1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Toluene
Product Number : 34866
Brand : Sigma-Aldrich
Company : Sigma-Aldrich
            3050 Spruce Street
            SAINT LOUIS MO 63103
            USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052
Emergency Phone # : (314) 776-6555

2. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C7H8
Molecular Weight : 92.14 g/mol

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>203-625-9</td>
<td>601-021-00-3</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

Emergency Overview
OSHA Hazards
  Flammable Liquid, Irritant, Teratogen, Reproductive hazard
Target Organs
  Bladder, Liver, Kidney, Brain.

HMIS Classification
  Health Hazard: 2 Blue
  Chronic Health Hazard: *
  Flammability: 3 Red
  Physical hazards: 0 Orange

NFPA Rating
  Health Hazard: 2 or Yellow
  Fire: 3
  Reactivity Hazard: 0

Potential Health Effects
  Inhalation: May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause drowsiness and dizziness.
Skin
Eyes
Ingestion

May be harmful if absorbed through skin. Causes skin irritation.
Causes eye irritation.
Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

4. FIRST AID MEASURES

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

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. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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

5. FIRE-FIGHTING MEASURES

Flammable properties
Flash point 4.0 °C (39.2 °F) - closed cup
Ignition temperature 535 °C (995 °F)

Suitable extinguishing media
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.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, 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.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods for cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
## Storage
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. Store in cool place.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Update</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>TWA</td>
<td>100 ppm 375 mg/m³</td>
<td>1989-03-01</td>
<td>US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A</td>
</tr>
<tr>
<td>Remarks</td>
<td>See Table Z-2.</td>
<td>STEL</td>
<td>150 ppm 560 mg/m³</td>
<td>1989-03-01</td>
<td>US. Department of Labor - Occupational Safety and Health Administration (OSHA) 29 CFR 1910.1000 Z-1-A</td>
</tr>
<tr>
<td>See Table Z-2.</td>
<td></td>
<td>TWA</td>
<td>200 ppm</td>
<td>1993-06-30</td>
<td>US. Department of Labor - Occupational Safety and Health Administration; (OSHA) Standards, Toxic and Hazardous Substances, Subpart Z 29 CFR Part 1910.1000, Table Z-2</td>
</tr>
<tr>
<td>(Z37.12-1967)</td>
<td></td>
<td>TWA</td>
<td>20 ppm</td>
<td>2006-11-17</td>
<td>US. American Conference of Governmental and</td>
</tr>
</tbody>
</table>

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The agent (mixture, or exposure circumstance) is not classifiable as to its carcinogenicity to humans.

Personal protective equipment

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

**Hand protection**
Handle with gloves.

**Eye protection**
Safety glasses

**Skin and body protection**
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

**Hygiene measures**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### Appearance
- **Form**: liquid
- **Colour**: colourless

#### Safety data
- **pH**: no data available
- **Melting point**: -93.0 °C (-135.4 °F)
- **Boiling point**: 110.6 °C (231.1 °F)
- **Flash point**: 4.0 °C (39.2 °F) - closed cup
- **Ignition temperature**: 535 °C (995 °F)
- **Lower explosion limit**: 1.2 % (V)
- **Upper explosion limit**: 7 % (V)
- **Vapour pressure**: 29.1 hPa (21.8 mmHg) at 20.0 °C (68.0 °F)
- **Density**: 0.86 g/cm3 at 25.00 °C (77.00 °F)
- **Water solubility**: no data available

- Kerosene FP 146°F
- Water VP 17.5
10. STABILITY AND REACTIVITY

Storage stability
Stable under recommended storage conditions.

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

Hazardous reactions
Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - rat - > 5,580 mg/kg
LC50 Inhalation - rat - 4 h - 12,500 - 28,800 mg/m3
LD50 Dermal - rabbit - 12,196 mg/kg

Highly Toxic 50 mg/kg

Highly Toxic 2 mg/m3 in one hour

Irritation and corrosion
Skin - rabbit - Skin irritation - 24 h
Eyes - rabbit - Severe eye irritation - 24 h

Sensitisation
No data available

Chronic exposure

IARC: Group 3 - Not classifiable as to carcinogenicity to humans (Toluene)

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.

Developmental Toxicity - rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Damage to fetus possible

Reproductive toxicity - rat - Inhalation
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Experiments have shown reproductive toxicity effects in male and female laboratory animals.

Signs and Symptoms of Exposure
Lung irritation, chest pain, pulmonary edema, Inhalation studies on toluene have demonstrated the development of inflammatory and ulcerous lesions of the penis, prepuce, and scrotum in animals.

Potential Health Effects

Inhalation
May be harmful if inhaled. Causes respiratory tract irritation. Vapours may cause
drowsiness and dizziness.

**Skin**
May be harmful if absorbed through skin. Causes skin irritation.

**Eyes**
Causes eye irritation.

**Ingestion**
Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed.

**Target Organs**
Bladder, Liver, Kidney, Brain.

**Additional Information**
RTECS: XS5250000

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12. ECOLOGICAL INFORMATION

**Elimination information (persistence and degradability)**

**Bioaccumulation**
Leuciscus idus (Golden orfe) - 3 d
Bioconcentration factor (BCF): 94

**Ecotoxicity effects**

**Toxicity to fish**
LC50 - Lepomis macrochirus (Bluegill) - 74.00 - 340.00 mg/l - 96 h
LC50 - Oncorhynchus mykiss (rainbow trout) - 7.63 mg/l - 96 h
NOEC - Pimephales promelas (fathead minnow) - 5.44 mg/l - 7 d
LOEC - Pimephales promelas (fathead minnow) - 8.04 mg/l - 7 d

**Toxicity to daphnia and other aquatic invertebrates.**
EC50 - Daphnia magna (Water flea) - 8.00 mg/l - 24 h
Immobilization EC50 - Daphnia magna (Water flea) - 6 mg/l - 48 h

**Toxicity to algae**
EC50 - Chiorella vulgaris (Fresh water algae) - 245.00 mg/l - 24 h
EC50 - Pseudokirchneriella subcapitata (green algae) - 10.00 mg/l - 24 h

**Further information on ecology**
no data available

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13. DISPOSAL CONSIDERATIONS

**Product**
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. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging**
Dispose of as unused product.

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14. TRANSPORT INFORMATION

**DOT (US)**
UN-Number: 1294 Class: 3
Proper shipping name: Toluene
Marine pollutant: No
Poison Inhalation Hazard: No

**Packing group: II**

**IMDG**
UN-Number: 1294 Class: 3
Proper shipping name: TOLUENE
Marine pollutant: No

EMS-No: F-E, S-D

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15. REGULATORY INFORMATION

**OSHA Hazards**
Flammable Liquid, Irritant, Teratogen, Reproductive hazard

**DSL Status**
All components of this product are on the Canadian DSL list.

**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**

<table>
<thead>
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**SARA 311/312 Hazards**
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

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**Pennsylvania Right To Know Components**

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**New Jersey Right To Know Components**

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**California Prop. 55 Components**
WARNING! This product contains a chemical known in the State of California to cause birth defects or other reproductive harm.

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<td>1992-05-09</td>
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16. OTHER INFORMATION

**Further information**
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