Material Safety Data Sheet

Section 1 - Product and Company Information

Product Name: Hexane, ReagentPlus®, >99%
Product Number: 139386
Brand: Aldrich Chemical
Company: Sigma-Aldrich
Address: 3050 Spruce Street
City, State, Zip, Country: SAINT LOUIS, MO 63103 US
Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
<th>EC no</th>
<th>Annex 1 Index Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-HEXANE</td>
<td>110-54-3</td>
<td>Yes</td>
<td>203-777-6</td>
<td>601-037-00-0</td>
</tr>
</tbody>
</table>

Formula: C6H14
Synonyms: Esani (Italian), Gettysolve-B, Heksan (Polish). n-Hexane (ACGIH:OSHA), Hexanen (Dutch), Hexyl hydride, NCI-C60571

Section 3 - Hazards Identification

Emergency Overview
Flammable (USA) Highly Flammable (EU). Harmful. Dangerous for the environment. Irritating to eyes, respiratory system and skin. Harmful: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms. may cause long-term adverse effects in the aquatic environment. Target organ(s): Nerves. Kidneys.

HMIS Rating
Health: 2* Flammability: 3 Reactivity: 0

NFPA Rating
Health: 2 Flammability: 3 Reactivity: 0

*additional chronic hazards present.

Section 4 - First Aid Measures

Oral Exposure
If swallowed, do not induce vomiting. call a physician immediately.

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 contact, immediately wash skin with soap and copious amounts of water.
Eye Exposure
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

Section 5 - Fire Fighting Measures

Flammable Hazards: Yes

Explosion Hazards
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

Flash Point: -14.8 °F, -26 °C

Explosion Limits: Lower: 1.2 %, Upper: 7.7 %

Autoignition Temp: 234 °C

Flammability: Yes

Extinguishing Media
Suitable
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Firefighting

Protective Equipment
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s)
Flammable liquid. Emits toxic fumes under fire conditions. Vapor may travel considerable distance to source of ignition and flash back.

Specific Method(s) of Fire Fighting
Use water spray to cool fire-exposed containers.

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
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling

User Exposure
Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.
Storage
Suitable
Keep tightly closed. Keep away from heat, sparks, and open flame.

Section 8 - Exposure Controls / PPE

Engineering Controls
Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

Personal Protective Equipment
Respiratory
Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand
Compatible chemical-resistant gloves.

Eye
Chemical safety goggles.

General Hygiene Measures
Remove and wash contaminated clothing promptly. Wash thoroughly after handling.

Exposure Limits

<table>
<thead>
<tr>
<th>Country</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>100 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>400 MG/M3</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td>-</td>
</tr>
</tbody>
</table>

Exposure Limits, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>50 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard-air</td>
<td>TWA</td>
<td>500 PPM (1800 MG/M3)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA</td>
<td>PEL</td>
<td>8H TWA 500 PPM (1800 MG/M3)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>OEL</td>
<td>TWA</td>
<td>50 PPM</td>
</tr>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td>TWA</td>
<td>50 PPM</td>
</tr>
</tbody>
</table>

Remarks: Skin

Remarks: check ACGIH TLV

Section 9 - Physical/Chemical Properties

Appearance
Physical State
Liquid

Molecular Weight: 86.18 AMU

pH
7

BP/MP Range
68 - 70 °C

MP/MP Range
-95 °C

Freezing Point
N/A

Vapor Pressure
132 mmHg

Vapor Density
3 g/l

Saturated Vapor Conc.
N/A

SG/Density
0.659 g/cm3

Bulk Density
N/A

Odor Threshold
64 - 244 ppm

Aldrich Chemical - 100066

Page 3
Volatile 100 %
VOC Content N/A
Water Content < 0.01 %
Solvent Content N/A
Evaporation Rate 15.8
Viscosity 32 Pas 25 C
Partition Coefficient Log Kow: 3.90 - 4.11
Decomposition Temp. N/A
Flash Point °F -14.8 °F Method closed cup
Flash Point °C -26 °C Method: closed cup

Explosion Limits
Lower: 1.2 %
Upper: 7.7 %

Flammability N/A
Autoignition Temp 234 °C
Refractive Index 1.375

Solubility
Solubility in Water: Insoluble.
N/A = not available

Section 10 - Stability and Reactivity

Stability
Stable

Materials to Avoid
Oxidizing agents. Incompatible with: chlorine, fluorine, and magnesium perchlorate.

Hazardous Decomposition Products
Hazardous Decomposition Products
Carbon monoxide, Carbon dioxide.

Hazardous Polymerization
Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure
Skin Contact
Causes skin irritation.

Skin Absorption
May be harmful if absorbed through the skin.

Eye Contact
May cause eye irritation.

Inhalation
Material may be irritating to mucous membranes and upper respiratory tract. Harmful if inhaled.

Ingestion
Harmful if swallowed.

Target Organ(s) or System(s)
Peripheral nervous system. Kidneys. Testes.

Signs and Symptoms of Exposure
Prolonged or repeated contact with skin can cause defatting and dermatitis. Contact with eyes can cause redness, tearing, and blurred vision. Ingestion may cause gastrointestinal irritation. Can cause CNS depression. Exposure can cause: Lung irritation, chest pain, and edema which may be fatal. Headache, dizziness, drowsiness, incoordination, slowed reaction time; slurred speech; giddiness and unconsciousness.

RTECS Number: MN9275000

Toxicity Data

Aldrich Chemical - 138086
Page 4
Oral - Rat: 25000 mg/kg (LD50)
Inhalation - Rat: 48,000 ppm (LC50)

**Irritation Data**
Eyes - Rabbit: 10 mg
Remarks: Mild irritation effect

**Chronic Exposure - Carcinogen**
Rat - Inhalation: 1000 PPM 4H/59W I
Mouse - Inhalation: 9018 PPM 6H/2Y I
Result: Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

**Chronic Exposure - Teratogen**

<table>
<thead>
<tr>
<th>Species</th>
<th>Dose</th>
<th>Route of Application</th>
<th>Exposure Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rat</td>
<td>5000 PPM/20H</td>
<td>Inhalation</td>
<td>(6-19D PREG)</td>
</tr>
<tr>
<td>Mouse</td>
<td>238 GM/KG</td>
<td>Oral</td>
<td>(6-15D PREG)</td>
</tr>
</tbody>
</table>

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

**Chronic Exposure - Mutagen**

<table>
<thead>
<tr>
<th>Species</th>
<th>Dose</th>
<th>Cell Type</th>
<th>Mutation test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamster</td>
<td>500 MG/L</td>
<td>fibroblast</td>
<td>Cytogenetic analysis</td>
</tr>
</tbody>
</table>

**Chronic Exposure - Reproductive Hazard**

<table>
<thead>
<tr>
<th>Species</th>
<th>Dose</th>
<th>Route of Application</th>
<th>Exposure Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rat</td>
<td>10000 PPM/7H</td>
<td>Inhalation</td>
<td>(15D PRE/1-18D PREG)</td>
</tr>
<tr>
<td>Rat</td>
<td>1000 PPM/6H</td>
<td>Inhalation</td>
<td>(8-16D PREG)</td>
</tr>
</tbody>
</table>

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.
Result: Effects on Newborn: Behavioral.
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain).

**Section 12 - Ecological Information**

**Acute Ecotoxicity Tests**

**Test Type**
EC50 Daphnia

**Species**
Daphnia magna

<table>
<thead>
<tr>
<th>Time</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.0 h</td>
<td>3.878 mg/l</td>
</tr>
</tbody>
</table>

**Test Type**
EC50 Algae

**Species**
Chlorella vulgaris

<table>
<thead>
<tr>
<th>Time</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 h</td>
<td>12.840 mg/l</td>
</tr>
</tbody>
</table>

**Test Type**
EC50 Algae

**Species**
SKELETONOMA

<table>
<thead>
<tr>
<th>Time</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 h</td>
<td>0.3 mg/l</td>
</tr>
</tbody>
</table>

**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 and scrubber 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: Hexanes
UN#: 1208
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Hexanes
IATA UN Number: 1208
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU Directives Classification
Symbol of Danger: F Xn N
Indication of Danger
Highly Flammable. Harmful. Dangerous for the environment.
Risk Statements
Highly flammable. Irritating to skin. Harmful: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements
Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. Do not empty into drains. Take precautionary measures against static discharges. Wear suitable protective clothing and gloves. Avoid release to the environment. Refer to special instructions/safety data sheets. If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

US Classification and Label Text
Indication of Danger
Flammable (USA) Highly Flammable (EU). Harmful. Dangerous for the environment.
Risk Statements
Irritating to eyes, respiratory system and skin. Harmful: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements
Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Do not empty into drains. Take precautionary measures against static discharges. Wear suitable protective clothing and gloves. Avoid release to the environment. Refer to special instructions/safety data sheets. If swallowed, do not induce vomiting; seek medical advice immediately and show this container or label.

US Statements
Target organ(s): Nerves. Kidneys.

United States Regulatory Information
SARA Listed: Yes
Deminimis: 1 %
Notes: This product is subject to SARA section 313 reporting requirements.

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.
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 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.