1. PRODUCT AND COMPANY IDENTIFICATION

Product Name Toluene

Cat No. S80229HPLC; T288-1; T288RS-19; T290-1; T290-1LC; T290-4; T290RS-19; T290RS-28; T290RS-200; T290N2-19; T290SK-1; T290SK-4; T290SS-28; T290SS-50; T290SS-115; T290SS-200; T291-4; T291-4LC; T291RS-200; T291SK-4; T291SS-19; T313-4; T313SK-4; T323-4; T323-20; T324-1; T324-4; T324-20; T324-500; T324CU-1300; T324FB-19; T324FB-50; T324FB-115; T324FB-200; T324POPB-200; T324RB-19; T324RB-115; T324RB-200; T324RS-19; T324RS-28; T324RS-50; T324RS-115; T324RS-200; T324SK-4; T324SS-28; T324SS-50; T324SS-115; T324SS-200; T326F-1GAL; T326P-4; T326S-20; T326S-20LC; T326S-200; T326SPOPB-200; T324RB-19; T324RB-115; T324RB-200; T324RS-19; T324RS-28; T324RS-50; T324RS-115; T324RS-200; T324SK-4; T324SS-28; T324SS-50; T324SS-115; T324SS-200; T326F-1GAL; T326P-4; T326S-20; T326S-20LC; T324RB-19; T324RB-115; T324RB-200; T324RS-19; T324RS-28; T324RS-50; T324RS-115; T324RS-200; T324SK-4; T324SS-28; T324SS-50; T324SS-115; T324SS-200; T326F-1GAL; T326P-4; T326S-20; T326S-20LC; T330-4

Synonyms Methylbenzene; Toluol; Phenyl methane (Certified ACS, HPLC, OPTIMA, Laboratory, Histological, Spectranalyzed, Scintanalyzed)

Recommended Use Laboratory chemicals

Company Fisher Scientific

Address One Reagent Lane

City Fair Lawn, NJ 07410

Country Tel: (201) 796-7100

Fax: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300

CHEMTREC®, Outside the USA: 001-703-527-3887

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview

Flammable liquid and vapor. Causes eye, skin, and respiratory tract irritation. Vapors may cause drowsiness and dizziness. Aspiration hazard if swallowed - can enter lungs and cause damage. Danger of serious damage to health by prolonged exposure. Possible risk of harm to the unborn child. May cause adverse kidney effects. May cause adverse liver effects.

Appearance Colorless

Physical State Liquid

Odor aromatic

Target Organs Eyes, Skin, Respiratory system, Liver, Kidney, Central nervous system (CNS), Blood, spleen

Potential Health Effects

Acute Effects

Principle Routes of Exposure
Eyes  
Irritating to eyes.

Skin  
Irritating to skin. Can be absorbed through skin. May be harmful in contact with skin.

Inhalation  
Irritating to respiratory system. May be harmful if inhaled. May cause drowsiness and dizziness.

Ingestion  
Aspiration hazard if swallowed - can enter lungs and cause damage. May be harmful if swallowed. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Chronic Effects  
Component substance is listed on California Proposition 65 as a developmental hazard. Experiments have shown reproductive toxicity effects on laboratory animals. May cause adverse liver effects. May cause adverse kidney effects. Danger of serious damage to health by prolonged exposure.

See Section 11 for additional Toxicological information.

Aggravated Medical Conditions  

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Haz/Non-haz</th>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Toluene</td>
<td>108-88-3</td>
<td>&gt;95</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye Contact  
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact  
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation  
Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion  
Do not induce vomiting. Call a physician or Poison Control Center immediately.

Notes to Physician  
Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash Point  
4°C / 39.2°F

Method  
No information available.

Autoignition Temperature  
535°C / 995°F

Explosion Limits  
Upper 7.1 vol %  
Lower 1.1 vol %

Suitable Extinguishing Media  
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media  
No information available.

Hazardous Combustion Products  
No information available.
Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

<table>
<thead>
<tr>
<th>NFPA</th>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
<th>Physical hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>N/A</td>
</tr>
</tbody>
</table>

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions
Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions
Should not be released into the environment.

Methods for Containment and Clean Up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. HANDLING AND STORAGE

Handling
Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use explosion-proof equipment. Take precautionary measures against static discharges.

Storage
Keep containers tightly closed in a dry, cool and well-ventilated place. Flammables area. Keep away from heat and sources of ignition.
8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Measures
Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Exposure Guidelines

<table>
<thead>
<tr>
<th>Component</th>
<th>ACGIH TLV</th>
<th>OSHA PEL</th>
<th>NIOSH IDLH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>TWA: 20 ppm</td>
<td>(Vacated) TWA: 100 ppm</td>
<td>IDLH: 500 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vacated) TWA: 375 mg/m³</td>
<td>TWA: 100 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ceiling: 300 ppm</td>
<td>TWA: 375 mg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Vacated) STEL: 150 ppm</td>
<td>STEL: 150 ppm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA: 200 ppm</td>
<td>STEL: 560 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Component</th>
<th>Quebec</th>
<th>Mexico OEL (TWA)</th>
<th>Ontario TWA EV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>TWA: 50 ppm</td>
<td>TWA: 50 ppm</td>
<td>TWA: 20 ppm</td>
</tr>
<tr>
<td></td>
<td>TWA: 188 mg/m³</td>
<td>TWA: 188 mg/m³</td>
<td></td>
</tr>
<tr>
<td>Skin</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NIOSH IDLH: Immediately Dangerous to Life or Health

Personal Protective Equipment

Eye/face Protection
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection
Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection
Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>aromatic</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available.</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>29 mbar @ 20 °C</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>3.1 (Air = 1.0)</td>
</tr>
<tr>
<td>Viscosity</td>
<td>0.6 mPa.s @ 20 °C</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>111°C / 231.8°F @ 760 mmHg</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>-95°C / -139°F</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available.</td>
</tr>
<tr>
<td>Flash Point</td>
<td>4°C / 39.2°F</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>2.4 (Butyl acetate = 1.0)</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.866</td>
</tr>
<tr>
<td>Solubility</td>
<td>Insoluble in water</td>
</tr>
<tr>
<td>log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>92.14</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>C7 H8</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability
Stable under normal conditions.

Conditions to Avoid
Incompatible products. Excess heat.

Incompatible Materials
Strong oxidizing agents, Strong acids
Hazardous Decomposition Products: Carbon monoxide (CO), Carbon dioxide (CO₂)
Hazardous Polymerization: Hazardous polymerization does not occur.
Hazardous Reactions: None under normal processing.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

<table>
<thead>
<tr>
<th>Component</th>
<th>LD₅₀ Oral</th>
<th>LD₅₀ Dermal</th>
<th>LC₅₀ Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>636 mg/kg (Rat)</td>
<td>12124 mg/kg (Rat)</td>
<td>26700 ppm (Rat) 1 h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8390 mg/kg (Rabbit)</td>
<td></td>
</tr>
</tbody>
</table>

Irritation: Irritating to eyes, respiratory system and skin

Toxicologically Synergistic Products: No information available.

Chronic Toxicity

Carcinogenicity: There are no known carcinogenic chemicals in this product

Sensitization: No information available.

Mutagenic Effects: Not mutagenic in AMES Test

Reproductive Effects: Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects: Developmental effects have occurred in experimental animals.

Teratogenicity: Possible risk of harm to the unborn child.

Other Adverse Effects: See actual entry in RTECS for complete information.

Endocrine Disruptor Information: No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Do not empty into drains.

<table>
<thead>
<tr>
<th>Component</th>
<th>Freshwater Algae</th>
<th>Freshwater Fish</th>
<th>Microtox</th>
<th>Water Flea</th>
</tr>
</thead>
</table>
| Toluene   | 433 mg/L EC₅₀ > 96 h
           | 12.5 mg/L EC₅₀ = 72 h |
|           | 50-70 mg/L LC₅₀ 96 h
           | 5-7 mg/L LC₅₀ 96 h
           | 15-19 mg/L LC₅₀ 96 h |
|           | 28 mg/L LC₅₀ 96 h |
|           | 12 mg/L LC₅₀ 96 h |
|           | EC₅₀ = 19.7 mg/L 30 min |
|           | 11.5 mg/L EC₅₀ = 48 h |
|           | 5.46 - 9.83 mg/L EC₅₀ 48 h |

Persistence and Degradability: No information available

Bioaccumulation/ Accumulation: No information available

Mobility: .
## 13. DISPOSAL CONSIDERATIONS

### Waste Disposal Methods

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

<table>
<thead>
<tr>
<th>Component</th>
<th>RCRA - U Series Wastes</th>
<th>RCRA - P Series Wastes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene - 108-88-3</td>
<td>U220</td>
<td>-</td>
</tr>
</tbody>
</table>

## 14. TRANSPORT INFORMATION

### DOT

- **UN-No**: UN1294
- **Proper Shipping Name**: TOLUENE
- **Hazard Class**: 3
- **Packing Group**: II

### TDG

- **UN-No**: UN1294
- **Proper Shipping Name**: TOLUENE
- **Hazard Class**: 3
- **Packing Group**: II

### IATA

- **UN-No**: UN1294
- **Proper Shipping Name**: TOLUENE
- **Hazard Class**: 3
- **Packing Group**: II

### IMDG/IMO

- **UN-No**: UN1294
- **Proper Shipping Name**: TOLUENE
- **Hazard Class**: 3
- **Packing Group**: II

## 15. REGULATORY INFORMATION

### International Inventories

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
<th>EINECS</th>
<th>ELINCS</th>
<th>NLP</th>
<th>PICCS</th>
<th>ENCS</th>
<th>AICS</th>
<th>CHINA</th>
<th>KECL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>203-625-9</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Legend:**
- X - Listed
- E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
- F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>&gt;95</td>
<td>1.0</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazardous Categorization

- Acute Health Hazard: Yes
- Chronic Health Hazard: No
- Fire Hazard: Yes
- Sudden Release of Pressure Hazard: No
- Reactive Hazard: No

Clean Water Act

<table>
<thead>
<tr>
<th>Component</th>
<th>CWA - Hazardous Substances</th>
<th>CWA - Reportable Quantities</th>
<th>CWA - Toxic Pollutants</th>
<th>CWA - Priority Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>X</td>
<td>1000 lb</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Clean Air Act

<table>
<thead>
<tr>
<th>Component</th>
<th>HAPS Data</th>
<th>Class 1 Ozone Depleters</th>
<th>Class 2 Ozone Depleters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

OSHA

Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Hazardous Substances RQs</th>
<th>CERCLA EHS RQs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>1000 lb</td>
<td></td>
</tr>
</tbody>
</table>

California Proposition 65

This product contains the following Proposition 65 chemicals:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>California Prop. 65</th>
<th>Prop 65 NSRL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>Developmental</td>
<td>Female Reproductive</td>
</tr>
<tr>
<td>Component</td>
<td>Massachusetts</td>
<td>New Jersey</td>
<td>Pennsylvania</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Toluene</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**U.S. Department of Transportation**
- Reportable Quantity (RQ): Y
- DOT Marine Pollutant: N
- DOT Severe Marine Pollutant: N

**U.S. Department of Homeland Security**
This product does not contain any DHS chemicals.

**Other International Regulations**
- **Mexico - Grade**
  - Serious risk, Grade 3

**Canada**
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

**WHMIS Hazard Class**
- B2 Flammable liquid
- D2A Very toxic materials
- D2B Toxic materials

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**16. OTHER INFORMATION**

**Prepared By**
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

**Creation Date**
11-Jun-2009
Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of MSDS