SAFETY DATA SHEET

1. Identification of the substance/mixture and of the company/undertaking

Identification of the substance/preparation

Product code 15596018
Product name TRIZOL REAGENT

Company/Undertaking Identification

Life Technologies
5791 VAN ALLEN WAY
PO BOX 6482
CARLSBAD, CA 92008
+1 760 603 7200

INVITROGEN CORPORATION
5250 MAINWAY DRIVE
BURLINGTON, ONT
CANADA L7L 6A4
800/263-6236

24 hour Emergency Response (Transport):
866-536-0631
301-431-8585
Outside of the U.S. +1-301-431-8585

For research use only. Not intended for human or animal diagnostic or therapeutic uses.
2. Hazards identification

GHS - Classification

Signal Word
DANGER

Health Hazard

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral toxicity</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute dermal toxicity</td>
<td>Category 3</td>
</tr>
<tr>
<td>Acute Inhalation Toxicity - Dusts and Mists</td>
<td>Category 2</td>
</tr>
<tr>
<td>Skin Corrosion/Irritation</td>
<td>Category 1 B</td>
</tr>
<tr>
<td>Serious Eye Damage/Eye Irritation</td>
<td>Category 1</td>
</tr>
<tr>
<td>Specific target organ systemic toxicity (repeated exposure)</td>
<td>Category 2</td>
</tr>
</tbody>
</table>

Mutagenicity
Mutagenic Category 2

Physical Hazards
not hazardous

Hazard statements
H330 - Fatal if inhaled
H301 - Toxic if swallowed
H311 - Toxic in contact with skin
H314 - Causes severe skin burns and eye damage
H341 - Suspected of causing genetic defects
H373 - May cause damage to organs through prolonged or repeated exposure
H412 - Harmful to aquatic life with long lasting effects
**Precautionary statements**

P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
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
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P309 + P311 - IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P284 - Wear respiratory protection
P271 - Use only outdoors or in a well-ventilated area
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P264 - Wash hands thoroughly after handling
P273 - Avoid release to the environment
EUH032 - Contact with acids liberates very toxic gas

**Principle Routes of Exposure/ Potential Health effects**

**Eyes**
Causes burns. Risk of serious damage to eyes. Corrosive to the eyes and may cause severe damage including blindness.

**Skin**
Toxic in contact with skin. Causes burns. Components of the product may be absorbed into the body through the skin. Irritating to skin and mucous membranes. Possible risks of irreversible effects.

**Inhalation**
Toxic by inhalation. Causes burns.

**Ingestion**
Toxic if swallowed. Ingestion causes burns of the upper digestive and respiratory tracts. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

**Specific effects**

**Carcinogenic effects**
Phenol has been classified by the International Agency for Research on Cancer (IARC) as not classifiable as to carcinogenicity to humans (Group 3).

**Mutagenic effects**
not applicable

**Reproductive toxicity**
not applicable

**Sensitization**
not applicable

**Target Organ Effects**
Skin
Lungs
Liver
spleen
Kidney

**HMIS**

<table>
<thead>
<tr>
<th>Health</th>
<th>3 * Chronic Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>1</td>
</tr>
<tr>
<td>Reactivity</td>
<td>0</td>
</tr>
</tbody>
</table>

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Revision Date 30-Aug-2011
Product code 15596018

Product name TRIZOL REAGENT

www.lifetechnologies.com
3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>EINECS-No</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>108-95-2</td>
<td>203-632-7</td>
<td>30-60</td>
</tr>
<tr>
<td>Guanidine isothiocyanate</td>
<td>593-84-0</td>
<td>209-812-1</td>
<td>15-40</td>
</tr>
<tr>
<td>Ammonium thiocyanate</td>
<td>1762-95-4</td>
<td>217-175-6</td>
<td>7-13</td>
</tr>
</tbody>
</table>

Contact with acids or bleach liberates toxic gases. DO NOT ADD acids or bleach to any liquid wastes containing this product. We recommend handling all chemicals with caution.

4. First aid measures

Skin contact
Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Call a physician immediately.

Eye contact
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Ingestion
Call a physician or Poison Control Centre immediately. Rinse mouth. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

Inhalation
Toxic by inhalation. Move to fresh air. Call a physician or Poison Control Centre immediately.

Notes to physician
Treat symptomatically.

5. Fire-fighting measures

Suitable extinguishing media
Dry chemical. Carbon dioxide (CO2). Water spray. Foam.

Special protective equipment for firefighters
Wear self-contained breathing apparatus and protective suit.

Australia HazChem Code
2X

6. Accidental release measures

Personal precautions
ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Use personal protective equipment. Avoid contact with skin, eyes and clothing. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Methods for cleaning up
Prevent product from entering drains. Soak up with inert absorbent material. Neutralise with slaked lime, sodium bicarbonate or crushed limestone. Pick up and transfer to properly labelled containers.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not allow material to contaminate ground water system.

See Section 12 for additional information.

7. Handling and storage

Handling
Always wear recommended Personal Protective Equipment. Prevent contact with skin, eyes and clothing. Remove all sources of ignition.
Storage
Keep containers tightly closed in a cool, well-ventilated place. Keep away from open flames, hot surfaces and sources of ignition. Protect from light.

8. Exposure controls/personal protection

Exposure limits

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>OSHA PEL</th>
<th>OSHA PEL (Ceiling)</th>
<th>ACGIH OEL (TWA)</th>
<th>ACGIH OEL (STEL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>19 mg/m³</td>
<td>-</td>
<td>5 ppm</td>
<td>-</td>
</tr>
</tbody>
</table>

Engineering measures
Use in a chemical fume hood.

Personal protective equipment

Respiratory protection
In case of insufficient ventilation wear suitable respiratory equipment.

Respirator

<table>
<thead>
<tr>
<th>Recommendations, National Institute of Occupational Safety and Health, U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(APF = 10) Any air-purifying half-mask respirator with organic vapor cartridge(s) in combination with an N95, R95, or P95 filter. The following filters may also be used: N99, R99, P99, N100, R100, P100.</td>
</tr>
<tr>
<td>(APF = 10) Any supplied-air respirator</td>
</tr>
<tr>
<td>Up to 125 ppm:</td>
</tr>
<tr>
<td>(APF = 25) Any supplied-air respirator operated in a continuous-flow mode</td>
</tr>
<tr>
<td>Up to 250 ppm:</td>
</tr>
<tr>
<td>(APF = 50) Any air-purifying full-facepiece respirator equipped with organic vapor cartridge(s) in combination with an N100, R100, or P100 filter.</td>
</tr>
<tr>
<td>(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter.</td>
</tr>
<tr>
<td>(APF = 50) Any powered, air-purifying respirator with a tight-fitting facepiece and organic vapor cartridge(s) in combination with a high-efficiency particulate filter</td>
</tr>
<tr>
<td>(APF = 50) Any self-contained breathing apparatus with a full facepiece</td>
</tr>
<tr>
<td>(APF = 50) Any supplied-air respirator with a full facepiece</td>
</tr>
<tr>
<td>Emergency or planned entry into unknown concentrations or IDLH conditions:</td>
</tr>
<tr>
<td>(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode</td>
</tr>
<tr>
<td>(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus</td>
</tr>
<tr>
<td>Escape:</td>
</tr>
<tr>
<td>(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having an N100, R100, or P100 filter. /Any appropriate escape-type, self-contained breathing apparatus</td>
</tr>
</tbody>
</table>

Hand protection
Impervious gloves. S24 - Avoid contact with skin. S36 - Wear suitable protective clothing.

Eye protection
Tightly fitting safety goggles.

Skin and body protection
Impervious clothing.

Hygiene measures
Contaminated work clothing should not be allowed out of the workplace. Avoid contact with skin, eyes and clothing. Handle in accordance with good industrial hygiene and safety practice.
9. Physical and chemical properties

General Information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Red, Maroon</td>
</tr>
<tr>
<td>Odor</td>
<td>Medicinal, sweet, Tar like</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>°C no data available</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>°C no data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>°C no data available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>°C no data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No information available.</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Soluble</td>
</tr>
</tbody>
</table>

10. Stability and reactivity

Stability
- Stable under normal conditions.

Materials to avoid
- Strong oxidizing agents
- Strong acids
- Isocyanates
- Heat Nitriles, Nitrides
- Alkaline earth metals
- Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.

Hazardous decomposition products
- Toxic gases
- Sulphur oxides
- Hydrogen cyanide (hydrocyanic acid)
- Carbon oxides
- Nitrogen Oxides

Hazardous polymerisation
- Does not occur.

11. Toxicological information

Acute toxicity

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>LD50 (oral, rat/mouse)</th>
<th>LD50 (dermal, rat/rabbit)</th>
<th>LC50 (inhalation, rat/mouse)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>317 mg/kg (Rat)</td>
<td>no data available</td>
<td>316 mg/m³ (Rat)</td>
</tr>
<tr>
<td>Guanidine isothiocyanate</td>
<td>571 mg/kg</td>
<td>2000 mg/kg</td>
<td>5.319 mg/L (4H)</td>
</tr>
<tr>
<td>Ammonium thiocyanate</td>
<td>500 mg/kg (Rat)</td>
<td>no data available</td>
<td>no data available</td>
</tr>
</tbody>
</table>

Principle Routes of Exposure/
Potential Health effects

Eyes
- Causes burns
- Risk of serious damage to eyes
- Corrosive to the eyes and may cause severe damage including blindness.

Skin
- Toxic in contact with skin
- Causes burns
- Components of the product may be absorbed into the body through the skin
- Irritating to skin and mucous membranes
- Possible risks of irreversible effects.

Inhalation
- Toxic by inhalation
- Causes burns.

Ingestion
- Toxic if swallowed
- Ingestion causes burns of the upper digestive and respiratory tracts
- Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Carcinogenic effects
- Phenol has been classified by the International Agency for Research on Cancer (IARC) as not classifiable as to carcinogenicity to humans (Group 3).

Mutagenic effects
- No information available.

Reproductive toxicity
- No information available.
Sensitization
No information available.

Target Organ Effects
Skin Lungs Liver spleen Kidney

12. Ecological information

Ecotoxicity effects
Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Mobility
see log Pow

Biodegradation
Inherently biodegradable

Bioaccumulation
No information available.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Freshwater Algae Data</th>
<th>Water Flea Data</th>
<th>Freshwater Fish Species Data</th>
<th>Microtox Data</th>
<th>log Pow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol 108-95-2</td>
<td>Pseudokirchneriella subcapitata EC50=46.42 mg/L (96 h) Pseudokirchneriella subcapitata EC500.0188 - 0.1044 mg/L (96 h) Desmodesmus subspicatus EC50187 - 279 mg/L (72 h)</td>
<td>Daphnia magna EC504.24 - 10.7 mg/L (48 h) Daphnia magna EC5010.2 - 15.5 mg/L (48 h)</td>
<td></td>
<td></td>
<td>logPow1.47</td>
</tr>
</tbody>
</table>

13. Disposal considerations

Dispose of in accordance with local regulations
S29 - Do not empty into drains
S57 - Use appropriate container to avoid environmental contamination

14. Transport information

IATA
Proper shipping name Corrosive liquid, n.o.s. (guanidine thiocyanate-phenol solution)

Hazard class 8

Subsidiary Class none

Packing group II

UN-No UN1760

ERG Code 153
15. Regulatory information

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>Listed</td>
</tr>
<tr>
<td>108-95-2 (30-60)</td>
<td></td>
</tr>
<tr>
<td>Guanidine isothiocyanate</td>
<td>Listed</td>
</tr>
<tr>
<td>593-84-0 (15-40)</td>
<td></td>
</tr>
<tr>
<td>Ammonium thiocyanate</td>
<td>Listed</td>
</tr>
<tr>
<td>1762-95-4 (7-13)</td>
<td></td>
</tr>
</tbody>
</table>

**U.S. Federal Regulations**

**SARA 313**
This product contains the following toxic chemical(s) subject to the notification requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986. This law requires certain manufacturers to report on annual emissions of specified chemicals and chemical categories. Please note that if you repackage, or otherwise redistribute, this product to industrial customers, a notice similar to this one should be sent to those customers:

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>SARA 313 - Threshold Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>108-95-2</td>
<td>30-60</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)**
This product contains the following HAPs:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No</th>
<th>Weight %</th>
<th>HAPS data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>108-95-2</td>
<td>30-60</td>
<td>Present</td>
</tr>
</tbody>
</table>

**U.S. State Regulations**

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Massachusetts - RTK</th>
<th>New Jersey - RTK</th>
<th>Pennsylvania - RTK</th>
<th>Illinois - RTK</th>
<th>Rhode Island - RTK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenol</td>
<td>Listed</td>
<td>Listed</td>
<td>Listed</td>
<td>Listed</td>
<td>Listed</td>
</tr>
<tr>
<td>Ammonium thiocyanate</td>
<td>Listed</td>
<td>-</td>
<td>Listed</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**California Proposition 65**
This product does not contain chemicals listed under Proposition 65

**WHMIS hazard class:**
- D1A Very toxic materials
- E Corrosive material

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR

16. Other information

**Reason for Revision**
not applicable. (M)SDS sections updated.

For research use only.
The above information was acquired by diligent search and/or investigation and the recommendations are based on prudent application of professional judgment. The information shall not be taken as being all inclusive and is to be used only as a guide. All materials and mixtures may present unknown hazards and should be used with caution. Since the Company cannot control the actual methods, volumes, or conditions of use, the Company shall not be held liable for any damages or losses resulting from the handling or from contact with the product as described herein.

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End of Safety Data Sheet