1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers
Product name : Diethylamine

<table>
<thead>
<tr>
<th>Identifier</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Number</td>
<td>471216</td>
</tr>
<tr>
<td>Brand</td>
<td>Sigma-Aldrich</td>
</tr>
<tr>
<td>Index-No.</td>
<td>612-003-00-X</td>
</tr>
<tr>
<td>REACH No.</td>
<td>A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>109-89-7</td>
</tr>
</tbody>
</table>

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number
Emergency Phone #: (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):
- Flammable liquids (Category 2), H225
- Acute toxicity, Oral (Category 4), H302
- Acute toxicity, Inhalation (Category 4), H332
- Acute toxicity, Dermal (Category 3), H311
- Skin irritation (Category 2), H315
- Serious eye damage (Category 1), H318
- Respiratory sensitisation (Category 1), H334
- Skin sensitisation (Category 1), H317
- Acute aquatic toxicity (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Hazard statement(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danger</td>
<td>H225</td>
<td>Highly flammable liquid and vapour.</td>
</tr>
<tr>
<td></td>
<td>H302 + H332</td>
<td>Harmful if swallowed or if inhaled</td>
</tr>
<tr>
<td></td>
<td>H311</td>
<td>Toxic in contact with skin.</td>
</tr>
</tbody>
</table>
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H402 Harmful to aquatic life.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P243 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P261 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P285 In case of inadequate ventilation wear respiratory protection.
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a POISON CENTER or doctor/ physician.
P322 Specific measures (see supplemental first aid instructions on this label).
P330 Rinse mouth.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P361 Remove/Take off immediately all contaminated clothing.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Formula</th>
<th>: C_4H_{11}N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>: 73.14 g/mol</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>: 109-89-7</td>
</tr>
<tr>
<td>EC-No.</td>
<td>: 203-716-3</td>
</tr>
<tr>
<td>Index-No.</td>
<td>: 612-003-00-X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazardous components</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylamine</td>
<td>Flam. Liq. 2; Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Dam. 1; Resp. Sens. 1; Skin Sens. 1; Aquatic Acute 3; H225, H302 + H332, H311, H315, H317, H318, H334,</td>
<td>-</td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

4.3 Indication of any immediate medical attention and special treatment needed
No data available.

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, nitrogen oxides (NOx).

5.3 Advice for firefighters
Wear self-contained breathing apparatus for fire fighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Flash back possible over considerable distance. Container explosion may occur under fire conditions. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 **Specific end use(s)**
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

8. **EXPOSURE CONTROLS/PERSONAL PROTECTION**

8.1 **Control parameters**

**Components with workplace control parameters**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethylamine</td>
<td>109-89-7</td>
<td>TWA</td>
<td>5 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye &amp; Upper Respiratory Tract irritation</td>
<td>Not classifiable as a human carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Danger of cutaneous absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>15 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye &amp; Upper Respiratory Tract irritation</td>
<td>Not classifiable as a human carcinogen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Danger of cutaneous absorption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>10 ppm</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30 mg/m3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>25 ppm 75 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>25 ppm 75 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
</tbody>
</table>

The value in mg/m3 is approximate.

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TWA</td>
<td>10 ppm 30 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
<tr>
<td></td>
<td>ST</td>
<td>25 ppm 75 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
</tr>
</tbody>
</table>

8.2 **Exposure controls**

**Appropriate engineering controls**
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Personal protective equipment**

**Eye/face protection**
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Splash contact**
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 159 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (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. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a) Appearance</strong></td>
<td>Form: liquid</td>
</tr>
<tr>
<td><strong>b) Odour</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>c) Odour Threshold</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>d) pH</strong></td>
<td>13 at 100 g/l at 20 °C (68 °F)</td>
</tr>
<tr>
<td><strong>e) Melting point/freezing point</strong></td>
<td>Melting point/range: -50 °C (-58 °F)</td>
</tr>
<tr>
<td><strong>f) Initial boiling point and boiling range</strong></td>
<td>55 °C (131 °F)</td>
</tr>
<tr>
<td><strong>g) Flash point</strong></td>
<td>-23 °C (-9 °F) - closed cup</td>
</tr>
<tr>
<td><strong>h) Evaporation rate</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>i) Flammability (solid, gas)</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>j) Upper/lower flammability or explosive limits</strong></td>
<td>Upper explosion limit: 10.1 %(V)</td>
</tr>
<tr>
<td></td>
<td>Lower explosion limit: 1.8 %(V)</td>
</tr>
<tr>
<td><strong>k) Vapour pressure</strong></td>
<td>241.936 hPa (181.467 mmHg) at 20 °C (68 °F)</td>
</tr>
<tr>
<td></td>
<td>974.637 hPa (731.038 mmHg) at 55 °C (131 °F)</td>
</tr>
<tr>
<td><strong>l) Vapour density</strong></td>
<td>2.53 - (Air = 1.0)</td>
</tr>
<tr>
<td><strong>m) Relative density</strong></td>
<td>0.707 g/mL at 25 °C (77 °F)</td>
</tr>
<tr>
<td><strong>n) Water solubility</strong></td>
<td>soluble</td>
</tr>
<tr>
<td><strong>o) Partition coefficient: n-octanol/water</strong></td>
<td>log Pow: 0.58</td>
</tr>
<tr>
<td><strong>p) Auto-ignition temperature</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>q) Decomposition temperature</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>r) Viscosity</strong></td>
<td>no data available</td>
</tr>
<tr>
<td><strong>s) Explosive properties</strong></td>
<td>no data available</td>
</tr>
</tbody>
</table>
t) Oxidizing properties no data available

9.2 Other safety information

Surface tension 19.85 mN/m at 25 °C (77 °F)
Relative vapour density 2.53 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Aldehydes, Alcohols, Dicyanofurazan, Ketones, phenols, Acids, Halogenated hydrocarbon, Oxidizing agents, Epoxides

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 540 mg/kg
LC50 Inhalation - rat - 4 h - 4000 ppm
LD50 Dermal - rabbit - 577 mg/kg
no data available

Skin corrosion/irritation
Skin - rabbit
Result: Severe skin irritation

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
Germ cell mutagenicity
no data available

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive toxicity
no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: HZ8750000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Lachrymation

12. ECOLOGICAL INFORMATION

12.1 Toxicity
Toxicity to fish
LC50 - Oncorhynchus mykiss (rainbow trout) - 25 - 198 mg/l - 96 h
LC50 - Oncorhynchus mykiss (rainbow trout) - 25 - 198 mg/l - 96 h

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 56 mg/l - 48 h
EC50 - Daphnia magna (Water flea) - 56 mg/l - 48 h

Toxicity to algae
EC50 - Algae - 20 mg/l - 96 h
EC50 - Pseudokirchneriella subcapitata (green algae) - 20 mg/l - 96 h

Toxicity to bacteria
- Bacteria - 47 mg/l - 17 h

12.2 Persistence and degradability
Biodegradability
Biotic/Aerobic - Exposure time 28 d
Result: 75 % - Readily biodegradable.

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life.
Do not empty into drains.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.
14. TRANSPORT INFORMATION

DOT (US)
UN number: 1154    Class: 3 (8)    Packing group: II
Proper shipping name: Diethylamine
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 1154    Class: 3 (8)    Packing group: II
Proper shipping name: DIETHYLAMINE
Marine pollutant: No
EMS-No: F-E, S-C

IATA
UN number: 1154    Class: 3 (8)    Packing group: II
Proper shipping name: Diethylamine

15. REGULATORY INFORMATION

REACH No.: A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>109-89-7</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>109-89-7</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>109-89-7</td>
<td>2007-03-01</td>
</tr>
</tbody>
</table>

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.    Acute toxicity
Aquatic Acute    Acute aquatic toxicity
Eye Dam.    Serious eye damage
Flam. Liq.    Flammable liquids
H225    Highly flammable liquid and vapour.
H302    Harmful if swallowed.
H302 + H332    Harmful if swallowed or if inhaled
H311    Toxic in contact with skin.
H315    Causes skin irritation.
H317    May cause an allergic skin reaction.
H318 Causes serious eye damage.
H332 Harmful if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H402 Harmful to aquatic life.

**HMIS Rating**
Health hazard: 3
Chronic Health Hazard: *
Flammability: 3
Physical Hazard 0

**NFPA Rating**
Health hazard: 3
Fire Hazard: 3
Reactivity Hazard: 0

**Further information**
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**Preparation Information**
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 02/24/2014 Print Date: 04/15/2014