Time: 78W
Frequency: I
Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 100 UMOL/L
Cell Type: HeLa cell
Mutation test: Other mutation test systems

Species: Human
Dose: 1 MMOL/L
Cell Type: HeLa cell
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Intraperitoneal
Dose: 25 GM/KG
Mutation test: Dominant lethal test

Species: Mouse
Route: Oral
Dose: 25 GM/KG
Mutation test: Dominant lethal test

Species: Hamster
Dose: 10 MG/L
Cell Type: kidney
Mutation test: Morphological transformation.

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. Burn in a chemical incinerator equipped with an afterburner but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Hexamethylenetetramine
UN#: 1328
Class: 4.1
Packing Group: Packing Group III
Hazard Label: Flammable solid
PIH: Not PIH

IATA
Proper Shipping Name: Hexamethylenetetramine
IATA UN Number: 1328
Hazard Class: 4.1
Packing Group: III

Section 15 – Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: F Xn
R: 11 42/43
Risk Statements: Highly flammable. May cause sensitization by inhalation and skin contact.
S: 16 22 24 37
Safety Statements: Keep away from sources of ignition - no smoking. Do not breathe dust. Avoid contact with skin. Wear suitable gloves.

US CLASSIFICATION AND LABEL TEXT
Risk Statements: May cause sensitization by inhalation and skin contact.
Safety Statements: Keep away from sources of ignition - no smoking. Do not breathe dust. Avoid contact with skin. Wear suitable gloves.
US Statements: Target organ(s): Kidneys.

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.
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