1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Life Technologies, Inc.
7335 Executive Way
Frederick, Maryland 21704
U.S.A. 1-(800) 828-6686

For Emergencies Concerning
Human Health or the Environment:
U.S.A. 1-(301) 431-8585

Product Name: TRIzol Reagent
MSDS Number: 15596
Catalog Number(s): 15596 10551

Tradename(s): TRIzol Reagent TRIzol (R) is a registered trademark of Molecular Research Center, Inc.

Synonyms: Phenol solution

Chemical Formula:

A formulation.

Molecular Weight:

A formulation.

2. COMPOSITION, INFORMATION ON INGREDIENTS

Component	CAS No.	Percent
+NON HAZARDOUS INGREDIENTS	NA 0004	20.00%
+PHENOL	108-95-2	50.00%
+THIOCYANATE COMPOUNDS	NA 0022	30.00%

Component	AIHA ERPG:	OSHA IDLH:
+NON HAZARDOUS INGREDIENTS	not applic.	not applic.
+PHENOL	not estab.	not estab.
+THIOCYANATE COMPOUNDS	not estab.	not estab.

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********
Is a serious health hazard.
Overexposure may be fatal.
May cause blindness.
Acute skin contact danger.
Skin contact a principal route of entry.
Corrosive to tissue.
May cause localized loss of feeling (anesthesia) such that contact may not be sensed.
May be rapidly absorbed through the skin in toxic quantities.
Acute inhalation danger.
May cause substantial respiratory tract injury.
May cause respiratory arrest.
Acute ingestion danger.
Do not induce vomiting.
May cause systemic poisoning.
May cause convulsions/seizures.
May cause death.
Overexposure can be dangerous. Get EMERGENCY medical attention.
****

Principal Routes of Entry
Route of Entry Inhalation: Yes.
Route of Entry Skin: Yes.
Route of Entry Ingestion: Yes.

Effects of Overexposure
Acute Effects:

From Eye Exposure:
May cause lacrimation, or tearing of the eye. May cause conjunctival swelling. May cause loss of sensation in the eye. May cause opacification or clouding of the cornea. May cause corneal ulceration. May cause blindness.

From Skin Overexposure:
Overexposure may be fatal. Contact may irritate/inflame the skin. Contact may cause a temporary burning sensation in the skin. May cause localized loss of feeling (anesthesia) such that contact may not be sensed. May cause whitening of the skin (blanching) due to reduction in blood flow. May be rapidly absorbed through the skin in toxic quantities.

From Inhalation:
May cause respiratory tract irritation. May cause substantial respiratory tract injury. May cause respiratory arrest.

From Ingestion:
May cause severe burns to the mouth. May cause severe burns to the throat. May cause abdominal burning sensation.

3. HAZARDS IDENTIFICATION (Cont.)

Other / Systemic Effects
May cause systemic poisoning. May cause nausea and/or vomiting. May cause diarrhea. May cause weakness. May cause tinnitus. May cause cyanosis. May cause a loss of the power of muscle coordination (ataxia, dyssynergia). May cause convulsions/seizures.
May cause respiratory arrest. May cause unconsciousness/collapse. May cause death.

Summary of Medical Conditions Aggravated by Exposure:
Renal insufficiency. Hepatic insufficiency. Chronic respiratory pathologies.

4. FIRST AID MEASURES

First Aid For Eyes:
Flush with water in an eyewash for at least 15 minutes, holding eyelids open.

First Aid For Skin:
Use a deluge safety shower for at least 15 minutes. Remove contaminated clothes, wash before re-use.

First Aid For Inhalation:
Remove person to fresh air. Monitor continuously for respiratory distress.

First Aid For Ingestion:
If vomiting occurs naturally, wash mouth out. Monitor continuously.

Note To Attending Physician:
No known specific antidote. Areas of skin contact smaller than that given below may cause a minor health hazard although individual sensitivity may vary. 100cm2. Systemic doses smaller than that given below may cause a minor health hazard although individual sensitivity may vary. 1gm.
For ingestion exposures: Give castor oil or another vegetable oil. Give charcoal slurry, if conscious. Treat symptomatically. Observe for 24 hours. Be prepared for emergency cardiovascular intervention. May cause changes in the results of common clinical urine tests.
Maintain ion balanced hydration. Monitor urine for signal Biological Exposure Index (BEI) to gauge exposure severity. Observe for 24 hours. Hypotension may occur. Tachycardia may occur. Be prepared for emergency cardiovascular intervention. May cause changes in the results of common clinical urine tests.

5. FIRE FIGHTING MEASURES

Combustible: Yes.

Flashpoint: (F) (C) 167 74.99

Method Used: Closed Cup

LEL: >2.1% phenol

UEL: <11% phenol

Autoignition Temp.: *
No specific information found.

Extinguishing Agents:
Class B extinguishers (oils, hydrocarbon liquids). Alcohol foam. Carbon dioxide. Dry chemical. Water spray.

Personal Protective Equipment for Fire Conditions:
Standard turnout gear slicker suit ("bunker gear"). Positive-pressure self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

(Note that accidental releases may be subject to special reporting requirements and other regulatory mandates. Check and comply with applicable laws and regulations.)

Personal Protective Equipment for Spill Conditions:
Gloves should be used as minimum hand protection. Use a face shield with chemical goggles, if the potential for splashing exists. The following clothing and/or equipment material(s) should generally be protective: Nitrile rubber. Natural rubber. Viton rubber. No respiratory protection will be needed for most operations. A half-face air-purifying respirator should be effective if needed for low- to-moderate exposure.

(See section 8 for recommendations on protective materials of construction.)

Spill Cleanup:
Remove or shut off ignition sources. Absorb spill. Common absorbent materials effective. Shovel or scoop up. Deposit in appropriate containers for removal and disposal.

Special Instructions:

7. HANDLING AND STORAGE

(Storage of some materials is regulated; it is the purchaser's responsibility to ensure that storage complies with all applicable laws and regulations.)

Storage Temperature: Refrigerated (4-10 C).

Storage Pressure: Atmospheric.

Storage and Handling Procedures:
Store in an area appropriate for flammables. Store in a well-ventilated area. Keep away from heat. Store out of direct sunlight. Keep away from ignition sources. Keep container tightly sealed. Store away from oxidizing agents. Store away from strong acids.

Special Storage Considerations:

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

General Protection and Precautions

Protective Measures:
Do not touch to unprotected skin. Do not wear contact lenses while handling this product. DO NOT pipette by mouth. Area ventilation is generally adequate.

Air Purifying Respirator Canisters/Cartridges:
Stacked cartridge of organic vapor (black ANSI color code, NIOSH approved): plus dust, mist (red ANSI color code, NIOSH approved).

Glove and Protective Clothing:
Any rubber material. Neoprene rubber.

Eye Protection:
Safety glasses should be the minimum eye protection. Chemical goggles should be used to reduce contact where the potential for airborne aerosols or mists exists.

Hygiene Practices:
Hand washing is recommended after working with this product. Clothing should be laundered before re-use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Solution. Slightly red to red.

Odor: Sweet, tarry, pungent.

Boiling Point (F) (C): *
Not determined.

Melting Point (F) (C): *
Not applicable.

pH:
Not determined.

Evaporation Rate:
Not determined.

Vapor Density (Air = 1):
Not determined.

Solubility in water (g/100g):
A solution.

Partition Coefficient (Kow): <1

Vapor Pressure (mm Hg): >0.35mmHg @25C

Volatiles (lbs/gallon):
Not determined.

Viscosity (Cp):
Not determined.

Heating Coefficient (cal/g):
Not determined.

Conductivity (mhos/cm^3):
Not determined.

Specific Gravity:
Not determined.

10. STABILITY AND REACTIVITY

Stability:
Stable under ordinary conditions of use and storage.

10. STABILITY AND REACTIVITY (Cont.)

Conditions To Avoid:
High temperatures, flames or light.

Materials To Avoid:
Strong acids. Many oxidizing agents. Aluminum chloride together with nitrobenzene. Hypochlorites. Formaldehyde. Butadiene. Product is corrosive to common metals when heated.

Hazardous Products Of Spontaneous Decomposition:
Not expected to occur.

Hazardous Products Of Thermal Decomposition:
Toxic vapors. Caustic vapors. Carbon/nitrogen/sulfur oxides. Hydrogen cyanide.
Ammonia. Pyrolyzes to flammable or explosive vapors.

Hazardous Polymerization:
Will not occur.

11. TOXICOLOGICAL INFORMATION

Consensus Exposure Guidelines:
ACGIH:
Component
+NON HAZARDOUS INGREDIENTS
+PHENOL
+THIOCYANATE COMPOUNDS

TLV-TWA:	TLV-STEL:	TLV-Ceiling:	Skin:	BEI:
not applic	not applic	not applic.	no	not applic.
5ppm	not estab.	not estab.	Yes	250 mg/g creatinine
not estab.	not estab.	not estab.	not estab.	not estab.

Regulatory Exposure Guidelines:
OSHA
Component
+NON HAZARDOUS INGREDIENTS
+PHENOL
+THIOCYANATE COMPOUNDS

PEL:	OSHA STEL:	Excursion:	Skin Warning?:
not applic	not applic	not applic.	no
5ppm	none	none	Yes
not estab.	not estab.	not estab.	no

Acute Exposures

11. TOXICOLOGICAL INFORMATION (Cont.)

Eyes:
No information found.

Dermal:
Considerable relevant human effects data available.

Inhalation:
Considerable relevant human effects data available.

Oral:
Considerable relevant human effects data available.

Sensitization:
No specific information found.

Chronic Effects

Systemic effects:
Considerable relevant human effects data available.

Target Organs:
Skin. Central Nervous System. Liver and urinary system.

Mutagenicity:
Not expected to occur.

Reproductive Hazards:
Causes birth defects (teratogenic) in some laboratory animals.

Carcinogenicity Status

Carcinogenicity:
May cause cancer (carcinogenic) in some laboratory animals.

NTP:

IARC:

OSHA:

Toxicological Investigations

Mice:
LD50 oral mouse: 270 mg/kg; Details of toxic effects not reported; phenol

11. TOXICOLOGICAL INFORMATION (Cont.)

Rats:
LD50 oral rat: 317 mg/kg; behavioral-convulsions or effect on seizure threshold; phenol

Human:
LDLo 10 mg/kg oral human; behavioral-muscle weakness, lungs, thorax, or respiration-cyanosis; phenol

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:
Short-term toxicity may be seen.
Toxic effects expected to be limited to immediate area of environmental release. Any effects expected to be most pronounced in microorganisms.

Environmental Movement and Partitioning:
Ingredient(s) of environmental significance is naturally occurring.
Short-term movement could be rapid due to high water solubility. Movement expected to be limited by relatively rapid environmental detoxification.
Expected to partition strongly into aqueous environmental components.

Environmental Fate (Degradation, Transformation, and Persistence):
Expected to rapidly decompose in the environment.
Groundwater contamination could persist below the vadose zone.

Environmental Investigations:
Anaerobic Biodegradation Index (BOD20/Th OD): 93% (2.22/2.38 p/p); phenol
Aerobic Biodegradation Index (BOD20/Th OD): >40%;phenol

12. ECOLOGICAL INFORMATION (Cont.)

13. DISPOSAL CONSIDERATIONS

EPA Waste Number (RCRA Hazard Class): U188

Other Waste Classifications:

Treatment and Disposal:
Handle as hazardous waste for disposal. Keep in sealed container between use and final disposal. This product is not recyclable or reusable. Hazardous characteristics may be destroyed by usual incineration methods.
May be incinerated in a hazardous waste incinerator. Product should be removed to a hazardous waste landfill only if no other disposal method is available.

(Note that treatment and disposal activities may be subject to laws and regulations that may include before-the-fact permitting as well as reporting requirements. It is the purchaser’s responsibility to comply.)

14. TRANSPORT INFORMATION

North American Emergency Response Guidebook #: 153

Transportation Agency:
ICAO/IATA.

Shipping Designation:
Solutions. Toxic.
(Phenol)

Hazard Class: 6.1

UN #: UN2821

Packing Group: II

Required Label Description:
Toxic.

15. REGULATORY INFORMATION

OSHA: Conforms to definition as a "hazardous chemical" under US OSHA HazCom regulation (29 CFR Part 1910.1200 (c) and Appendix B).

TSCA: Some constituents of this product: Included in the US EPA Toxic Substances Control Act (TSCA; 40 CFR Part 710) inventory as a natural product.
Some constituents of this product: Included on the US EPA Toxic Substances Control Act (TSCA; 40 CFR Part 710) inventory.

SARA: Classified as an "Extremely Hazardous Substance" under SARA Title 3 Section 302.

CERCLA Reportable Quantity: 1000 lbs
RQ

Section 302: 1000 lbs (454 kg) reportable quantity, phenol

Section 304: 1000 lbs RQ

Section 313: 1% DeMinimis

US California Proposition 65:

Canadian Regulations:
WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (CPR SECTION (33)) This product has been classified according to the hazard criteria of the Controlled Products Regulations, and the MSDS. This document contains all required information.

European Union:

MAC (Germany): 5ppm phenol in air, 19mg/M3 phenol with a skin warning

EINICS #: 2036327

Risk Phrase: Warning!; R24/25: Toxic in contact with skin and if swallowed. R34: Causes burns.

Safety Phrase: S28: After contact with skin, wash immediately with plenty of detergent and water. S45: In case of accident, or if you feel unwell, seek medical advice (show label where possible).

Safety Symbol: Toxic

16. OTHER INFORMATION

NFPA 704M Rating

Fire: 1 Health: 3 Reactive: 0 Special: none

Additional NFPA information:
Not listed.
Ratings not reviewed by NFPA.

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 mistures may present unknown hazards and should be used with caution. Since Life Technologies 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. THE INFORMATION IN THIS MSDS DOES NOT CONSTITUTE A WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.